HEALTHCARE COST AND UTILIZATION PROJECT — HCUP
A FEDERAL-STATE-INDUSTRY PARTNERSHIP IN HEALTH DATA
Sponsored by the Agency for Healthcare Research and Quality

INTRODUCTION TO

THE HCUP NATIONWIDE AMBULATORY SURGERY SAMPLE (NASS) 2019

These pages provide only an introduction to the 2019 NASS.
For full documentation and notification of changes,
visit the HCUP User Support (HCUP-US) website at
www.hcup-us.ahrq.gov.

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Agency for Healthcare Research and Quality
Healthcare Cost and Utilization Project (HCUP)
5600 Fishers Lane
Mail Stop 7W25B
Rockville, MD 20857

NASS Data and Documentation Distributed through the
HCUP Central Distributor
Website: www.hcup-us.ahrq.gov
Phone: (866) 290-4287 (toll free)
Fax: (805) 979-3787
E-mail: HCUP@AHRQ.gov

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SUMMARY OF DATA USE RESTRICTIONS

******* REMINDER *******

All users of the NASS must take the online HCUP Data Use Agreement (DUA) training course, and read and sign a Data Use Agreement. Details and links may be found on the following page.

Authorized users of HCUP data agree to the following restrictions:[a]

- Will not use the data for any purpose other than research, analysis, and aggregate statistical reporting.
- Will not re-release any data to unauthorized users.
- Will not redistribute HCUP data by posting on any website or publishing in any other publicly accessible online repository. Will cite restrictions on data sharing in the Data Use Agreement and direct them to AHRQ HCUP (www.hcup-us.ahrq.gov) for more information on accessing HCUP data if a journal or publication requests access to data or analytic files.
- Will not identify or attempt to identify any individual, including by the use of vulnerability analysis or penetration testing. Methods that could be used to identify individuals directly or indirectly shall not be disclosed or published.
- Will not report any statistics where the number of observations (i.e., individual discharge records) in any given cell of tabulated data is less than or equal to 10 (≤10).
- Will not publish information that could identify individual establishments (e.g., hospitals) and will not contact establishments.
- Will not use the data concerning individual establishments for commercial or competitive purposes affecting establishments, or to determine rights, benefits, or privileges of establishments.
- Will not use the data for criminal and civil litigation, including expert witness testimony or for law enforcement activities.
- Will not use data elements from the proprietary severity adjustment software packages (e.g., 3M™ APR-DRGs) for any commercial purpose or to disassemble, decompile, or otherwise reverse engineer the proprietary software.
- Will acknowledge in reports that data from the "Healthcare Cost and Utilization Project (HCUP)" were used, including names of the specific databases used for analysis.[b]

Any violation of the limitations in the Data Use Agreement is punishable under Federal law by a fine, up to five years in prison, or both. Violations may also be subject to penalties under State statutes.

[a] This is a summary of key terms of the Data Use Agreement for Nationwide Databases; please refer to the DUA for full terms and conditions.
[b] Suggested citations for the HCUP databases are provided in the Requirements for Publishing with HCUP Data available at www.hcup-us.ahrq.gov/db/publishing.jsp.

HCUP DATA USE AGREEMENT REQUIREMENTS

All Healthcare Cost and Utilization Project (HCUP) data users, including data purchasers and collaborators, must complete the online HCUP Data Use Agreement (DUA) Training Course and read and sign the HCUP DUA. Proof of training completion and signed DUAs must be submitted to the HCUP Central Distributor.

Data purchasers will be required to provide their DUA training completion code and will execute their DUAs electronically as a part of the online ordering process. The DUAs and training certificates for collaborators and others with access to HCUP data should be submitted directly to the HCUP Central Distributor using the contact information below.

The online DUA Training Course is available at www.hcup-us.ahrq.gov/tech_assist/dua.jsp.

The HCUP Nationwide DUA is available on the HCUP User Support (HCUP-US) website at www.hcup-us.ahrq.gov.

HCUP CONTACT INFORMATION

HCUP Central Distributor and HCUP User Support

Information about the content of the HCUP databases is available on the HCUP User Support (HCUP-US) website (www.hcup-us.ahrq.gov).

If you have questions, please review the HCUP Frequently Asked Questions located at www.hcup-us.ahrq.gov/tech_assist/faq.jsp.

If you need further technical assistance, please contact the HCUP Central Distributor and User Support team at:

Phone: (866) 290-HCUP (4287) (toll free in the United States)

Email: hcup@ahrq.gov

Fax: (805) 792-5313 (toll free in the United States)

Mailing address:
HCUP Central Distributor
IBM Watson Health
5425 Hollister Avenue, Suite 140
Santa Barbara, CA 93111

WHAT'S NEW IN THE 2019 NATIONWIDE AMBULATORY SURGERY SAMPLE (NASS)?

- Several refinements were made to the NASS sampling design in 2019:
  - The 2019 NASS is based on data selected from both the HCUP State Ambulatory Surgery and Services Databases (SASD) *and* the State Emergency Department Databases (SEDD) in order to capture both planned and emergent major ambulatory surgeries. See Section 1.1 for more information about this change.
  - The hospital-owned facility universe for the 2019 NASS was expanded to include more than general acute care and children's service types of facilities. Consistent with all other HCUP nationwide databases, the 2019 NASS now includes specialty hospitals such as surgical, cancer, heart, and orthopedic facilities owned by community hospitals that performed in-scope major ambulatory surgeries.
  - Consistent with all other HCUP nationwide databases, the hospital-owned facility universe for the 2019 NASS was limited to hospitals included in the American Hospital Association (AHA) Annual Survey of Hospitals that reported performing outpatient surgeries. In prior years, the Centers for Medicare and Medicaid Services (CMS) Provider of Services (POS) data were used to augment the information on hospital-owned facilities.
  - The list of in-scope procedures was expanded to include heart value procedures, destruction of lesion or retina and choroid, excision of skin lesion, suture of skin and subcutaneous tissue, and other operations on ovary. Two in-scope procedures from the 2018 NASS were excluded: varicose vein stripping and other diagnostic procedures of female organs. See Appendix B for the list of all in-scope procedures across data years.
  - These changes will cause some discontinuity in estimates from before and after data year 2019. See Section 4.8 for more information about how this affects trending estimates over time.
- The 2019 NASS includes several new data elements:
  - Patient race and ethnicity
  - Comorbidity measures identified by the AHRQ Elixhauser Comorbidity Software Refined for ICD-10-CM diagnosis codes.
  - Indicators that one or multiple injury-related International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) diagnoses are reported on an encounter record were added to the Encounter File.

WHAT IS THE NATIONWIDE AMBULATORY SURGERY SAMPLE (NASS)?

- The Nationwide Ambulatory Surgery Sample (NASS) is a calendar-year, encounter-level database constructed from the Healthcare Cost and Utilization Project (HCUP) State Ambulatory Surgery and Services Databases (SASD) and State Emergency Department Databases (SEDD).[1]
- The NASS is the largest all-payer ambulatory surgery database that has been constructed in the United States, yielding national estimates of major ambulatory surgery encounters performed in hospital-owned facilities. The NASS contains clinical and resource-use information that is included in a typical hospital-owned facility record, including patient characteristics, clinical diagnostic and surgical procedure codes, disposition of patients, total charges, expected source of payment, and facility characteristics.
- Major ambulatory surgeries are identified through Healthcare Common Procedure Coding System (HCPCS) Level I codes, also known as Current Procedural Terminology (CPT®) codes. In what follows, HCPCS Level I codes will be called *CPT codes* for brevity. These major ambulatory surgeries are selected major therapeutic procedures that require the use of an operating room, penetrate or break the skin, and involve regional anesthesia, general anesthesia, or sedation to control pain. Procedures intended primarily for diagnostic purposes were excluded. In addition, other selection criteria were applied to major ambulatory surgeries included in the NASS and are described below.
- A total of 35 HCUP Partner organizations contributed to the 2019 NASS: Alaska, California, Colorado, Connecticut, District of Columbia, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, and Wisconsin. These States are geographically dispersed and account for 83 percent of the total U.S. resident population, an estimated 68 percent sample of the universe of hospital-owned facilities, and an estimated 76 percent sample of the universe of ambulatory surgery encounters.
- Unweighted, the NASS contains approximately 9.0 million major ambulatory surgery encounters in 2019, corresponding to approximately 11.8 million major ambulatory surgeries (some encounters have more than one major ambulatory surgery). Weighted, it estimates approximately 11.9 million major ambulatory surgery encounters and 15.7 million major ambulatory surgeries in the United States.
- The NASS is a publicly available database that can be purchased through the HCUP Central Distributor. Currently, the NASS is available for data years 2016–2019.
- Users must complete the HCUP Data Use Agreement Training Course before receiving the data.

[1] SEDD encounters are included in the 2019 NASS only. Reference section 1.1 for more information about how this compares to previous data years.

UNDERSTANDING THE NATIONWIDE AMBULATORY SURGERY SAMPLE (NASS)

- This document, *Introduction to the HCUP Nationwide Ambulatory Surgery Sample (NASS) 2019*, summarizes the content of the NASS and describes the development of the NASS sample and weights.
- Important considerations for data analysis are highlighted, and references to further resources are provided.
- In-depth documentation for the NASS is available on the HCUP User Support (HCUP-US) website (www.hcup-us.ahrq.gov). Please refer to detailed documentation before using the data.

HEALTHCARE COST AND UTILIZATION PROJECT—HCUP
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HCUP Nationwide Ambulatory Surgery Sample (NASS)

ABSTRACT

The Nationwide Ambulatory Surgery Sample (NASS) is part of the Healthcare Cost and Utilization Project (HCUP), which is sponsored by the Agency for Healthcare Research and Quality (AHRQ).

The NASS was created to enable analyses of selected ambulatory surgery utilization patterns and to support public health professionals, administrators, policymakers, and clinicians in their decision making regarding this critical source of care. The NASS contains clinical and resource-use information that is included in a typical hospital-owned facility record abstract, including patient characteristics, clinical diagnostic and surgical procedure codes, disposition of patients, total charges, expected source of payment, and facility characteristics. Therefore, it enables government entities, industry professionals, and researchers to develop research concepts with data-driven applications.

The NASS is the largest all-payer ambulatory surgery database that has been constructed in the United States, yielding national estimates of major ambulatory surgery encounters performed in hospital-owned facilities. It contains information from 9.0 million ambulatory surgery encounters at 2,958 hospital-owned facilities that approximate an estimated 68 percent stratified sample of U.S. hospital-owned facilities performing ambulatory surgeries. Weights are provided to calculate national estimates totaling 11.8 million ambulatory surgery encounters in 2019.

The NASS is drawn from statewide data organizations that provide HCUP with data from ambulatory surgery encounters. Thirty-five HCUP Partner organizations participated in the 2019 NASS. See Appendix A, Table A.1 for a list of HCUP Partner organizations that contributed to the 2019 NASS.

By stratifying on important facility characteristics, the NASS is designed to be representative of U.S. hospital-owned facilities that perform ambulatory surgeries. Stratification is based on the following characteristics:

- Geographic region (Northeast, Midwest, South, and West)
- Hospital bed size (small, medium, and large dependent on region, location, and teaching status)
- Urban-rural location of the hospital (metropolitan and nonmetropolitan)
- Hospital teaching status
- Hospital ownership or control (public, for profit, and not for profit)

Access to the NASS is open to users who sign Data Use Agreements. Uses are limited to research and aggregate statistical reporting.

For more information on the NASS, visit the AHRQ-sponsored HCUP User Support (HCUP-US) website at www.hcup-us.ahrq.gov/db/nation/nass/nassdbdocumentation.jsp.

INTRODUCTION TO THE NATIONWIDE AMBULATORY SURGERY SAMPLE (NASS)

1 OVERVIEW OF NASS DATA

The Healthcare Cost and Utilization Project (HCUP) Nationwide Ambulatory Surgery Sample (NASS) was created to enable analysis of selected ambulatory surgery utilization patterns and to support public health professionals, administrators, policymakers, and clinicians in their decision making regarding this critical source of care. The NASS has many research, policy, and other data-driven applications because it contains clinical and nonclinical information about major ambulatory surgeries and diagnoses as well as geographic, facility, and patient characteristics.

1.1 NASS Data Sources, Hospitals, and Encounters

The 2019 NASS is sampled from the HCUP State Ambulatory Surgery and Services Databases (SASD) and State Emergency Departmet Databases (SEDD). The SASD include various types of outpatient services, such as observation stays, lithotripsy, radiation therapy, imaging, chemotherapy, and labor and delivery. The specific types of ambulatory surgeries and outpatient services included in each SASD vary by State and data year. All SASD include data on ambulatory surgery encounters from hospital-owned facilities. Some States include data from nonhospital-owned facilities, although these are not included in the NASS.[2] The SEDD capture emergency encounters at hospital-owned emergency departments that do not result in hospitalization. The SASD and SEDD do *not* include ambulatory surgery encounters that were subsequently admitted to the same hospital for inpatient care. As such, the NASS does not contain any encounters admitted to the inpatient setting from the ambulatory setting. Information on patients admitted to the hospital following ambulatory surgery is included in the HCUP State Inpatient Databases (SID).

Prior to data year 2019, the NASS sample was limited to SASD encounters that involved surgeries defined as “narrow” by the HCUP Surgery Flag Software for Services and Procedures. Subsequent analyses revealed additional encounters involving “narrow” or major surgeries that were started in the emergency department and appeared in the SEDD but not in the SASD. As a result, these surgeries are undercounted in the 2016–2018 NASS. The procedures most impacted by this issue include appendectomy and removal of ectopic pregnancy (each undercounted by more than 50%) and cholecystectomy (undercounted by approximately 10%).

