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

INTRODUCTION TO

THE AHRQ HCUP NATIONWIDE AMBULATORY SURGERY SAMPLE (NASS) 2023

These pages provide only an introduction to the 2023 AHRQ HCUP NASS.

For full documentation and notification of changes,
visit the AHRQ HCUP User Support (HCUP-US) website at
https://hcup-us.ahrq.gov.

Please read all documentation carefully.

Issued January 2026

AHRQ NASS data available through
AHRQ HCUP Central Distributor Online Reporting System (CDORS) at
https://cdors.ahrq.gov/

AHRQ NASS documentation available through
AHRQ HCUP User Support (HCUP-US) website at
https://hcup-us.ahrq.gov

AHRQ NASS technical support available via
E-mail: hcup@ahrq.gov

TABLE OF CONTENTS

AHRQ HCUP NATIONWIDE AMBULATORY SURGERY SAMPLE (NASS)
SUMMARY OF DATA USE RESTRICTIONS

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

All users of the AHRQ HCUP NASS must take the online AHRQ HCUP Data Use Agreement (DUA) Training Course, and read and sign a Data Use Agreement for the AHRQ HCUP Nationwide databases. Details and links may be found on the following page.

Authorized users of AHRQ 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. If a journal or publication requests access to data or analytic files, will cite restrictions on data sharing in the Data Use Agreement and direct them to AHRQ HCUP (https://hcup-us.ahrq.gov) for more information on accessing HCUP data.
- 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 HCUP 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 https://hcup-us.ahrq.gov/db/publishing.jsp.

AHRQ HCUP DATA USE AGREEMENT REQUIREMENTS

All HCUP data users, including data purchasers and collaborators, must complete the online AHRQ HCUP Data Use Agreement (DUA) Training Tool, and read and sign the AHRQ HCUP Data Use Agreement for Nationwide databases.

When placing an order through the AHRQ HCUP Central Distributor Online Reporting System (CDORS), you will be prompted to enter the AHRQ HCUP DUA Training Course completion certification code and electronically sign the AHRQ HCUP DUA for Nationwide databases. Please note, you will be required to agree to the DUA requirements for each purchase and each project being considered, but the DUA training course and full DUA only needs to be completed every two years.

The online **AHRQ HCUP Data Use Agreement (DUA) Training Course** is available at: https://hcup-us.ahrq.gov/tech_assist/dua.jsp.

The **AHRQ HCUP Data Use Agreement (DUA) for the Nationwide Database** is available at: https://hcup-us.ahrq.gov/team/NationwideDUA.pdf.

AHRQ HCUP CONTACT INFORMATION

HCUP User Support

Information about the content of the AHRQ HCUP databases is available on the HCUP User Support (HCUP-US) website at https://hcup-us.ahrq.gov.

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

If you need further technical assistance, please contact the HCUP User Support team via email at hcup@ahrq.gov.

HCUP Central Distributor

If you have questions specific to the purchase or re-use of the data, please contact the HCUP Central Distributor team via email at HCUP-RequestData@ahrq.gov.

We would like to receive your feedback on the HCUP data products.
Please send user feedback to hcup@ahrq.gov.

WHAT IS THE AHRQ NATIONWIDE AMBULATORY SURGERY SAMPLE (NASS)?

- The Nationwide Ambulatory Surgery Sample (NASS) is a calendar-year, encounter-level database of selected therapeutic ambulatory surgeries constructed from the Healthcare Cost and Utilization Project (HCUP) State Ambulatory Surgery and Services Databases (SASD).
- The ambulatory surgeries selected for inclusion in the NASS are therapeutic procedures, which 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. To be considered in-scope for the NASS, ambulatory surgeries are also required to have a relatively high annual volume or aggregate total facility charge. Examples include ambulatory surgeries such as cataract surgery, cholecystectomy, appendectomy, gastric bypass, hysterectomy, hernia repair, spinal fusion, and hip replacement. See Appendix B for a complete list of in-scope ambulatory surgeries.
- The NASS is the only all-payer ambulatory surgery database, yielding national and regional estimates of in-scope 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.
- The 2016–2023 NASS are available for purchase online through the AHRQ HCUP Central Distributor Online Reporting System (CDORS). All HCUP data users, including data purchasers and collaborators, must complete the online HCUP Data Use Agreement Training Tool, and must read and sign the AHRQ HCUP Data Use Agreement for Nationwide Databases.