The number of States, hospital-owned facilities, and ambulatory surgery encounters in the NASS varies by year (Table 1).

[2] The following States have at least one freestanding facility in the HCUP SASD: California, Florida, Illinois, Kentucky, Michigan, Missouri, North Carolina, Nevada, New York, Oklahoma, Oregon, Pennsylvania, South Carolina, Utah, and Wisconsin.

Table 1. Number of States, Hospital-Owned Facilities, and Encounters in the NASS by Year

Data Year	States in the NASS	Number of Hospital-Owned Facilities	Number of AS Encounters, Unweighted	Number of AS Encounters, Weighted for National Estimates
2019	AK, CA, CO, CT, DC, FL, GA, HI, IA, IL, IN, KS, KY, MD, ME, MI, MN, MO, NC, ND, NE, NJ, NV, NY, OH, OK, OR, PA, SC, SD, TN, TX, UT, VT, WI	2,958	8,994,101	11,880,487
2018	CA, CO, CT, DC, FL, GA, IA, IL, IN, KS, KY, MD, ME, MI, MN, MO, NC, ND, NE, NJ, NV, NY, OH, OK, OR, PA, SC, SD, TN, TX, VT, WI (HI and UT data were not available)	2,699	7,693,084	10,696,131
2017	CA, CO, CT, DC, FL, GA, IA, IL, IN, KS, KY, MD, ME, MI, MN, MO, NC, ND, NE, NJ, NV, NY, OH, OK, OR, PA, SC, SD, TN, TX, UT, VT, WI (HI data were not available)	2,737	7,647,636	10,570,649
2016	CA, CO, CT, DC, FL, GA, HI, IA, IL, IN, KS, KY, MD, ME, MI, MN, MO, NC, ND, NE, NJ, NV, NY, OH, OK, OR, PA, SC, SD, TN, TX, UT, VT, WI	2,751	7,608,879	10,623,113

Abbreviations: AS, Ambulatory Surgery; NASS, Nationwide Ambulatory Surgery Sample.

The 2019 NASS sample comprises data from 35 HCUP Partner organizations (34 States and the District of Columbia). Appendix A, Figure A.1 represents the geographic distribution of the HCUP Partner organizations that contributed to the 2019 NASS. The HCUP NASS States with the District of Columbia account for 83 percent of the U.S. population in 2019, an estimated 68 percent of hospital-owned facilities performing ambulatory surgeries, and an estimated 76 percent of ambulatory surgery encounters. Details on the percentage of population, encounters, and facilities by region are provided in Appendix A, Table A.4 and Appendix A, Table A.5.

The NASS is limited to encounters with at least one in-scope major ambulatory surgery on the record, performed at hospital-owned facilities. *In-scope major ambulatory surgeries* are defined as selected therapeutic Current Procedural Terminology (CPT)-coded procedures that require the use of an operating room, penetrate or break the skin, and involve regional anesthesia, general anesthesia, or sedation to control pain. These surgeries are flagged as *narrow* in the HCUP Surgery Flag Software.[3] They also belong to a subset of Clinical Classifications

[3] Agency for Healthcare Research and Quality. Surgery Flag Software for Services and Procedures. Healthcare Cost and Utilization Project (HCUP). Last modified May 25, 2021. www.hcup-us.ahrq.gov/toolssoftware/surgeryflags_svcproc/surgeryflagssvc_proc.jsp. Accessed September 16, 2021. The terms *narrow* and *broad* are specific to the Surgery Flag Software. The 2018 and 2019 NASS applied v2019.2, which included narrow surgeries identified in the following ranges of CPT codes: surgical (10004-69990), emerging technology (0100T-0588T), and cardiac-related medical (92920-93986). For more information, reference the Surgery Flag Software for Services and Procedures User Guide, available at: www.hcup-us.ahrq.gov/toolssoftware/surgeryflags_svcproc/surgeryflagssvc_proc.jsp#user.

Software for Services and Procedures (CCS-Services and Procedures)[4] categories with a relatively high major ambulatory surgery volume or aggregate charge total, and evidence of reliable reporting from SASD/SEDD hospitals. Detailed major ambulatory surgery selection criteria are outlined in Section 3.2. A complete list of 2019 in-scope CCS-Services and Procedure categories is included in Appendix B. The 2019 sample includes 2,958 hospitals, 8,994,101 in-scope major ambulatory surgery encounters (unweighted), and 11,880,487 in-scope major ambulatory surgery encounters (weighted for national estimates).

Although encounters are limited to those with at least one in-scope major ambulatory surgery on the record, the NASS Supplemental File provides information on other surgical and nonsurgical procedures performed during these encounters (see Section 1.3).

1.2 Data Restrictions

Some HCUP Partner organizations that contributed data to the NASS imposed restrictions on the release of certain data elements. In addition, because of confidentiality laws, some data sources were prohibited from providing HCUP with encounter records that indicated specific medical conditions, such as HIV/AIDS or behavioral health conditions. Detailed information on these restrictions is available in Appendix C.

1.3 File Structure of the NASS

The NASS is delivered as a set of related files. A hospital file lists hospitals in the NASS along with hospital attributes (e.g., teaching status, bed size category) as well as the encounter weight and sample stratum information. An encounter file links to the hospital table and contains information on the major ambulatory surgery encounter (e.g., patient age, expected source of payment, diagnoses), including information about in-scope major ambulatory surgeries. A related supplemental file contains entries for out-of-scope procedures with a key linking to the encounter file. Finally, a diagnosis and procedure group file contains information about diagnosis groupings with a key linking to the encounter file. (Note that this file is not available in the 2016 or 2017 NASS.)

Hospital File: This hospital-level file contains one observation for each hospital included in the NASS, along with encounter weight and stratum data elements. For 2019, the NASS Hospital File has 2,958 hospital-specific records. A list of data elements in the Hospital File is provided in Appendix D, Table D.1.

Encounter File: This encounter-level file contains 100 percent of ambulatory surgery encounters containing a major ambulatory surgery from hospital-owned facilities in participating States and the District of Columbia that meet facility inclusion criteria. For 2019, the NASS Encounter File has about 9.0 million ambulatory surgery encounter records (unweighted). Refer to Appendix D, Table D.2 for a list of data elements in the NASS Encounter File.

Supplemental File: This encounter-level file contains information on procedures that were performed during encounters recorded in the Encounter File but not considered to be in-scope major ambulatory surgeries in the NASS. The Supplemental File contains about 6.4 million

[4] The Clinical Classifications Software for Services and Procedures (CCS-Services and Procedures) is HCUP software that provides a method for classifying CPT codes and Healthcare Common Procedure Coding System (HCPCS) codes into clinically meaningful procedure categories. More than 9,000 CPT/HCPCS codes and 6,000 HCPCS codes are collapsed into 244 clinically meaningful categories that may be more useful for presenting descriptive statistics than are individual CPT or HCPCS codes. For more information, visit www.hcup-us.ahrq.gov/toolssoftware/ccs_svcsproc/ccssvcproc.jsp.

records for 2019. Procedures included on the Supplemental File are limited to Healthcare Common Procedure Coding System (HCPCS) Level I (CPT) procedure codes. HCPCS Level II codes were excluded from the Supplemental File. Refer to Appendix D, Table D.3 for a list of data elements in the NASS Supplemental File.

Diagnosis and Procedure Groups File: Available beginning with the 2019 NASS, this encounter-level file contains information about International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) diagnosis groups and comorbidity indicators for all diagnoses associated with encounters recorded in the Encounter File, derived from the Clinical Classifications Software Refined (CCSR) for ICD-10-CM Tool[5] and Elixhauser Comorbidity Software Refined for ICD-10-CM.[6] Refer to Appendix D, Table D.4 for a list of data elements in the NASS Diagnosis and Procedure Groups File.

1.4 NASS Data Elements

The coding of data elements in the NASS is consistent with the coding in other HCUP databases. The following three objectives guided the definition of data elements in all HCUP databases:

- Ensure usability without extensive editing by analysts
- Retain the largest amount of information available from the original sources, while still maintaining consistency among sources
- Structure the information for efficient storage, manipulation, and analysis

More information on the coding of HCUP data elements is available on the HCUP User Support (HCUP-US) website (www.hcup-us.ahrq.gov/db/coding.jsp).

After analyzing the availability of information from the HCUP Partner organizations, a set of common fields to be available in the NASS was created. The NASS contains more than 100 clinical and nonclinical variables, such as the following:

- Patient demographics (e.g., sex, age, race and ethnicity, urban-rural designation of residence, national quartile of the median household annual income for the patient's ZIP Code)
- HCPCS Level I, also known as CPT procedure codes
- ICD-10-CM diagnosis codes
- Total charges and expected payment source (e.g., Medicare, Medicaid, private insurance, self-pay)
- Hospital characteristics (e.g., ownership, teaching status, region of the United States)

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[5] Agency for Healthcare Research and Quality. Elixhauser Comorbidity Software Refined for ICD-10-CM. Last modified October 23, 2020. www.hcup-us.ahrq.gov/toolssoftware/comorbidityicd10/comorbidity_icd10.jsp. Accessed September 10, 2021.
[6] Agency for Healthcare Research and Quality. Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses. Last modified October 15, 2020. https://www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp. Accessed October 19, 2020.

For comprehensive information about the NASS data elements, please refer to the NASS documentation on the HCUP-US website (www.hcup-us.ahrq.gov/db/nation/nass/nassdbdocumentation.jsp).

2 GETTING STARTED

The HCUP NASS is distributed as comma-separated value (CSV) files delivered via secure digital download from the Online HCUP Central Distributor. The files are compressed and encrypted with SecureZIP® from PKWARE®.

The NASS product is downloaded in a single zipped file, which contains several data-related files and accompanying documentation. The three data-related files include the following compressed files:

1) Hospital File (NASS_2019_Hospital.zip)
2) Encounter File (NASS_2019_Encounter.zip)
3) Supplemental File (NASS_2019_Supplemental.zip)
4) Diagnosis and Procedure Groups File (NASS_2019_DX_PR_GRPS.zip)

To load and analyze the NASS data on a computer, users will need the following:

- The password provided by the HCUP Central Distributor
- A hard drive with 50 to 100 gigabytes (GB) of space available
- A third-party zip utility such as ZIP Reader, SecureZIP®, WinZip®, or Stuffit Expander®
- SAS®, SPSS®, Stata®, or similar analysis software

The total size of the CSV version of the NASS is 14.2 GB. The NASS files loaded into SAS are about 6.3 GB. Most SAS data steps will require twice the storage space of the file so that the input and output files can coexist.

With a file of this size, space easily could become a problem in a multistep program. It is not unusual to have several versions of a file marking different steps while preparing it for analysis, and there may be more versions for the actual analyses. Therefore, users should plan carefully because the amount of space required could escalate rapidly.

2.1 Decompressing the NASS Files

To extract the data files from the compressed download file, follow these steps:

1) Create a directory for the NASS on your hard drive.
2) Unzip the compressed NASS product file into the new directory using a third-party zip utility. This will place three compressed, encrypted data-related files in the new directory. You will be prompted to enter the encryption password (sent separately by email) to decrypt the file.

   Please note that attempts to unzip encrypted files using the built-in zip utility in Windows® (Windows Explorer) or Macintosh® (Archive Utility) will produce an error message warning of an incorrect password and/or file or folder errors. The solution is to use a third-party zip utility.

   Third-party zip utilities are available from the following reputable vendors on their official websites.

- ZIP Reader (Windows) (free download offered by the PKWARE corporation)
- SecureZIP for Mac or Windows (free evaluation and licensed/fee software offered by the PKWARE corporation)
- WinZip (Windows) (evaluation and fee versions offered by the WinZip corporation)
- Stuffit Expander (Mac) (free evaluation and licensed/fee software offered by Smith Micro corporation)

3) Unzip each of the compressed, encrypted data-related files using the same password and third-party zip utility method. This will place the data-related CSV files in the same directory by default.

2.2 Downloading and Running the Load Programs

Programs to load the data into SAS, SPSS, or Stata are available on the HCUP-US website. To download and run the load programs, follow these steps:

1) Go to the NASS Database Documentation page on HCUP-US at www.hcup-us.ahrq.gov/db/nation/nass/nassdbdocumentation.jsp.
2) Go to the "File Specifications and Load Programs" section on this page.
3) Click on "Nationwide SAS Load Programs," "Nationwide SPSS Load Programs," or "Nationwide Stata Load Programs" to go to the corresponding Load Programs page.
4) Select the data year and the database ("NASS") from the drop-down lists on this page.
5) Select and save the load programs you need. **The load programs are specific to the data year and data-related file**. Save the load programs into the same directory as the NASS CSV files on your computer.
6) Edit and run the load programs as appropriate for your computing environment to create the analysis files. For example, modify the directory paths to point to the location of your input and output files.

NOTE: The Encounter File and Supplemental File load programs use the same variable names for the array of CPT codes (e.g., CPT1) and their associated CCS-Services and Procedures categories (e.g., CCSCPT1). When merging the Encounter and Supplemental Files, this can result in CPT and CCS-Services and Procedures codes being overwritten unintentionally in one file or the other. To avoid this problem, edit the Supplemental File load program to change the names of the CPT and CCS variable names (e.g., change CPT1 to SUPPCPT1 and CCSCPT1 to SUPCCSCPT1).

2.3 NASS Documentation

Comprehensive documentation for the NASS files is available on the HCUP-US website (www.hcup-us.ahrq.gov/db/nation/nass/nassdbdocumentation.jsp). Users of the NASS can access complete file documentation, including variable notes, file layouts, summary statistics, and related technical reports. Similarly, data users can download SAS, SPSS, and Stata load programs. These important resources help the user understand the structure and content of the NASS and aid in using the database. Appendix A, Table A.2 details the comprehensive NASS documentation available on HCUP-US.

2.4 HCUP Online Tutorials

For additional assistance, the Agency for Healthcare Research and Quality (AHRQ) has created the HCUP Online Tutorial Series, a series of free, interactive courses that provide information on using HCUP data and tools and training on technical methods for conducting research with HCUP data. Topics include an HCUP Overview Course and these tutorials:

- The Load and Check HCUP Data tutorial provides instructions on how to unzip (decompress) HCUP data, save it on your computer, and load the data into a standard statistical software package. This tutorial also describes how to verify that the data have loaded correctly.
- The HCUP Sample Design tutorial is designed to help users learn how to account for sample design in their work with the HCUP nationwide databases. The tutorial will be updated in the future to directly address the NASS sampling design.
- The Producing National HCUP Estimates tutorial is designed to help users understand how three of the nationwide databases—the National (Nationwide) (NIS), the Nationwide Emergency Department Sample (NEDS), and the Kids' Inpatient Database (KID)—can be used to produce national and regional estimates. A tutorial specific to the NASS database will be added in the future.
- The Calculating Standard Errors tutorial shows how to accurately determine the precision of the estimates produced from the HCUP nationwide databases. Users will learn two methods for calculating standard errors for estimates produced from the HCUP nationwide databases.
- The HCUP Software Tools Tutorial introduces users to the HCUP software tools, which can be applied to HCUP and other administrative databases to create new data elements from existing data, thereby enhancing a researcher's ability to conduct analyses. There are four modules within this course grouping the HCUP tools by the following coding systems: ICD-10-CM diagnoses, ICD-10-PCS procedures, CPT and HCPCS Level II codes, and ICD-9-CM diagnoses and procedures. Users will learn about the purpose of each tool and receive technical guidance for applying the tools to their data.

Other tutorials about the design or use of the HCUP databases are also available, and new tutorials are added periodically. The Online Tutorial Series is located on the HCUP-US website at www.hcup-us.ahrq.gov/tech_assist/tutorials.jsp.

3 METHODS

3.1 Creation of the NASS

Creation of the NASS requires the following steps:

- *Identify in-scope major ambulatory surgeries.* The HCUP Surgery Flag Software (see Section 3.2) is used to identify **major ambulatory surgeries** as those with a taxonomy category of *narrow*. These are major therapeutic procedures that require the use of an operating room, penetrate or break the skin, and involve regional anesthesia, general anesthesia, or sedation to control pain. Empirical selection criteria then are used to

define qualifying CCS-Services and Procedures[7] categories or **in-scope major ambulatory surgeries**. Selection criteria for a given CCS-Services and Procedures category include meeting volume or charge thresholds (i.e., the surgery accounts for at least .05% of total major ambulatory surgery volume in the SASD/SEDD ***or*** at least .05% of total charges associated with major ambulatory surgery encounters in the SASD/SEDD) and evidence that SASD/SEDD hospitals are reliably reporting major ambulatory surgeries in the CCS-Services and Procedures category.

- *Build the NASS hospital sampling frame.* The NASS sampling frame is limited to facilities owned by community hospitals (excluding rehabilitaiton and long-term acute care hospitals) in the SASD and SEDD[8] that perform in-scope major ambulatory surgeries. Additional restrictions imposed for the NASS sampling frame were that the hospital have no gross irregularities in quarterly reporting volume, submit data to the SASD/SEDD in all four quarters of 2019, and not have an unusually low volume of encounters containing an in-scope major ambulatory surgery.
- *Build encounter predictive models.* NASS sampling frame hospitals are used to create models for volumes of encounters containing in-scope major ambulatory surgeries. The predictive model can be applied to hospitals outside the NASS sampling frame.
- *Construct the universe of hospitals and ambulatory surgery encounters.* A national list of all hospitals performing ambulatory surgeries is created using SASD/SEDD and the American Hospital Association (AHA), consistent with the approach used for other HCUP nationwide databases. (Prior to data year 2019, the Centers for Medicare & Medicaid Services (CMS) Provider of Services (POS) file was also used.) The encounter predictive model is applied to hospitals outside the NASS sampling frame and then combined with observed data from sampling frame hospitals to create national encounter volume estimates.
- *Develop NASS sample strata.* Strata are created using hospital characteristics. When needed, strata are collapsed to achieve reasonable hospital sample/universe ratios.
- *Compute sample weights.* Hospitals are sampled from the NASS sampling frame. For 2019, 100 percent of hospitals were sampled from the frame. On the basis of the set of NASS sample hospitals and universe totals, sample weights are computed that project the NASS encounters and major ambulatory surgeries to the universe.
- *Create the NASS database.* All of the previous steps culminate in a NASS database, which is a set of four related files: Hospital, Encounter, Supplemental, and Diagnosis and Procedure Groups.

The relationship between the NASS universe, the SASD/SEDD sample, and the NASS sampling frame is portrayed in Figure 1. The predictive model for hospital major ambulatory surgery encounter volume is developed using the NASS sampling frame hospitals and then is applied to all other hospitals not in the sampling frame to generate the encounter universe. In 2019, the NASS sample and sampling frame were identical because 100 percent of hospitals were sampled.

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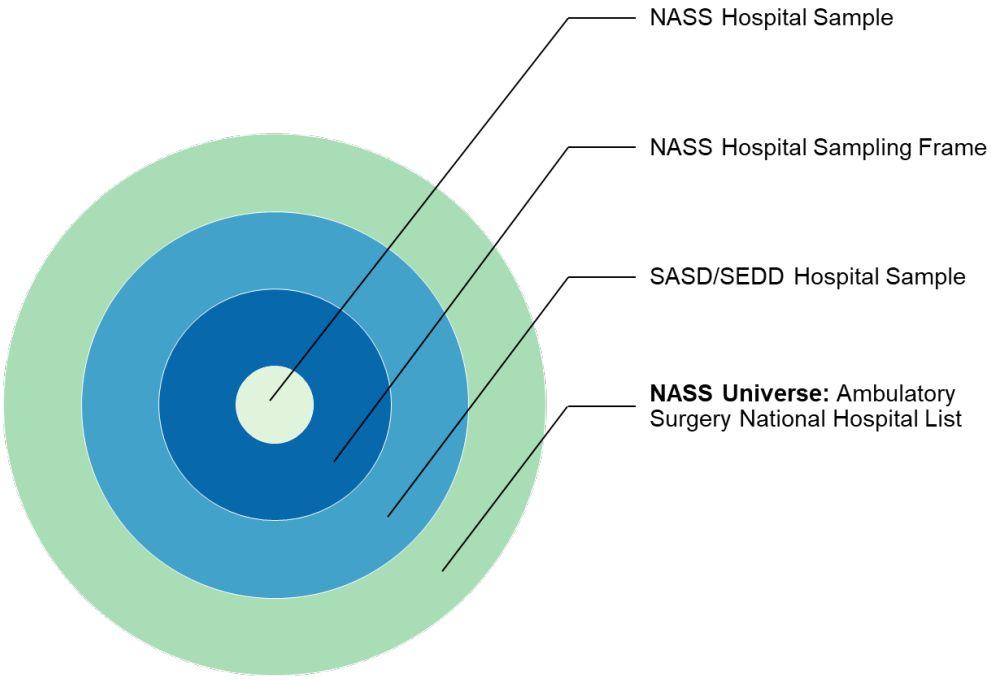
[7] Agency for Healthcare Research and Quality. Clinical Classifications Software (CCS) for Services and Procedures. Healthcare Cost and Utilization Project (HCUP). Last modified April 26, 2021. www.hcup-us.ahrq.gov/toolssoftware/ccs_svcsproc/ccssvcproc.jsp. Accessed September 16, 2021.

[8] The SEDD were sampled for data year 2019 only.

Figure 1. NASS Hospital Universe, SASD/SEDD Sample, and NASS Sampling Frame



Abbreviations: NASS, Nationwide Ambulatory Surgery Sample; SASD, State Ambulatory Surgery and Services Databases; SEDD, State Emergency Department Databases

The following sections describe several of the NASS development steps in greater detail.

3.2 Selection of Major Ambulatory Surgeries

3.2.1 Definition of Major Ambulatory Surgery

HCUP Surgery Flag Software[9] was used to identify surgical procedures of interest for the NASS. The Surgery Flag Software processes CPT procedure codes and classifies them as *narrow*, *broad,* or *neither*. The NASS will focus on surgeries in the narrow class, or **major ambulatory surgeries**. The narrowly defined flag (narrow flag) is the most targeted and restrictive surgical identifier, consisting of major therapeutic procedures. A narrow procedure (1) requires the use of an operating room, (2) penetrates or breaks the skin, and (3) involves regional anesthesia, general anesthesia, or sedation to control pain. Some common narrow procedures are cataract surgery and cholecystectomy. Other examples include appendectomy, gastric bypass, hysterectomy, hernia repair, and spinal fusion. The following three procedures, which are primarily performed for a diagnostic purpose, are assigned a narrow surgery flag

[9] Agency for Healthcare Research and Quality. Surgery Flag Software for Services and Procedures. Healthcare Cost and Utilization Project (HCUP). Last modified May 25, 2021. www.hcup-us.ahrq.gov/toolssoftware/surgeryflags_svcproc/surgeryflagssvc_proc.jsp. Accessed September 16,, 2021. The terms *narrow* and *broad* are specific to the Surgery Flag Software. The 2018 and 2019 NASS applied v2019.2, which included narrow surgeries identified in the following ranges of CPT codes: surgical (10004-69990), emerging technology (0100T-0588T), and cardiac-related medical (92920-93986).

based on the degree of their invasiveness: biopsies if the procedure is within an internal organ (e.g., brain, deep cervical node, stomach), thoracotomy with or without biopsy, and exploratory laparotomy with or without biopsy.

3.2.2 Selection of In-Scope Major Ambulatory Surgeries

Several selection criteria were used to define **in-scope major ambulatory surgeries** for the NASS. Prior to application of selection criteria, all major ambulatory surgeries identified by HCUP Surgery Flag Software were grouped in categories defined by CCS-Services and Procedures. [10]

Beginning with data year 2019, the following criteria were applied at the CCS-Services and Procedures category level:

1. *Volume and charges*. The ambulatory surgery accounts for at least .05% of total major ambulatory surgery volume in the SASD/SEDD ***or*** at least .05% of total charges associated with major ambulatory surgery encounters in the SASD/SEDD.
2. *Reporting quality*. Hospitals are reliably submitting major ambulatory surgery data. Four CCS-Services and Procedures categories are excluded because SASD/SEDD hospital data showed evidence of unreliable reporting or underreporting of dental services, skin grafts, wound debridement, and percutaneous transluminal coronary angioplasty (PTCA).[11]

The final set of included, or *in-scope*, CCS-Services and Procedures categories for the 2019 NASS is provided in Appendix B. Appendix B also includes a running list of changes to the in-scope procedure groups over time.

Prior to data year 2019, the following criteria were applied at the CCS-Services and Procedures category level:

1. *Hospital share*. A substantial share of major ambulatory surgeries occurs in hospital-owned facilities (at least 25 percent of major ambulatory surgeries for the CCS-Services and Procedures category)
2. *Volume*. A relatively high major ambulatory surgery volume is observed in the SASD (4,000 surgeries annually).
3. *Reporting quality*. Hospitals are reliably submitting major ambulatory surgery data.

Figure 2 illustrates the relationship between ambulatory surgeries, major ambulatory surgeries, and in-scope major ambulatory surgeries.

Note that although encounters are limited to those with at least one in-scope major ambulatory surgery on the record, the NASS Supplemental File provides information on other (or *out-of-scope*) procedures performed during these encounters.

In the remainder of this document, we use the term *major ambulatory surgery* as synonymous with *in-scope major ambulatory surgery* for brevity.

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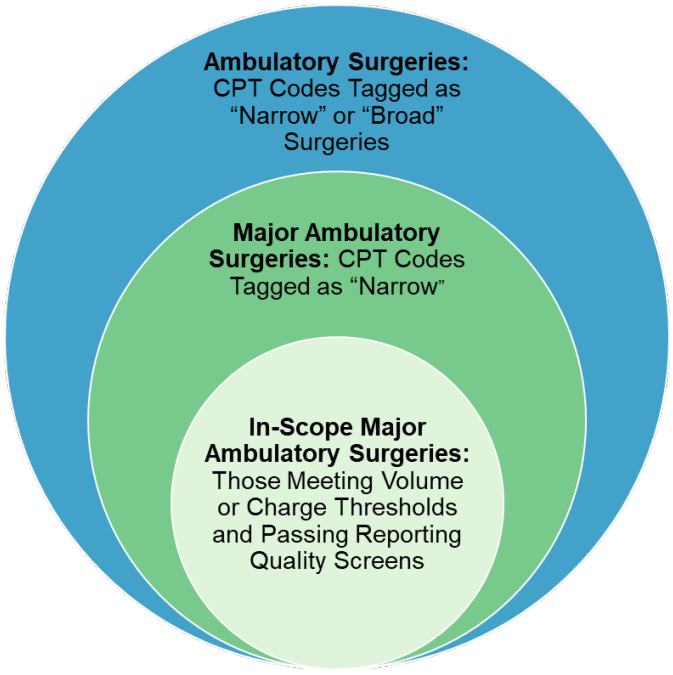
[10] Agency for Healthcare Research and Quality. Clinical Classifications Software (CCS) for Services and Procedures. Healthcare Cost and Utilization Project (HCUP). Last modified April 26, 2021. www.hcup-us.ahrq.gov/toolssoftware/ccs_svcsproc/ccssvcproc.jsp. Accessed September 16, 2021.