WHAT'S NEW IN THE 2023 AGENCY FOR HEALTHCARE RESEARCH AND QUALITY (AHRQ) NATIONWIDE AMBULATORY SURGERY SAMPLE (NASS)?

- The total number of in-scope ambulatory surgery encounters for data year 2023 increases by 9 percent from 12.4 million in 2022 to 13.5 million.
- Because of a change in the states available to participate in the 2023 NASS and a need to produce accurate national estimates, the following modifications have been made to the data elements included in the NASS:
    - Remove information identifying the Census region of the hospital:
        - Remove the data elements that identified Census region (HOSP_REGION).
        - Revise the coding of the data elements for the hospital identifier (HOSP_NASS) and record identifier (KEY_NASS) to remove the information identifying Census region.
    - Limit the information released on patient characteristics:
        - Remove the data element identifying the patient's race and ethnicity (RACE).
        - Replace the data element identifying the detailed metro status designation of the county of the patient's residence (PL_NCHS) with a new consolidated data element that distinguishes only two categories: metropolitan and non-metropolitan (PL_NCHS2).
    - Remove the data element for total hospital charge (TOTCHG) due to a lack of information needed to make adjustments for missing data.
- Changes to the Diagnosis and Procedure Groups file:
    - Added data elements derived from the Chronic Condition Indicator Refined (CCIR) for ICD-10-CM, v2025.1.
    - Used v2025.1 for all HCUP software tools included in the Diagnosis and Procedures Group file.
- For more information on NASS data elements, see Appendix D.
- Please note that these modifications to the 2023 NASS data elements may make comparisons of some estimates across years more difficult.

UNDERSTANDING THE AHRQ HCUP NASS

- This document, *Introduction to the AHRQ HCUP Nationwide Ambulatory Surgery Sample (NASS), 2023*, summarizes the content of the NASS and describes the development of the NASS sample and weights.
- In-depth documentation for the NASS is available on the HCUP User Support (HCUP-US) website (https://hcup-us.ahrq.gov/db/nation/nis/nisdbdocumentation.jsp). Please refer to detailed documentation before using the data, including descriptions of available data elements.
- Important considerations for data analysis are provided along with references to detailed reports available on the HCUP-US website at https://hcup-us.ahrq.gov/reports/methods.jsp.

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

The Agency for Healthcare Research and Quality (AHRQ) and the staff of the Healthcare Cost and Utilization Project (HCUP) thank users for purchasing the AHRQ HCUP Nationwide Ambulatory Surgery Sample (NASS).

AHRQ 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 is 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 2023 NASS contains information that is included in a typical hospital-owned facility record abstract, including patient characteristics, clinical diagnostic and surgical procedure codes, disposition of patients, expected source of payment, and facility characteristics.

The NASS is the largest all-payer ambulatory surgery database that has been constructed in the United States, yielding national estimates of selected therapeutic ambulatory surgery encounters performed in hospital-owned facilities. The ambulatory surgeries selected for inclusion in the NASS are therapeutic procedures, which require the use of an operating room, penetrate or break the skin, and involve regional anesthesia, general anesthesia, or sedation to control pain. To be considered in-scope for the NASS, ambulatory surgeries are also required to have a relatively high annual volume or aggregate total facility charge. Examples include ambulatory surgeries such as cataract surgery, appendectomy, gastric bypass, hysterectomy, hernia repair, spinal fusion, and hip replacement.

The 2023 NASS is drawn from the AHRQ HCUP State Ambulatory Surgery and Services Database (SASD) from thirty-two HCUP Partner organizations (Appendix A, Table A1). The 2023 NASS contains information for 8.8 million ambulatory surgery encounters at 2,554 hospital-owned facilities that approximate an estimated 59.3 percent stratified sample of U.S. hospital-owned facilities performing ambulatory surgeries. Weights are provided to estimate national total of 13.5 million ambulatory surgery encounters in 2023.

Key features of the most recent NASS (2023) include:

- The NASS is designed to be representative of U.S. hospital-owned facilities that perform ambulatory surgeries.
- The NASS has many research applications, because it contains clinical and nonclinical information about in-scope ambulatory surgeries and diagnoses, as well as facility and patient characteristics.