[11] Percutaneous transluminal coronary angioplasty (PTCA) was included in earlier years of the NASS (2016 and 2017).

Figure 2. Ambulatory Surgeries, Major Ambulatory Surgeries, and In-Scope Major Ambulatory Surgeries



Abbreviation: CPT, Current Procedural Terminology.

3.3 Sampling Design of the NASS

The NASS is a stratified cluster sample of major ambulatory surgery encounters (see Section 3.2) occurring in hospital-owned facilities. The main objective of a stratified sample is to ensure that it is representative of the target universe with respect to factors in the stratification scheme. In this section, we summarize the NASS setting and universe definition, the process for constructing the sampling frame, the sample strata, the sampling plan, and the calculation of sample weights.

3.3.1 Ambulatory Surgery Setting and Universe Definition

Ambulatory surgeries are performed in hospital-owned facilities, nonhospital-owned ambulatory surgery centers (ASCs), or office settings. In this context, *office* means a place of service that is neither a hospital-owned facility nor an ASC. The office setting may include professional facilities with procedure rooms or surgical suites.

HCUP Partners provide information on ambulatory surgeries in hospital-owned facilities. About half of the Partners also provide ambulatory surgery data from facilities that are not hospital owned. 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. The designation as *hospital owned* means that HCUP can verify that the hospital is billing for this service.

The NASS is restricted to major ambulatory surgeries performed in the hospital-owned facilities, either in the hospital itself or in physically separate hospital-owned facilities. There are two reasons for this restriction. First, the SASD have more than twice as many hospital-owned

facilities as facilities that are not hospital owned. Second, although the HCUP hospital sampling frame is well understood, much less is known about the HCUP sample of surgery facilities that are not hospital owned compared with all freestanding ASCs.

In addition to restricting attention to the hospital-owned facilities, facilities are limited to U.S. community hospitals, defined as "all non-Federal, short-term, general, and other specialty hospitals, excluding hospital units of institutions."[12] Noncommunity hospitals are excluded because of inconsistent capture of data across HCUP States. Additionally, community hospitals that are either rehabilitation or long-term acute care (LTAC) facilities are excluded because these hospitals treat a unique patient population that has longer stays and higher costs.

A key challenge for the NASS design is the creation of national major ambulatory surgery encounter volume estimates (*encounter universe*), tabulated in strata used in the sampling design. National estimates do not exist for several reasons, but the most important is the definition of *ambulatory surgery* itself. Organizations collecting survey information from hospitals, such as the AHA, rely on verbal descriptions of ambulatory surgery.[13] These descriptions leave room for interpretation and result in significant variation in which encounters hospitals report as ambulatory surgeries. In contrast, hospitals generally report total inpatient admissions, births, and emergency department visits with reasonable accuracy.

The NASS uses a CPT code- and data-based definition of **major ambulatory surgeries** (see Section 3.2). Self-reported hospital ambulatory surgery volumes from the AHA may or may not be consistent with the HCUP definition of *major ambulatory surgeries*, and it is challenging to ascertain that consistency. Consequently, rather than using an external reference source for major ambulatory surgery volumes, the NASS universe of major ambulatory surgery encounters was constructed by combining observed encounter volumes for hospitals in the NASS sampling frame and estimated encounter volumes for all other hospitals performing major ambulatory surgeries. Estimated encounter volumes were generated using a predictive model, described in Section 3.4.1.

3.3.2 Generating the Ambulatory Surgery National Hospital List

A crucial step in developing the NASS was generating a list of hospitals performing major ambulatory surgery outside the NASS sampling frame and hospital-specific predictor variables to compute estimated encounters using a predictive model (see Section 3.4.1).

Hospitals were included in the national list if they were a community hospital. Rehabilitation and LTAC hospitals were excluded. Hospitals reporting no outpatient surgeries in the AHA Annual Survey were then excluded from the national list.

Model predictor variables were obtained from the AHA Annual Survey (for HCUP SASD/SEDD hospitals and hospitals reporting outpatient surgeries in the AHA Annual Survey). See Table 2 for a description of the predictor variables obtained from AHA.

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[12] See the AHA "community hospital designation" at www.ahadataviewer.com/glossary.

[13] The AHA Annual Survey definition for *outpatient surgery* is as follows: Scheduled surgical services provided to patients who do not remain in the hospital overnight. The surgery may be performed in operating suites also used for inpatient surgery, specially designated surgical suites for outpatient surgery, or procedure rooms within an outpatient care facility. (American Hospital Association. TrendWatch Chartbook 2019 – Glossary. www.aha.org/system/files/media/file/2019/10/AHA-TrendWatch-Chartbook-Glossary.pdf. Accessed September 16, 2021.)

3.4 NASS Sampling Frame

Selection of SASD/SEDD hospitals for the NASS sampling frame was limited to facilities owned by community hospitals, excluding rehabilitation and LTAC hospitals.[14]

Additional restrictions imposed for the NASS sampling frame were that the hospital (1) have no gross irregularities in quarterly reporting volume, (2) submit data to the SASD/SEDD in all four quarters of 2019, and (3) not have an unusually low volume of encounters containing an in-scope major ambulatory surgery.

A comparison between the NASS hospital universe and the final NASS sample is provided in Appendix A, Table A.3.

3.4.1 NASS Encounter Predictive Model

Creation of the major ambulatory surgery encounter universe requires a method for estimating the volume of encounters containing major ambulatory surgeries for hospitals outside the NASS sampling frame. This estimation was accomplished by building a predictive model for encounters using data for the 2,958 hospitals in the NASS sampling frame.

The hospital-specific number of encounters containing at least one in-scope major ambulatory surgery was the outcome variable in the model. A model predicting the number of major ambulatory surgery encounters per hospital was developed using the NASS sampling frame hospitals. Predictor variables used in the model are reported in Table 2.

Table 2. Independent Variables Included in Encounter Predictive Model

Category	Independent Variable
Ownership	Voluntary, not for profit
	Proprietary, for profit
	Local or State government
Location and teaching status	Rural location
	Urban nonteaching
	Urban teaching
Census region	Midwest
	Northeast
	South
	West
Hospital size (number of beds)	001–024
	025–049
	050–099
	100–199
	200–299
	300–399
	400–499

[14] The HCUP SASD contain a number of hospital-owned facilities performing major ambulatory surgeries that are not inpatient hospitals. In the NASS, these facilities are assigned the identifier of the hospital owner. Stratification, sampling, weighting, and reporting are performed using the hospital owner identifier and hospital characteristics.

Category	Independent Variable
	500+
AHA Annual Survey: self-reported outpatient surgery volume	Log scale

Abbreviation: AHA, American Hospital Association.

3.4.2 NASS Sampling Strata

Sampling strata were selected using results from the encounter predictive model (which quantify the importance of stratification factors in encounter volume variation) and a study of the current NIS and NEDS stratification schemes. Table 3 contains values for the NASS stratification variables: census region, bed size category,[15] location and teaching status, and ownership.[16] There are 108 possible strata (i.e., unique combinations of region, bed size, location/teaching status, and ownership categories).

Table 3. NASS Stratification Variables

Stratum	Code	Label
Census region	1	North
	2	Midwest
	3	South
	4	West
Bed size category	1	Small (depends on region, location, and teaching status)
	2	Medium (depends on region, location, and teaching status)
	3	Large (depends on region, location, and teaching status)
Location and teaching status	1	Rural
	2	Urban nonteaching
	3	Urban teaching
Ownership	1	Local and State government
	2	Voluntary, not for profit
	3	Proprietary, for profit

Abbreviation: NASS, Nationwide Ambulatory Surgery Sample.

A goal was established to have at least 10 hospitals assigned to each stratum with as many strata as possible having a sampling fraction greater than .20.[17]

Assignment of hospitals to the initial stratification scheme of 108 levels results in a number of strata with fewer than 10 sampling frame hospitals small sampling fractions. In those cases, ownership category was collapsed, first by combining local and State government with voluntary

[15] Bed size categories were originally established for the development of the Nationwide Inpatient Sample (NIS). Cutoff points were originally chosen so that approximately one-third of the hospitals in each region, location, and teaching status combination would fall within each bed size category (small, medium, or large). For more information, reference the *Introduction to the NIS,* available at www.hcup-us.ahrq.gov/db/nation/nis/nisdbdocumentation.jsp.

[16] Hospital service type was not used as a stratum because of its weaker predictive power in the predictive models and the small number of children's hospitals in the sample.

[17] *The sampling fraction* is defined as (number units in sample)/(number units in universe). The overall sampling fraction for the 2019 universe of hospitals and sampling frame is (2,958/4,362) = 0.68.

hospitals.[18] If the goal still was not achieved, all the ownership types were combined. Other stratum combinations were constructed *manually*, using the following conventions:

- Require that the region dimension persist.
- Examine the strata with deficient ratios or sample sizes. On the basis of the data, elect to collapse the location and teaching or bed size dimensions using the following rules:
    - Collapse location and teaching into two categories (urban and rural nonteaching vs. teaching) or collapse the entire location and teaching dimension if required.
    - Collapse the entire bed size dimension if required.

We used judgment when manually collapsing the strata to ensure that no single stratum had a large percentage of total encounter or hospital volume. This led to relaxing the number of sampling frame hospitals or sampling fraction criteria for some strata. After manual adjustments, the NASS had 62 strata for 2019. In the end, all strata had at least 10 hospitals and sampling fractions greater than .20.

3.5 Sample Weights

To obtain nationwide estimates, encounter weights were developed combining the NASS universe of hospitals and encounters with the NASS sample hospitals and encounters.

Computation of sample weights is straightforward. Given a universe of encounter volumes in stratum *s*, the sample weight is computed as the ratio of NASS universe to sample encounter volumes so that the sample volume is inflated to agree with the universe volume within the stratum.

3.5.1 Frame Sampling Rate

For the 2019 NASS, all hospitals in the sampling frame were selected for inclusion in the NASS, resulting in an approximate 68 percent sample of universe hospitals.

3.5.2 Encounter Weights

Encounter weights were calculated by stratum. Within stratum *s* for hospital *i*, the universe weight for each encounter in the NASS sample was calculated as follows:

$$W_{is}(\text{universe}) = [N_s(\text{universe}) \div N_s(\text{sample})] * (4 \div Q_i),$$

where $W_{is}(universe)$ is the encounter weight, $N_s(universe)$ represents the number of ambulatory surgery encounters in the universe within stratum *s*, $N_s(sample)$ is the number of ambulatory surgery encounters from sample hospitals selected for the NASS, and Q_i represents the number of quarters of ambulatory surgery encounters contributed by hospital *i* to the NASS (for the 2019 NASS, $Q_i = 4$ for all hospitals). Thus, each encounter's weight is equal to the number of universe ambulatory surgery encounters it represents in stratum *s* during that year. W_{is}(universe) is named DISCWT in the NASS encounter table (see Appendix D, Table D.2). The 2019 NASS sampling frame required that all hospitals qualifying for the frame submit data in all four quarters of 2019.

[18] The ownership category was chosen for collapsing because it had lower explanatory power in the predictive models than did bed size or location and teaching status. Census region was considered as an essential stratum to include in the design.

4 HOW TO USE THE NASS FOR DATA ANALYSIS

This section provides a synopsis of special considerations for using the NASS.

4.1 Calculating National Estimates

To produce national estimates, weights MUST be used.

The major ambulatory surgery encounter weight (DISCWT) in the NASS Encounter Table should be used for producing nationwide, encounter-level statistics where the ambulatory surgery encounter is the unit of analysis.

Because the NASS is a stratified cluster sample, proper statistical techniques must be used to calculate standard errors and confidence intervals. For detailed instructions, refer to the HCUP Methods Series report #2003-02, *Calculating Nationwide Inpatient Sample (NIS) Variances for Data Years 2011 and Earlier*, on the HCUP-US website (www.hcup-us.ahrq.gov/). The NASS used a stratified sampling design similar to the HCUP NIS prior to 2012, so techniques appropriate for the NIS prior to 2012 are also appropriate for the NASS.

4.2 Choosing Data Elements for Analysis

For all data elements to be used in the analysis, the analyst first should perform descriptive statistics and examine the range of values, including the number of missing cases. When anomalies (such as large numbers of missing cases) are detected, descriptive statistics can be computed by region for that variable to determine whether there are region-specific differences. Sometimes, computing descriptive statistics by hospital can be helpful in detecting hospital-specific data anomalies.

4.3 ICD-10-CM Diagnosis Codes and CPT Procedure Codes

Each unique analysis should consider limitations related to ICD-10-CM and CPT procedure codes.

- CPT procedure codes, which are copyrighted by the American Medical Association, can change each year in January. It is essential to check all procedure codes used for analysis to ensure that the codes are in effect during the time period(s) studied.
- ICD-10-CM diagnosis codes provide valuable insights into the reasons for hospitalization and what procedures patients receive, but these codes need to be carefully used and interpreted. ICD-10-CM codes change every October as new codes are introduced and some codes are retired. It is critical to check all ICD-10-CM codes used for analysis to ensure that the codes are in effect during the time period studied.
- The NASS contains fields for up to 15 diagnoses, up to 30 in-scope HCPCS Level I or CPT-coded procedures, and up to 30 out-of-scope HCPCS Level I or CPT-coded procedures, although the number of code fields populated varies by State because of reporting differences. Some States provide more than the maximum code fields retained on the NASS. To reduce the file size of the NASS, the number of codes retained was limited. For 2019, approximately 7.5 percent of all ambulatory surgery records report more fields than the maximum allowed on the NASS.