- The NASS includes information on facility characteristics such as urban/rural location, ownership, teaching status, and hospital bed size.
- The NASS includes demographic data such as patient age, sex, community income quartile, and urbanicity of the county of the patient's residence.
- The data elements included in the NASS are designed to protect patient and hospital confidentiality.

Appendix D provides a list of data elements in the 2023 NASS. Although some modifications have been made to the data elements included in the 2023 NASS, no changes have been made to the sample design.

The 2023 NASS is designed to produce national estimates of selected therapeutic ambulatory surgery encounters performed in hospital-owned facilities. The following analyses are not possible using the 2023 NASS:

- Analyses by geographic areas such as ZIP Code of the hospital or patient residence, county of the hospital or patient residence, state of the hospital or patient residence, or Census region.
- Analyses requiring the identification of hospitals.
- Analyses by the patient's race and ethnicity.
- Analyses of the urbanicity of the county of the patient residence requiring more detail than the distinction of metropolitan and non-metropolitan.
- Procedures are reported using Healthcare Common Procedure Coding System (HCPCS) Level I codes, commonly referred to as Current Procedural Terminology (CPT®) codes. HCPCS Level II codes are not included.
- 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.

These analyses can be done using the HCUP State Ambulatory Surgery and Services Database (SASD), available through the HCUP Central Distributor.

The 2016-2023 NASS are available for purchase online through the AHRQ HCUP Central Distributor Online Reporting System (CDORS). All HCUP data users, including data purchasers and collaborators, must complete the online AHRQ HCUP Data Use Agreement Training Tool, and must read and sign the AHRQ HCUP Data Use Agreement for Nationwide Databases.

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

INTRODUCTION TO THE AHRQ HCUP NATIONWIDE AMBULATORY SURGERY SAMPLE (NASS)

Overview of the 2023 AHRQ HCUP NASS Data

The Agency for Healthcare Research and Quality (AHRQ) Healthcare Cost and Utilization Project (HCUP) Nationwide Ambulatory Surgery Sample (NASS) is 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 in-scope ambulatory surgeries and diagnoses, as well as facility and patient characteristics.

The 2023 NASS is sampled from the AHRQ HCUP State Ambulatory Surgery and Services Databases (SASD) and contains information from 8.8 million ambulatory surgery encounters at 2,554 hospital-owned ambulatory surgery facilities from 31 States and the District of Columbia. Weights are provided to calculate national estimates representing about 13.5 million ambulatory surgery encounters in the United States in 2023.

Because of a change in the states available to participate in the 2023 NASS and a need to produce accurate national estimates, the following modifications have been made to the data elements included in the NASS:

- Remove information identifying the Census region of the hospital:
  - Remove the data elements that identified Census region (HOSP_REGION).
  - Revise the coding of the data elements for the hospital identifier (HOSP_NASS) and record identifier (KEY_NASS) to remove the information identifying Census region.
- Limit the information released on patient characteristics:
  - Remove the data element identifying the patient's race and ethnicity (RACE).
  - Replace the data element identifying the detailed metro status designation of the county of the patient's residence (PL_NCHS) with a new consolidated data element that distinguishes only two categories: metropolitan and non-metropolitan (PL_NCHS2).
- Remove the data element for total hospital charge (TOTCHG) due to a lack of information needed to make adjustments for missing data.

Sample Design for the 2023 NASS

The 2023 NASS includes ambulatory surgery encounters in the AHRQ HCUP State Ambulatory Surgery and Services Databases (SASD) with at least one in-scope ambulatory surgery on the record, performed at hospital-owned facilities. *In-scope ambulatory surgeries* are defined based on the following factors:

- Surgical procedure: a therapeutic procedure that would 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 identified by Healthcare Common Procedure Coding System (HCPCS) Level I codes, commonly referred to as Current Procedural Terminology (CPT®) codes on the billing record, and are categorized as

narrow in the HCUP Surgery Flag Software.[1] The term narrow is specific to the Surgery Flag Software. The "narrow" surgeries are identified in the following ranges of CPT codes: surgical, emerging technology, radiology, and medical (excluding the evaluation and management codes). For the 2023 NASS, v2023.1 of the HCUP Surgery Flag Software is used because v2023.1 is relevant to CPT codes valid in calendar year 2023.

- Frequency: Surgeries, categorized by groups of CPT codes in the Clinical Classifications Software for Services and Procedures (CCS-Services and Procedures),[2] with a relatively high volume or aggregate total facility charge, and evidence of reliable reporting from SASD hospitals.

A complete list of 2023 in-scope CCS-Services and Procedures categories is included in Appendix B.

The NASS is a stratified cluster sample of in-scope ambulatory surgery encounters occurring in hospital-owned facilities. The 2023 NASS universe includes all community hospitals (i.e., non-federal, acute care hospitals) reporting outpatient surgery volume in the American Hospital Association (AHA) Annual Survey of Hospitals. Community hospitals that are rehabilitation and long-term, acute care facilities are excluded. The NASS sampling frame includes hospitals in the universe that have data for the selected CCS categories for all discharge quarters in the data year.

Post-stratification for the purposes of weighting the NASS encounters to national estimates is based on the following characteristics: Census region (Northeast, Midwest, South, and West) of hospital, 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, and hospital ownership or control (public, for profit, and not for profit).

For more information on the methodology used to create the NASS, see Appendix F.

Weighted Estimates

To facilitate the production of national estimates, encounter weights (NASS data element DISCWT) are provided, along with information necessary to calculate the variance of estimates. 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 (https://hcup-us.ahrq.gov/). The HCUP NIS prior to 2012 used a stratified sampling design similar to the NASS, so techniques appropriate for the NIS prior to 2012 are also appropriate for the NASS.

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[1] Agency for Healthcare Research and Quality. Surgery Flag Software for Services and Procedures. Healthcare Cost and Utilization Project (HCUP). Released April 17, 2024. https://hcup-us.ahrq.gov/toolssoftware/surgeryflags_svcproc/surgeryflagssvc_proc.jsp. Accessed August 19, 2025. For more information, reference the Surgery Flag Software for Services and Procedures User Guide, available at: https://hcup-us.ahrq.gov/toolssoftware/surgeryflags_svcproc/surgeryflagssvc_proc.jsp#user.

[2] The Clinical Classifications Software for Services and Procedures (CCS-Services and Procedures) is HCUP software that provides a method for classifying Healthcare Common Procedure Coding System (HCPCS) Level I and II codes into clinically meaningful procedure categories. For more information, visit https://hcup-us.ahrq.gov/toolssoftware/ccs_svcsproc/ccssvcproc.jsp.

NASS Data Sources, Hospitals, and Encounters

The names of the HCUP Partner organizations that contribute to the 2023 NASS are listed in Appendix A, Table A1 with the geographic distribution of the 32 HCUP Partner organizations shown in Appendix A, Figure A1.

Based on the U.S. Census Bureau data, the data included in the 2023 NASS account for 70.0 percent of the U.S. population in 2023, an estimated 59.3 percent of hospital-owned facilities performing ambulatory surgeries, and an estimated 64.9 percent of ambulatory surgery encounters. Details on the percentage of encounters and facilities by region in 2023 are provided in Appendix A, Table A2. Information on the numbers of States, number of hospital-owned facilities, and ambualtory surgery encounters in the NASS by data year are provided in Appendix A, Table A3.

Partner Restrictions

Some HCUP Partners 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.

File Structure of the NASS

Because of the size of the database, the information in the NASS is divided into four types of files:

- **Encounter File:** This file contains one record for all ambulatory surgery encounters containing an in-scope procedure from hospital-owned facilities in participating States and the District of Columbia.
- **Supplemental File:** This file contains one record with information on not-in-scope procedures that were performed during encounters recorded in the Encounter File. This file includes fewer records than the Encounter File because not all encounters included both in-scope and not-in-scope procedures. If an encounter had no not-in-scope procedures, then there is no record in the Supplemental File.
    - The unique NASS record identifier (KEY_NASS) provides the linkage between the NASS Encounter File and the Supplemental File.
- **Diagnosis and Procedure Groups File:** This file contains one record for each record in the Encounter File with additional information on ICD-10-CM diagnoses, derived from the AHRQ HCUP software tools.
    - The unique NASS record identifier (KEY_NASS) provides the linkage between the NASS Encounter File and the Diagnosis and Procedure Groups File.
- **Hospital File:** This hospital-level file contains one observation for each hospital-owned facility included in the NASS, along with encounter weight and select hospital characteristics.
    - The unique NASS hospital identifier (HOSP_NASS) provides the linkage between the NASS Encounter File and the Hospital File.