4.4 Missing Values

Missing data values can compromise the quality of estimates. For example, if the outcome for ambulatory surgery encounters with missing values is different from the outcome for ambulatory surgery encounters with valid values, then sample estimates for that outcome will be biased and

inaccurately represent the ambulatory surgery utilization patterns. Several techniques are available to help overcome this bias. One strategy is to use imputation to replace missing values with acceptable values. Another strategy is to use sample weight adjustments to compensate for missing values. Descriptions of such data preparation and adjustment are outside the scope of this report; however, it is recommended that researchers evaluate and adjust for missing data, if necessary.

Alternatively, if the cases with and without missing values are assumed to be similar with respect to their outcomes, no adjustment may be necessary for estimates of means and rates because the nonmissing cases would be representative of the missing cases. However, some adjustment still may be necessary for the estimates of totals. Sums of data elements (such as aggregate ambulatory surgery charges) containing missing values would be incomplete because cases with missing values would be omitted from the calculations. Estimates of the sum of charges should use the product of the number of cases times the average charge to account for records with missing information.

4.5 Variance Calculations

It may be important for researchers to calculate a measure of precision for some estimates based on the NASS sample data. Variance estimates must account for both the sampling design and the form of the statistic. The NASS sampling design consists of a stratified, single-stage cluster sample. A stratified random sample of hospitals (clusters) providing major ambulatory surgeries was drawn, and then all encounters with in-scope major ambulatory surgeries were included from each selected hospital. **To accurately calculate variances from the NASS, appropriate statistical software and techniques must be used.** For detailed instructions, refer to the HCUP Methods Series report #2003-02, *Calculating Nationwide Inpatient Sample (NIS) Variances for Data Years 2011 and Earlier*, on the HCUP-US website (www.hcup-us.ahrq.gov/). The NASS used a stratified sampling design similar to the HCUP NIS prior to 2012, so techniques appropriate for the NIS prior to 2012 are also appropriate for the NASS.

If hospitals inside the sampling frame are like hospitals outside the frame, the sample hospitals can be treated as if they were randomly selected from the entire universe of hospitals within each stratum. Standard formulas for a stratified, single-stage cluster sample without replacement could be used to calculate statistics and their variances in most applications.

A multitude of statistics can be estimated from the NASS data. Several computer programs that calculate statistics and their variances from sample survey data are listed in Section 4.6. Some of these programs use general methods of variance calculations (e.g., the jackknife and balanced half-sample replications) that account for the sampling design. However, it may be desirable to calculate variances using formulas specifically developed for certain statistics.

These variance calculations are based on finite-sample theory, which is an appropriate method for obtaining cross-sectional, nationwide estimates of outcomes. According to finite-sample theory, the intent of the estimation process is to obtain estimates that are precise representations of the nationwide population at a specific point in time. In the context of the NASS, any estimates that attempt to accurately describe characteristics and interrelationships among hospitals and ambulatory surgery encounters during a specific year should be governed by finite-sample theory. Examples include estimates of expenditure and utilization patterns.

Alternatively, in the study of hypothetical population outcomes not limited to a specific point in time, the concept of a *superpopulation* may be useful. Analysts may be less interested in specific characteristics of the finite population (and time period) from which the *sample* was

drawn than they are in hypothetical characteristics of a conceptual superpopulation from which any particular finite *population* in a given year might have been drawn. According to this superpopulation model, the nationwide population in a given year is only a snapshot in time of the possible interrelationships among hospital, market, discharge, encounter, or visit characteristics. In a given year, all possible interactions between such characteristics may not have been observed, but analysts may wish to predict or simulate interrelationships that may occur in the future.

Under the finite-population model, the variances of estimates approach zero as the sampling fraction approaches one. This is the case because the population is defined at that point in time and because the estimate is for a characteristic as it existed when sampled. This is in contrast to the superpopulation model, which adopts a stochastic viewpoint rather than a deterministic viewpoint. That is, the nationwide population in a particular year is viewed as a random sample of some underlying superpopulation over time. Different methods are used for calculating variances under the two sample theories. The choice of an appropriate method for calculating variances for nationwide estimates depends on the type of measure and the intent of the estimation process.

4.6 Computer Software for Weighted and Variance Calculations

Computer programs are readily available to perform weighted variance calculations. Several statistical programming packages allow weighted analyses.[19] For example, nearly all SAS procedures incorporate weights. In addition, several statistical analysis programs have been developed to specifically calculate statistics and their standard errors from survey data. Version 8 or later of SAS contains procedures (PROC SURVEYMEANS and PROC SURVEYREG) for calculating statistics on the basis of specific sampling designs. Stata and SUDAAN® are two other common statistical software packages that perform calculations for numerous statistics arising from the stratified, single-stage cluster sampling design. Examples of the use of SAS, SUDAAN, and Stata to calculate NIS variances are presented in the special report *Calculating Nationwide Inpatient Sample (NIS) Variances for Data Years 2011 and Earlier* on the HCUP-US website (www.hcup-us.ahrq.gov). For a helpful review of programs to calculate statistics from survey data, visit the following website: www.hcp.med.harvard.edu/statistics/survey-soft/.

The NASS includes a Hospital File with variables required by these programs to calculate finite-population statistics. The file includes synthetic hospital identifiers (Primary Sampling Units, or PSUs), stratification variables, and stratum-specific totals for the numbers of ambulatory surgery encounters and hospitals so that finite-population corrections can be applied to variance estimates.

In addition to these subroutines, standard errors can be estimated by validation and cross-validation techniques. Depending on the analysis problem, a large number of observations may be available, and it may be feasible to set aside a part of the data for validation purposes. Standard errors and confidence intervals then can be calculated from the validation data.

If the analytic file is too small to set aside a large validation sample, cross-validation techniques may be used. For example, tenfold cross-validation would split the data into 10 subsets of equal size. The estimation would take place in 10 iterations. In each iteration, the outcome of interest is predicted for one-tenth of the observations by an estimate based on a model that is fit

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[19] Carlson BL, Johnson AE, Cohen SB. An evaluation of the use of personal computers for variance estimation with complex survey data. J Off Statistics. 1993;9(4):795-814.

to the other nine-tenths of the observations. Unbiased estimates of error variance then are obtained by comparing the actual values to the predicted values obtained in this manner.

4.7 Limitations of the NASS

The NASS contains about 9.0 million ambulatory surgery encounter records and many clinical and nonclinical data elements. Many research studies can be conducted with the data, but some limitations should be considered:

The NASS contains *encounter*-level records, not *patient*-level records. This means that individual patients who visit a hospital facility for ambulatory surgery multiple times in 1 year may be present in the NASS multiple times. No uniform patient identifier is available that would allow a patient-level analysis to identify individuals with more than one ambulatory surgery encounter or to track outcomes or additional follow-up care received after an encounter. In contrast, some HCUP State databases may be used for this type of analysis.

The database includes only HCPCS Level I or CPT codes. HCPCS Level II codes are excluded.

4.8 Considerations for Trending Over Time

When conducting longitudinal analyses, users should exercise caution and consider several aspects of the NASS design and changes to the design over time.

- **Procedures considered in scope for the NASS sample can change from year to year (see Appendix B).** These changes may result from an increase or decrease in the volume of procedures performed in the outpatient setting, as this determines whether a CCS-Services and Procedures category meets the threshold for inclusion in the NASS sample. Additionally, the 2018 NASS applied updated versions of the HCUP Surgery Flag Software for Services and Procedures (that expanded the range of possible CPT codes) and the CCS-Services and Procedures Tool. Combined, these updates contributed to changes in the CPT procedures and CCS-Services and Procedures categories defined as in-scope for the NASS sample. The NASS in-scope procedure criteria also changed between data years 2018 and 2019, which resulted in some changes to the CCS-Services and Procedures categories considered in scope for the NASS.

- **Earlier years of the NASS (2016–2018) undercount certain emergent surgeries.** Prior to data year 2019, the NASS sample was limited to SASD encounters that involved surgeries defined as “narrow” by the HCUP Surgery Flag Software for Services and Procedures. Subsequent analyses revealed additional encounters involving “narrow” or major surgeries that were started in the emergency department and appeared in the State Emergency Department Databases (SEDD) but not in the SASD. As a result, these surgeries are undercounted in the 2016–2018 NASS. The procedures most impacted by this issue include appendectomy and removal of ectopic pregnancy (each undercounted by more than 50%) and cholecystectomy (undercounted by approximately 10%). In subsequent data years, these emergent in-scope surgeries are captured in the NASS.

- **The hospital-owned facility universe for the NASS changed between data years 2018 and 2019.** First, the universe was expanded to include specialty hospitals such as surgical, cancer, heart, and orthopedic facilities owned by community hospitals that performed in-scope major ambulatory surgeries. This resulted in volume increases in certain surgeries commonly performed in these types of facilities. Second, the universe was limited to hospitals included in the AHA Annual Survey that reported performing outpatient surgeries. In prior years, the CMS POS data were used to augment the information.

Refer to Appendix E for a summary of CCS-Services and Procedures procedure category totals in the 2016–2019 NASS and contributing reasons for large changes over time. For the subset of CCS categories affected by NASS design changes, trend analyses based on CCS-Services and Procedure category are not recommended.

5 USER FEEDBACK AND QUESTIONS

The NASS is a new HCUP database, with 2016–2019 as the first publicly available data years. To optimize the usefulness of the data and related documentation, HCUP would like to hear from data users regarding any suggestions, comments, or issues. Please contact HCUP User Support at hcup@ahrq.gov or (866) 290-HCUP (4287).

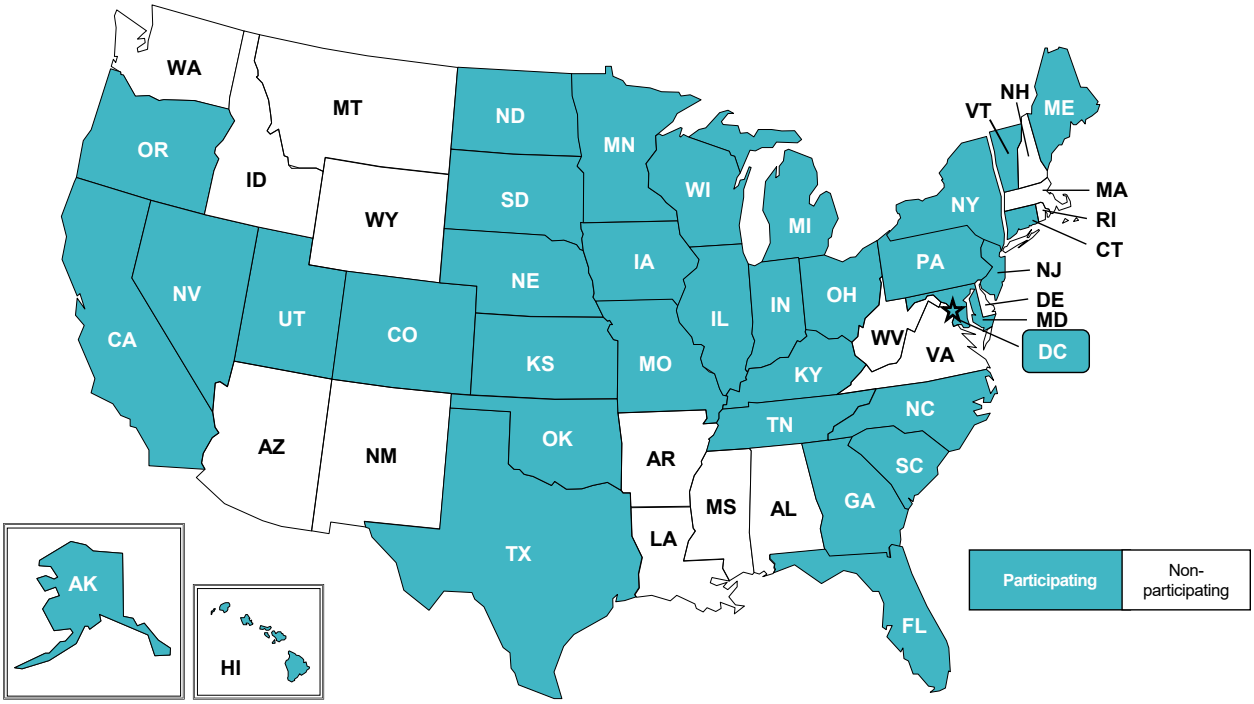
Appendix A:
NASS Introductory Information

Table A.1. HCUP Partner Organizations Participating in the 2019 NASS

State	Data Organization
Alaska	Alaska Department of Health and Social Services Alaska State Hospital and Nursing Home Association
California	California Office of Statewide Health Planning & Development
Colorado	Colorado Hospital Association
Connecticut	Connecticut Hospital Association
District of Columbia	District of Columbia Hospital Association
Florida	Florida Agency for Health Care Administration
Georgia	Georgia Hospital Association
Hawaii	Hawaii Laulima Data Alliance Hawaii University of Hawai'i at Hilo
Iowa	Iowa Hospital Association
Illinois	Illinois Department of Public Health
Indiana	Indiana Hospital Association
Kansas	Kansas Hospital Association
Kentucky	Kentucky Cabinet for Health and Family Services
Maryland	Maryland Health Services Cost Review Commission
Maine	Maine Health Data Organization
Michigan	Michigan Health & Hospital Association
Minnesota	Minnesota Hospital Association
Missouri	Missouri Hospital Industry Data Institute
North Carolina	North Carolina Department of Health and Human Services
North Dakota	North Dakota (data provided by the Minnesota Hospital Association)
Nebraska	Nebraska Hospital Association
New Jersey	New Jersey Department of Health
Nevada	Nevada Department of Health and Human Services
New York	New York State Department of Health
Ohio	Ohio Hospital Association
Oklahoma	Oklahoma State Department of Health
Oregon	Oregon Association of Hospitals and Health Systems Oregon Office of Health Analytics
Pennsylvania	Pennsylvania Health Care Cost Containment Council
South Carolina	South Carolina Revenue and Fiscal Affairs Office
South Dakota	South Dakota Association of Healthcare Organizations
Tennessee	Tennessee Hospital Association
Texas	Texas Department of State Health Services
Utah	Utah Department of Health
Vermont	Vermont Association of Hospitals and Health Systems
Wisconsin	Wisconsin Department of Health Services

Abbreviation: HCUP, Healthcare Cost and Utilization Project; NASS, Nationwide Ambulatory Surgery Sample.

Figure A.1. HCUP States and the District of Columbia Included in the 2019 NASS



Abbreviation: HCUP, Healthcare Cost and Utilization Project; NASS, Nationwide Ambulatory Surgery Sample.

Table A.2. NASS-Related Reports and Database Documentation Available on the HCUP-US Website

Description of NASS Database

- NASS Overview
  - HCUP Partners in the NASS
- Introduction to the NASS, 2019 (*this document*) and prior years
- NASS Related Reports
- Checklist for Working with the NASS

Restrictions on the Use

- HCUP Data Use Agreement Training
- Data Use Agreement for the HCUP Nationwide Databases
- Requirements for Publishing with HCUP data

File Specifications and Load Programs

- NASS File Specifications—details on data file names, number of records, record length, and record layout
- Nationwide SAS Load Programs
- Nationwide SPSS Load Programs
- Nationwide Stata Load Programs

Data Elements

- NASS Description of Data Elements—details uniform coding and State-specific idiosyncrasies
- Summary Statistics—lists means and frequencies on nearly all data elements
- Frequencies by Diagnosis Codes

Additional Resources for NASS Data Elements

- HCUP Quality Control Procedures—describes procedures used to assess data quality
- HCUP Coding Practices—describes how HCUP data elements are coded
- HCUP Hospital Identifiers—explains data elements that characterize individual hospitals

NASS

- 2019 NASS Refinements
- 2018 In-Scope Procedure Change

HCUP Tools: Labels and Formats

- Clinical Classifications Software Refined (CCSR) for ICD-10-CM diagnoses
- Clinical Classifications Software for Services and Procedures
- Format Programs—to create value labels
  - HCUP Formats
  - HCUP Diagnoses and Procedure Groups Formats, including CCSR Categories
  - ICD-10-CM Formats

Obtaining HCUP Data

- Purchase HCUP Data from the HCUP Central Distributor

Abbreviation: CCSR, Clinical Classification Software Refined; HCUP, Healthcare Cost and Utilization Project; ICD-10-CM/PCS, International Classification of Diseases, Tenth Revision, Clinical Modification/Procedure Coding System; NASS, Nationwide Ambulatory Surgery Sample; US, User Support.

Table A.3. NASS Target Universe, Sampling Frame, and Final Sample Characteristics, 2019

Sample	Description	Number of Hospitals Providing Outpatient Surgery	Number of In-Scope Major Ambulatory Surgery Encounters
2019 target universe	Community hospitals (excluding rehabilitation and LTAC)	4,362[a]	11,880,487[b]
2019 NASS	Sample of target universe drawn from the sampling frame	2,958	8,994,101

Abbreviation: LTAC, long-term acute care; NASS, Nationwide Ambulatory Surgery Sample.

[a] Estimated. See section 3.3.2.

[b] Estimated. See section 3.4.1.

Table A.4. Percentage of Population in NASS Sample, by Census Region, 2019

Census Region	2019 Population States in NASS Sampling Frame	2019 Population States Not in NASS Sampling Frame	Total 2019 Population	States in NASS Sampling Frame: Percent of Total Population
Northeast	46,671,228	9,311,575	55,982,803	83.4
Midwest	68,329,004	0	68,329,004	100.0
South	98,733,086	26,847,362	125,580,448	78.6
West	57,922,227	20,425,041	78,347,268	73.9
Total	271,655,545	56,583,978	328,239,523	82.8

Abbreviation: NASS, Nationwide Ambulatory Surgery Sample.

Source: Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2020 (NST-EST2020), Population Division, U.S. Census Bureau, www.census.gov/programs-surveys/popest/technical-documentation/research/evaluation-estimates/2020-evaluation-estimates/2010s-state-total.html. Accessed September 14, 2021.

Table A.5. Percentage of Encounters and Facilities in NASS Sample, by Census Region, 2019

Census Region	Encounters			Facilities		
	No. of Ambulatory Surgery Encounters (Unweighted)	No. of Ambulatory Surgery Encounters (Weighted)[a]	Unweighted Encounters: Weighted Encounters, %	No. of NASS Sample Hospitals	No. of Hospitals Performing Ambulatory Surgery[b]	NASS Sample Hospitals: Hospitals Performing Ambulatory Surgery, %
Northeast	1,624,579	2,051,945	79.2	416	548	75.9
Midwest	2,833,662	3,064,307	92.5	1,095	1,336	82.0
South	2,978,600	4,332,331	68.8	956	1,591	60.1
West	1,557,260	2,431,904	64.0	491	887	55.4
Total	8,994,101	11,880,487	75.7	2,958	4,362	67.8

Abbreviations: NASS, Nationwide Ambulatory Surgery Sample.

[a] Estimated. See section 3.3.2.

[b] Estimated. See section 3.4.1.

Appendix B:
2019 NASS In-Scope Major Ambulatory Surgeries

Table B.1. NASS In-Scope Clinical Classifications Software (CCS) for Services and Procedure Categories

CCS for Services and Procedures Category	Description	Data Years in Scope for the NASS Sample
003	Laminectomy, excision intervertebral disc	2016–2019
006	Decompression peripheral nerve	2016–2019
009	Other OR therapeutic nervous system procedures	2016–2019
010	Thyroidectomy, partial or complete	2016–2019
012	Other therapeutic endocrine procedures	2016–2019
013	Corneal transplant	2016–2019
014	Glaucoma procedures	2018-2019
015	Lens and cataract procedures	2016–2019
016	Repair of retinal tear, detachment	2016–2019
017	Destruction of lesion of retina and choroid	2019
019	Other therapeutic procedures on eyelids, conjunctiva, cornea	2018–2019
020	Other intraocular therapeutic procedures	2018–2019
021	Other extraocular muscle and orbit therapeutic procedures	2016–2019
022	Tympanoplasty	2016–2019
023	Myringotomy	2016–2019
024	Mastoidectomy	2016–2019
026	Other therapeutic ear procedures	2016–2019
028	Plastic procedures on nose	2016–2019
030	Tonsillectomy and/or adenoidectomy	2016–2019
033	Other OR therapeutic procedures on nose, mouth and pharynx	2016–2019
042	Other OR therapeutic procedures on respiratory system	2016–2019
043	Heart valve procedures	2019
045	Percutaneous transluminal coronary angioplasty (PTCA)[a]	2016, 2017
048	Insertion, revision, replacement, removal of cardiac pacemaker or cardioverter/defibrillator	2016–2019
049	Other OR heart procedures	2016–2019
053	Varicose vein stripping, lower limb	2016–2018
057	Creation, revision and removal of arteriovenous fistula or vessel-to-vessel cannula for dialysis	2016–2019
061	Other OR procedures on vessels other than head and neck	2016–2019
063	Other non-OR therapeutic cardiovascular procedures[a]	2016, 2017
067	Other therapeutic procedures, hemic and lymphatic system	2016–2019
078	Colorectal resection	2016–2019
080	Appendectomy	2016–2019
081	Hemorrhoid procedures	2018–2019
084	Cholecystectomy and common duct exploration	2016–2019
085	Inguinal and femoral hernia repair	2016–2019
086	Other hernia repair	2016–2019
087	Laparoscopy	2016–2019
094	Other OR upper GI therapeutic procedures	2016–2019
095	Other non-OR lower GI therapeutic procedures[a]	2016, 2017

CCS for Services and Procedures Category	Description	Data Years in Scope for the NASS Sample
096	Other OR lower GI therapeutic procedures	2016–2019
099	Other OR gastrointestinal therapeutic procedures	2016–2019
100	Endoscopy and endoscopic biopsy of the urinary tract	2016, 2017
101	Transurethral excision, drainage, or removal urinary obstruction	2018–2019
104	Nephrectomy, partial or complete	2018–2019
106	Genitourinary incontinence procedures	2016–2019
109	Procedures on the urethra	2016–2019
112	Other OR therapeutic procedures of urinary tract	2016–2019
113	Transurethral resection of prostate (TURP)	2016–2019
114	Open prostatectomy	2016–2019
117	Other non-OR therapeutic procedures, male genital[a]	2016, 2017
118	Other OR therapeutic procedures, male genital	2016–2019
119	Oophorectomy, unilateral and bilateral	2016–2019
120	Other operations on ovary	2016, 2019
121	Ligation of fallopian tubes	2016–2019
122	Removal of ectopic pregnancy	2016–2019
124	Hysterectomy, abdominal and vaginal	2016–2019
125	Other excision of cervix and uterus	2016–2019
129	Repair of cystocele and rectocele, obliteration of vaginal vault	2016–2019
130	Other diagnostic procedures, female organs	2018
132	Other OR therapeutic procedures, female organs	2016–2019
141	Other therapeutic obstetrical procedures	2016, 2017
142	Partial excision bone	2016–2019
143	Bunionectomy or repair of toe deformities	2016–2019
144	Treatment, facial fracture or dislocation	2016–2019
145	Treatment, fracture or dislocation of radius and ulna	2016–2019
146	Treatment, fracture or dislocation of hip and femur	2017, 2019
147	Treatment, fracture or dislocation of lower extremity (other than hip or femur)	2016–2019
148	Other fracture and dislocation procedure	2016–2019
149	Arthroscopy	2016–2019
150	Division of joint capsule, ligament or cartilage	2016–2019
151	Excision of semilunar cartilage of knee	2016–2019
152	Arthroplasty knee	2016–2019
153	Hip replacement, total and partial	2016–2019
154	Arthroplasty other than hip or knee	2016–2019
157	Amputation of lower extremity	2016–2019
158	Spinal fusion	2016–2019
160	Other therapeutic procedures on muscles and tendons	2016–2019
161	Other OR therapeutic procedures on bone	2016–2019
162	Other OR therapeutic procedures on joints	2016–2019
164	Other OR therapeutic procedures on musculoskeletal system	2016–2019

CCS for Services and Procedures Category	Description	Data Years in Scope for the NASS Sample
166	Lumpectomy, quadrantectomy of breast	2016–2019
167	Mastectomy	2016–2019
170	Excision of skin lesion	2019
171	Suture of skin and subcutaneous tissue	2016–2017, 2019
174	Other non-OR therapeutic procedures on skin and breast[a]	2016, 2017
175	Other OR therapeutic procedures on skin and breast	2016–2019
225	Conversion of cardiac rhythm	2016–2019
244	Gastric bypass and volume reduction	2016–2019

Abbreviations: GI, gastrointestinal; NASS, Nationwide Ambulatory Surgery Sample; OR, operating room.

[a] CCS-Services and Procedures categories 63, 95, 117, and 174 did not meet the criteria for inclusion beginning with the 2018 NASS because all major surgeries were moved from these "non-OR therapeutic procedure" categories in an update to the CCS-Services and Procedures Tool. For example, all major surgeries in CCS 95, *Other non-OR lower GI therapeutic procedures* were reassigned to CCS 96, *Other OR lower GI therapeutic procedures*. Therefore, these major surgeries are still included in the NASS, but with a different CCS-Services and Procedures category assignment than in previous NASS data years. CCS 45, *PTCA*, was removed from the NASS beginning with data year 2018 based on evidence of underreporting by NASS sample hospitals.

Notes: Updates to the HCUP Surgery Flag Software for Services and Procedures changed the designation of several surgeries from major ("narrow") to not major ("broad" or "neither"), and vice versa. This affected the major surgery volume and hospital-owned facility outpatient market share for multiple CCS-Services and Procedures categories, resulting in additions to and deletions from the NASS in-scope CCS-Services and Procedures categories between data year 2017 and 2018. See www.hcup-us.ahrq.gov/toolssoftware/ccs_svcsproc/ccssvcproc.jsp for more information on CCS for Services and Procedures.

Appendix C: Data Restrictions

Table C.1 enumerates the types of restrictions applied to the 2019 Nationwide Ambulatory Surgery Sample. Restrictions include the following types:

- Confidentiality of hospitals
- Confidentiality of records
- Limited reporting of diagnosis codes for medical misadventures and adverse effects
- Missing encounters for specific populations of patients.

Table C.1. Data Restrictions

Confidentiality of Hospitals
Limitations on sampling to ensure hospital confidentiality: • Hospital identifiers are removed from NASS records. • State identifiers are removed from NASS records.
Confidentiality of Records
Limitations on selected data elements to ensure patient confidentiality: • Age (AGE) values greater than 90 are set to 90 for all NASS records. • At least one HCUP Partner required ages in years (AGE) to be set to the midpoints of age ranges. • At least one HCUP Partner requires that admission month (AMONTH) is set to missing on all records.
Limited Reporting of Diagnosis Codes for Medical Misadventures and Adverse Effects
• At least one HCUP Partner removes diagnosis codes for medical misadventures and adverse effects from the data files supplied to HCUP.
Missing Information for Specific Populations of Patients
• Human Immunodeficiency Virus (HIV) • At least one HCUP Partner excludes records for HIV patients from the files provided to HCUP. Therefore, these records are not included in the NASS. • Alternatively, at least one HCUP Partner includes records for HIV patients in the data provided to HCUP but removes the diagnosis codes identifying HIV. • At least one HCUP Partner masks the type of abortion (e.g., spontaneous, legally induced) by setting all abortion-specific diagnosis and procedure codes to "unspecified" abortions.

Abbreviations: HCUP, Healthcare Cost and Utilization Project; NASS, Nationwide Ambulatory Surgery Sample.

Appendix D:
NASS Files and Data Elements

Table D.1. NASS Hospital File Data Elements, 2019

Type of Data Element	HCUP Data Element	Coding Notes
Encounter counts	TOTAL_AS_ENCOUNTERS	SASD/SEDD encounters with at least one narrow surgery for this hospital[a]
	N_DISC_U	Number of ambulatory surgery encounters for all hospitals in the stratum
	S_DISC_U	Number of ambulatory surgery encounters for sampled hospitals in the stratum
Encounter weight	DISCWT	Encounter weight used to calculate national estimates
Encounter year	YEAR	Encounter year
Hospital characteristics	HOSP_BEDSIZE_CAT	Hospital bed size category: (1) 00–99, (2) 100–299, (3) 300+
	HOSP_CONTROL	Control/ownership of hospital: (1) public, (2) voluntary, (3) proprietary
	HOSP_LOCATION	Location of hospital: (0) rural, (1) urban
	HOSP_LOCTEACH	Location/teaching status of hospital: (1) rural, (2) urban nonteaching, (3) urban teaching
	HOSP_REGION	Region of hospital: (1) Northeast, (2) Midwest, (3) South, (4) West
	HOSP_TEACH	Teaching status of hospital: (0) nonteaching, (1) teaching
	NASS_STRATUM	Stratum used to sample hospital-owned facilities, includes geographic region, bed size category, location/teaching status, and control/ownership
Hospital counts	N_HOSP_U	Number of hospitals in the stratum
	S_HOSP_U	Number of sampled hospitals in the stratum
NASS hospital identifier, synthetic	HOSP_NASS	Unique HCUP NASS hospital number, links to other NASS files, but not to other HCUP databases

Abbreviations: HCUP, Healthcare Cost and Utilization Project; NASS, Nationwide Ambulatory Surgery Sample.

[a] Surgeries flagged as "narrow" in the HCUP Surgery Flag Software are defined as invasive therapeutic surgical procedures that typically require the use of an operating room and regional anesthesia, general anesthesia, or sedation.

Table D.2. NASS Encounter File Data Elements, 2019

Type of Data Element	HCUP Data Element	Coding Notes
Admission timing	AMONTH	Admission month coded from (1) January to (12) December
	AWEEKEND	Admission on weekend: (0) admission on Monday–Friday, (1) admission on Saturday–Sunday
Age at admission	AGE	Age in years coded 0–90 years. Any ages greater than 90 years were set to 90.

Type of Data Element	HCUP Data Element	Coding Notes
CPT procedure information	CPT1-CPT30	In-scope CPT procedures on the record (maximum of 30)
	CPTCCS1-CPTCCS30	Clinical Classifications Software (CCS) for Services and Procedures category for in-scope CPT procedures
	NCPT_INSCOPE	Number of in-scope CPT procedures for this encounter
Diagnosis information	I10_DX1-I10DX15	ICD-10-CM diagnoses (maximum of 15)
	I10_NDX	Number of diagnoses for this encounter
	I10_INJURY	Injury ICD-10-CM diagnosis reported on record
	I10_MULTINJURY	Multiple ICD-10-CM injuries reported on record
Disposition of the patient	DISPUNIFORM	Disposition of patient, uniform coding: (1) routine; (2) transfer to short-term hospital; (5) other transfers, including skilled nursing facility, intermediate care, and another type of facility; (6) home healthcare; (7) against medical advice; (20) died in hospital; (99) discharged alive, destination unknown
Encounter timing	DQTR	Encounter quarter
	YEAR	Encounter year
Encounter weight	DISCWT	Encounter weight used to calculate national estimates
Identifiers, synthetic	HOSP_NASS	Unique HCUP NASS hospital number, links to other NASS files but not to other HCUP databases
	KEY_NASS	Unique HCUP NASS record number, links to NASS Supplemental and Diagnosis and Procedure Groups Files, but not to other HCUP databases
National quartile for median household income of patient's ZIP Code	ZIPINC_QRTL	Median household income quartiles for patient's ZIP Code. For 2018, the median income quartiles are defined as (1) $1–$42,999, (2) $43,000–$53,999, (3) $54,000–$70,999, and (4) $71,000 or more.
Payer information	PAY1	Expected primary payer, uniform: (1) Medicare, (2) Medicaid, (3) private including HMO, (4) self-pay, (5) no charge, (6) other
Race and ethnicity of patient	RACE	Race and ethnicity, uniform: (1) White, (2) Black, (3) Hispanic, (4) Asian or Pacific Islander, (5) Native American, (6) other
Sex of patient	FEMALE	Indicator of sex: (0) male, (1) female
Total charges	TOTCHG	Total charges for AS services, edited
Urban-rural location of patient's residence	PL_NCHS	Urban–rural designation for patient's county of residence: (1) large central metropolitan, (2) large fringe metropolitan, (3) medium metropolitan, (4) small metropolitan, (5) micropolitan, (6) not metropolitan or micropolitan

Abbreviations: AS, ambulatory surgery; CPT, Current Procedural Terminology; HCUP, Healthcare Cost and Utilization Project; HMO, health maintenance organization; ICD-10-CM, International Classification of Diseases, Tenth Revision, Clinical Modification; NASS, Nationwide Ambulatory Surgery Sample.

Table D.3. NASS Supplemental File Data Elements, 2019

Type of Data Element	HCUP Data Element	Coding Notes
CPT procedure information[a]	CPT1-CPT30[b]	Out-of-scope CPT procedures on the record (maximum of 30)
	CPTCCS1-CPTCCS30[b]	Clinical Classifications Software (CCS) for Services and Procedures category for out-of-scope CPT procedures
	NCPT_NOTINSCOPE	Number of out-of-scope CPT procedures for this encounter
Encounter year	YEAR	Encounter year
Identifiers, synthetic	HOSP_NASS	Unique HCUP NASS hospital number, links to other NASS files but not to other HCUP databases
	KEY_NASS	Unique HCUP NASS record number, links to NASS Encounter and Diagnosis and Procedure Groups Files but not to other HCUP databases

Abbreviations: CPT, Current Procedural Terminology; HCUP, Healthcare Cost and Utilization Project; NASS, Nationwide Ambulatory Surgery Sample.

[a] Although some encounter records may have included Level II Healthcare Common Procedure Coding System (HCPCS) codes, this procedure information is limited to Level I HCPCS codes (i.e., CPT codes).

[b] Data elements with the same names (representing in-scope, rather than out-of-scope procedures) appear in the Encounter file. Please refer to Section 2.2 of this document for recommendations about how to rename the data elements to avoid issues when merging the Encounter and Supplemental files.

Table D.4. NASS Diagnosis and Procedure Groups File Data Elements, 2019

Type of Data Element	HCUP Data Element	Coding Notes
CCSR for ICD-10-CM diagnoses	DXCCSR_AAAnnn[1]	Indication that at least one ICD-10-CM diagnosis on the record is included in CCSR AAAnnn
	DXCCSR_DEFAULT_DX1	Default CCSR for first-listed ICD-10-CM diagnosis
	DXCCSR_VERSION	Version of CCSR for ICD-10-CM diagnoses
Elixhauser Comorbidity Software Refined for ICD-10-CM	CMR_aaab[2]	Comorbidity measures (aaa) identified by the AHRQ Elixhauser Comorbidity Software Refined for ICD-10-CM diagnosis codes
	CMR_VERSION	Version of the Elixhauser Comorbidity Measure Refined for ICD-10-CM
Identifiers, synthetic	HOSP_NASS	Unique HCUP NASS hospital number, links to other NASS files but not to other HCUP databases
	KEY_NASS	Unique HCUP NASS record number, links to NASS Encounter and Supplemental Files but not to other HCUP databases

Abbreviations: CCSR, Clinical Classifications Software Refined; CPT, Current Procedural Terminology; HCUP, Healthcare Cost and Utilization Project; ICD-10-CM, International Classification of Diseases, Tenth Revision, Clinical Modification; NASS, Nationwide Ambulatory Surgery Sample.

[1] Where aaa denotes the body system and nnn denotes the CCSR number within the body system.

[2] Where aaa denotes the specific comorbidity measure.

Appendix E:
Encounter Totals by In-Scope Clinical Classifications Software (CCS) for Services and Procedure Category, 2016–2019

Table E.1. Encounter Totals by In-Scope Clinical Classifications Software (CCS) for Services and Procedure Category, 2016–2019

CCS Category	Description	Total Encounters, N				Percentage Change, %			Potential Contributing Reasons for Change Over Time
		2016	2017	2018	2019	2016–2017	2017–2018	2018–2019	
003	Laminectomy, excision intervertebral disc	234,832	236,796	235,412	276,727	0.8	-0.6	17.6	
006	Decompression peripheral nerve	357,868	353,638	351,346	387,555	-1.2	-0.6	10.3	
009	Other OR therapeutic nervous system procedures	95,818	102,208	95,330	115,510	6.7	-6.7	21.2	Inclusion of specialty hospitals: increase in 2019 after specialty hospitals were added to the NASS universe
010	Thyroidectomy, partial or complete	108,583	105,810	101,233	104,081	-2.6	-4.3	2.8	
012	Other therapeutic endocrine procedures	51,516	51,495	53,825	59,067	0.0	4.5	9.7	
013	Corneal transplant	19,656	18,961	19,091	20,318	-3.5	0.7	6.4	
014	Glaucoma procedures			51,990	63,511			22.2	Surgery Flag Software update: added as in scope for 2018; satisfied hospital outpatient market share threshold after reclassification of 2 CPT codes Inclusion of specialty hospitals: increase in 2019 after specialty hospitals were added to the NASS universe
015	Lens and cataract procedures	1,284,125	1,239,408	1,149,894	1,172,830	-3.5	-7.2	2.0	
016	Repair of retinal tear, detachment	97,996	96,040	96,345	99,232	-2.0	0.3	3.0	
017	Destruction of lesion of retina and choroid				5,365				Change to in-scope procedure criteria: in scope in 2019 because market share criterion was removed
019	Other therapeutic procedures on eyelids, conjunctiva, cornea			133,758	152,854			14.3	Surgery Flag Software update: added as in scope for 2018; satisfied hospital outpatient market share threshold after reclassification of several CPT codes

CCS Category	Description	Total Encounters, N				Percentage Change, %			Potential Contributing Reasons for Change Over Time
		2016	2017	2018	2019	2016–2017	2017–2018	2018–2019	
020	Other intraocular therapeutic procedures			85,208	88,491			3.9	Surgery Flag Software update: added as in scope for 2018; satisfied hospital outpatient market share threshold after reclassification of 3 CPT codes
021	Other extraocular muscle and orbit therapeutic procedures	61,677	62,476	56,429	60,624	1.3	-9.7	7.4	
022	Tympanoplasty	29,591	29,354	48,328	52,013	-0.8	64.6	7.6	Surgery Flag Software update: volume increase in 2018 after 2 CPT codes were reclassified from broad to narrow
023	Myringotomy	330,666	324,996	308,451	335,397	-1.7	-5.1	8.7	
024	Mastoidectomy	18,284	17,510	17,505	17,616	-4.2	0.0	0.6	
026	Other therapeutic ear procedures	29,016	29,497	31,174	32,892	1.7	5.7	5.5	
028	Plastic procedures on nose	168,446	164,723	155,805	167,263	-2.2	-5.4	7.4	
030	Tonsillectomy and/or adenoidectomy	447,101	436,314	395,401	422,137	-2.4	-9.4	6.8	
033	Other OR therapeutic procedures on nose, mouth and pharynx	243,975	218,489	268,994	292,706	-10.4	23.1	8.8	Surgery Flag Software and CCS for Services and Procedures updates: overall volume increase in 2018 after reclassification of several CPT codes and reassignment of 1 narrow CPT code to CCS 33 from CCS 32
042	Other OR therapeutic procedures on respiratory system	38,833	36,275	34,996	35,164	-6.6	-3.5	0.5	
043	Heart valve procedures				4,609				Change to in-scope procedure criteria: in scope in 2019 because this procedure exceeded the minimum threshold for total charges
045	Percutaneous transluminal coronary angioplasty (PTCA)	97,895	97,567			-0.3			Evidence of underreporting in 2016 and 2017 SASD: removed from in scope list for 2018
048	Insertion, revision, replacement, removal of cardiac pacemaker or cardioverter/defibrillator	286,008	276,914	260,471	265,870	-3.2	-5.9	2.1	

CCS Category	Description	Total Encounters, N				Percentage Change, %			Potential Contributing Reasons for Change Over Time
		2016	2017	2018	2019	2016–2017	2017–2018	2018–2019	
049	Other OR heart procedures	8,048	9,997	13,449	16,297	24.2	34.5	21.2	Surgery Flag Software and CCS for Services and Procedures updates: overall volume increase in 2018 after 4 CPT codes were reclassified from narrow to broad and 1 narrow CPT code was reassigned to CCS 49 from CCS 63 Inclusion of specialty hospitals: increase in 2019 after specialty hospitals were added to the NASS universe Addition of emergent surgeries: increase in 2019 after SEDD encounters were added to the NASS
053	Varicose vein stripping, lower limb	31,981	29,557	7,865		-7.6	-73.4		Surgery Flag Software update: volume decrease in 2018 after 2 CPT codes were reclassified from narrow to broad Change to in-scope procedure criteria: no longer in scope in 2019 because procedure did not meet minimum volume or charge threshold
057	Creation, revision and removal of arteriovenous fistula or vessel-to-vessel cannula for dialysis	157,200	155,498	158,579	156,776	-1.1	2.0	-1.1	
061	Other OR procedures on vessels other than head and neck	197,486	191,088	230,710	233,450	-3.2	20.7	1.2	
063	Other non-OR therapeutic cardiovascular procedures	30,133	28,156			-6.6			CCS for Services and Procedures update: not in scope for 2018 after all narrow procedures were reassigned from CCS 63 to other CCS categories
067	Other therapeutic procedures, hemic and lymphatic system	198,459	211,123	239,130	282,313	6.4	13.3	18.1	

CCS Category	Description	Total Encounters, N				Percentage Change, %			Potential Contributing Reasons for Change Over Time
		2016	2017	2018	2019	2016–2017	2017–2018	2018–2019	
078	Colorectal resection	12,472	12,590	13,077	13,810	0.9	3.9	5.6	
080	Appendectomy	170,057	174,534	170,952	278,430	2.6	-2.1	62.9	Addition of emergent surgeries: increase in 2019 after SEDD encounters were added to the NASS
081	Hemorrhoid procedures			51,396	53,967			5.0	Surgery Flag Software update: added as in scope for 2018; satisfied volume threshold after 6 CPT codes were reclassified to narrow
084	Cholecystectomy and common duct exploration	599,503	585,438	559,911	606,943	-2.3	-4.4	8.4	
085	Inguinal and femoral hernia repair	462,360	458,721	446,464	456,556	-0.8	-2.7	2.3	
086	Other hernia repair	425,538	432,115	424,602	434,222	1.5	-1.7	2.3	
087	Laparoscopy	73,341	72,596	76,976	81,420	-1.0	6.0	5.8	
094	Other OR upper GI therapeutic procedures	11,613	12,619	21,563	26,266	8.7	70.9	21.8	Surgery Flag Software and CCS for Services and Procedures updates: volume increase in 2018 after 1 CPT code was reclassified from broad to narrow and 1 narrow CPT code was reassigned to CCS 94 from CCS 95 Inclusion of specialty hospitals: increase in 2019 after specialty hospitals were added to the NASS universe
095	Other non-OR lower GI therapeutic procedures	5,402	5,405			0.1			CCS for Services and Procedures update: not in scope for 2018 after all narrow procedures were reassigned from CCS 95 to CCS 96
096	Other OR lower GI therapeutic procedures	59,123	56,694	67,864	70,387	-4.1	19.7	3.7	
099	Other OR gastrointestinal therapeutic procedures	31,426	32,470	18,708	18,679	3.3	-42.4	-0.2	Surgery Flag Software update: volume decrease in 2018 after reclassification of 2 CPT codes were reclassified from narrow to broad
100	Endoscopy and endoscopic biopsy of the urinary tract	17,593	17,309			-1.6			CCS for Services and Procedures update: not in scope for 2018 after all narrow procedures were moved from CCS 100

CCS Category	Description	Total Encounters, N				Percentage Change, %			Potential Contributing Reasons for Change Over Time
		2016	2017	2018	2019	2016–2017	2017–2018	2018–2019	
101	Transurethral excision, drainage, or removal urinary obstruction			151,887	158,548			4.4	Surgery Flag Software update: added as in scope for 2018; satisfied volume threshold after reclassification of 8 CPT codes
104	Nephrectomy, partial or complete			6,841	8,895			30.0	Volume increase: added as in scope for 2018; satisfied volume threshold Inclusion of specialty hospitals: increase in 2019 after specialty hospitals were added to the NASS universe
106	Genitourinary incontinence procedures	104,290	109,746	112,970	115,272	5.2	2.9	2.0	
109	Procedures on the urethra	24,010	24,127	18,228	18,925	0.5	-24.4	3.8	Surgery Flag Software update: volume decrease in 2018 after 5 CPT codes were reclassified from narrow to neither
112	Other OR therapeutic procedures of urinary tract	29,318	31,313	20,757	24,315	6.8	-33.7	17.1	Surgery Flag Software update and CCS for Services and Procedures update: volume decrease in 2018 after reclassification of 5 CPT codes and the reassignment of 1 narrow CPT code to CCS 112 from CCS 111
113	Transurethral resection of prostate (TURP)	77,962	81,782	84,765	89,707	4.9	3.6	5.8	
114	Open prostatectomy	7,211	7,914	28,017	38,372	9.7	254.0	37.0	Reimbursement change: increased volume in 2018 after CMS removed laparoscopic prostatectomy from the inpatient-only list[a] Inclusion of specialty hospitals: increase in 2019 after specialty hospitals were added to the NASS universe
117	Other non-OR therapeutic procedures, male genital	6,841	8,412			23.0			CCS for Services and Procedures update: not in scope for 2018 after all narrow procedures were reassigned from CCS 117 to CCS 118

CCS Category	Description	Total Encounters, N				Percentage Change, %			Potential Contributing Reasons for Change Over Time
		2016	2017	2018	2019	2016–2017	2017–2018	2018–2019	
118	Other OR therapeutic procedures, male genital	208,611	208,931	170,126	177,839	0.2	-18.6	4.5	
119	Oophorectomy, unilateral and bilateral	146,930	156,208	167,501	184,111	6.3	7.2	9.9	
120	Other operations on ovary	15,105	15,109		14,865	0.0			Not in scope for 2018; did not satisfy outpatient hospital market share threshold Change to in-scope procedure criteria: in scope in 2019 because market share criterion was removed
121	Ligation of fallopian tubes	100,709	89,543	76,698	65,993	-11.1	-14.3	-14.0	
122	Removal of ectopic pregnancy	20,922	19,621	18,687	28,143	-6.2	-4.8	50.6	Addition of emergent surgeries: increase in 2019 after SEDD encounters were added to the NASS
124	Hysterectomy, abdominal and vaginal	353,477	372,422	382,869	399,826	5.4	2.8	4.4	
125	Other excision of cervix and uterus	18,923	19,695	51,258	51,878	4.1	160.3	1.2	Surgery Flag Software update: volume increase in 2018 after 1 CPT code was reclassified from broad to narrow
129	Repair of cystocele and rectocele, obliteration of vaginal vault	90,843	97,167	99,669	101,688	7.0	2.6	2.0	
130	Other diagnostic procedures, female organs			5,436					Surgery Flag Software update: added as in scope for 2018; satisfied volume threshold after 2 CPT codes were reclassified from neither to narrow Change to in-scope procedure criteria: no longer in scope in 2019 because procedure did not meet minimum volume or charge threshold
132	Other OR therapeutic procedures, female organs	222,486	227,217	226,192	236,321	2.1	-0.5	4.5	
141	Other therapeutic obstetrical procedures	17,071	17,887			4.8			Surgery Flag Software update: not in scope for 2018; did not satisfy

CCS Category	Description	Total Encounters, N				Percentage Change, %			Potential Contributing Reasons for Change Over Time
		2016	2017	2018	2019	2016–2017	2017–2018	2018–2019	
									volume threshold after reclassification of 2 CPT codes
142	Partial excision bone	258,034	266,434	249,908	277,326	3.3	-6.2	11.0	
143	Bunionectomy or repair of toe deformities	188,512	181,576	173,820	179,157	-3.7	-4.3	3.1	
144	Treatment, facial fracture or dislocation	47,292	48,670	43,661	43,810	2.9	-10.3	0.3	
145	Treatment, fracture or dislocation of radius and ulna	115,218	115,873	117,738	135,863	0.6	1.6	15.4	
146	Treatment, fracture or dislocation of hip and femur		5,391	5,835	7,355		8.2	26.0	Volume increase: added as in scope in 2017; satisfied volume threshold Inclusion of specialty hospitals: increase in 2019 after specialty hospitals were added to the NASS universe Addition of emergent surgeries: increase in 2019 after SEDD encounters were added to the NASS
147	Treatment, fracture or dislocation of lower extremity (other than hip or femur)	155,318	160,680	165,542	193,280	3.5	3.0	16.8	
148	Other fracture and dislocation procedure	109,868	110,565	106,409	126,658	0.6	-3.8	19.0	
149	Arthroscopy	100,325	94,560	88,407	99,699	-5.7	-6.5	12.8	
150	Division of joint capsule, ligament or cartilage	60,423	55,031	51,386	54,569	-8.9	-6.6	6.2	
151	Excision of semilunar cartilage of knee	453,421	417,884	383,794	404,838	-7.8	-8.2	5.5	
152	Arthroplasty knee	44,230	49,456	192,752	301,910	11.8	289.7	56.6	Reimbursement change: increased volume in 2018 after CMS removed total knee arthroplasty from the inpatient-only list[a] Inclusion of specialty hospitals: increase in 2019 after specialty hospitals were added to the NASS

CCS Category	Description	Total Encounters, N				Percentage Change, %			Potential Contributing Reasons for Change Over Time
		2016	2017	2018	2019	2016–2017	2017–2018	2018–2019	
									universe
153	Hip replacement, total and partial	26,406	30,308	36,846	49,826	14.8	21.6	35.2	Inclusion of specialty hospitals: increase in 2019 after specialty hospitals were added to the NASS universe
154	Arthroplasty other than hip or knee	55,131	55,611	57,934	66,148	0.9	4.2	14.2	
157	Amputation of lower extremity	39,518	40,221	42,802	48,970	1.8	6.4	14.4	
158	Spinal fusion	52,558	75,851	82,506	93,850	44.3	8.8	13.7	Reimbursement change: increased volume in 2017 after CMS added several surgical spine codes to the list of approved ambulatory surgery center covered procedures[b]
160	Other therapeutic procedures on muscles and tendons	811,537	808,426	806,409	911,712	-0.4	-0.2	13.1	
161	Other OR therapeutic procedures on bone	277,895	281,555	259,817	288,187	1.3	-7.7	10.9	
162	Other OR therapeutic procedures on joints	524,408	513,561	463,114	518,568	-2.1	-9.8	12.0	
164	Other OR therapeutic procedures on musculoskeletal system	42,909	43,797	43,683	55,635	2.1	-0.3	27.4	Inclusion of specialty hospitals: increase in 2019 after specialty hospitals were added to the NASS universe
166	Lumpectomy, quadrantectomy of breast	317,041	317,702	317,525	331,735	0.2	-0.1	4.5	
167	Mastectomy	74,635	79,764	86,585	94,411	6.9	8.6	9.0	
170	Excision of skin lesion				134,215				Change to in-scope procedure criteria: in scope in 2019 because market share criterion was removed
171	Suture of skin and subcutaneous tissue	7,867	8,247		120,030	4.8			Surgery Flag Software update: not in scope for 2018 because outpatient hospital share fell below threshold after reclassification of 6 CPT codes Change to in-scope procedure criteria: in scope in 2019 because market share criterion was removed

CCS Category	Description	Total Encounters, N				Percentage Change, %			Potential Contributing Reasons for Change Over Time
		2016	2017	2018	2019	2016–2017	2017–2018	2018–2019	
174	Other non-OR therapeutic procedures on skin and breast	18,666	19,753			5.8			CCS for Services and Procedures update: not in scope for 2018 after all narrow procedures were reclassified from CCS 174 to CCS 175
175	Other OR therapeutic procedures on skin and breast	341,972	343,787	342,372	376,101	0.5	-0.4	9.9	
225	Conversion of cardiac rhythm	118,742	136,840	149,475	169,206	15.2	9.2	13.2	
244	Gastric bypass and volume reduction	26,390	24,600	24,709	24,658	-6.8	0.4	-0.2	

Abbreviations: CMS, Centers for Medicare & Medicaid Services; CPT, Current Procedural Terminology; GI, gastrointestinal; NASS, Nationwide Ambulatory Surgery Sample; OR, operating room; SEDD, State Emergency Department Databases

[a] See CMS Hospital Outpatient Prospective Payment- Notice of Final Rulemaking (NFRM) with Comment Period (CMS–1678–FC), available at: https://www.govinfo.gov/content/pkg/FR-2017-11-13/pdf/2017-23932.pdf.

[b] See CMS Hospital Outpatient Prospective Payment - Final Rule with Comment and Final CY2017 Payment Rates (CMS-1656-FC), available at: https://www.govinfo.gov/content/pkg/FR-2016-11-14/pdf/2016-26515.pdf.

Notes: Totals represent weighted estimates. CCS-Services and Procedures category totals are unduplicated, such that if two or more CPT codes on the same encounter record mapped to the same CCS-Services and Procedures category, the record was only counted once. Totals are missing if the CCS-Services and Procedures procedure category was not in scope for the NASS sample. Contributing reasons for changes over time are reported only for categories that were added to or removed from the NASS in-scope procedure list and for categories with year-to-year percentage change in volume greater than 20 percent.