On the HCUP-US website, NASS users can access complete file documentation, including data element notes, file layouts, summary statistics, and related technical reports. Similarly, users

can also download SAS, SPSS, and Stata load programs from this website. Available online documentation and supporting files are detailed in Appendix A, Table A4.

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 (https://hcup-us.ahrq.gov/db/coding.jsp).

The 2023 NASS contains more than 100 clinical and nonclinical data elements, such as the following:

- Patient demographics (e.g., sex, age, 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
- Expected payment source (e.g., Medicare, Medicaid, private insurance, self-pay)
- Hospital characteristics (e.g., ownership, teaching status, region of the United States).

Tables in Appendix D provide a summary of data elements in each NASS file. Please refer to the NASS Description of Data Elements page on the HCUP-US website (https://hcup-us.ahrq.gov) for more comprehensive information about the data elements and the files.

Getting Started

The HCUP NASS is distributed as comma-separated value (CSV) files delivered via secure digital download through the AHRQ HCUP Central Distributor Online Reporting System (CDORS). The files are compressed and encrypted with 7-Zip©. **Users will need the password provided to the original data purchaser through the HCUP Central Distributor.**

The NASS product is downloaded in a single zipped file, which contains several data-related files and accompanying documentation. The four compressed data-related files are as follows:

1) Hospital File (NASS_2023_Hospital.zip)
2) Encounter File (NASS_2023_Encounter.zip)
3) Supplemental File (NASS_2023_Supplemental.zip)
4) Diagnosis and Procedure Groups File (NASS_2023_DX_PR_GRPS.zip)

Computer Specifications Required for Using the NASS

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

- A hard drive with *at least* 85 gigabytes (GB) of space available

- A third-party zip utility such as 7-Zip©, ZIP Reader, SecureZIP®, WinZip®, or Stuffit Expander®
- SAS®, SPSS®, Stata®, or similar analysis software
- Load program (described below)

The total size of the CSV version of the 2023 NASS is approximately 16 GB. The NASS files loaded into SAS are about 22 GB. Most SAS data steps will require two to three times the file's storage space to perform sorting procedures and to allow the input and output files to 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.

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:

   - 7-Zip© (Windows) (free download offered by 7-Zip)
   - 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.

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 website.
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 (2023) 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.

NASS Documentation

Comprehensive documentation for the NASS files is available on the NASS Database Documentation page on the HCUP-US website (https://hcup-us.ahrq.gov). 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 A2 details the comprehensive NASS documentation available on HCUP-US.

HCUP Online Tutorials

For additional assistance, 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 Multi-year Analysis tutorial presents solutions that may be necessary when conducting analyses that span multiple years of HCUP data.
- 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 https://hcup-us.ahrq.gov/tech_assist/tutorials.jsp.

HOW TO USE THE 2023 NASS FOR DATA ANALYSIS

This section provides a synopsis of special considerations for using the 2023 NASS. Before reporting findings using the NASS, you should refer to the *Checklist for Working with the NASS* (https://hcup-us.ahrq.gov/db/nation/nass/nasschecklist.jsp) to verify adherence to data use, methodology, and reporting requirements.

AHRQ HCUP Data Use Agreement

If anyone other than the original purchaser uses the NIS data, be sure to have them read and sign a AHRQ HCUP Data Use Agreement, after viewing the online AHRQ HCUP Data Use Agreement Training Tool available on the HCUP-US website (https://hcup-us.ahrq.gov). A copy of the signed Data Use Agreements must be submitted to the AHRQ HCUP Central Distributor through the Central Distributor Online Reporting System (CDORS) website (https://cdors.ahrq.gov).

Choosing Data Elements for Analysis

For all data elements to be used in the analysis, the analyst should first 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.

CPT Procedure Codes and ICD-10-CM Diagnosis Codes

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

CPT procedure codes, 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. The 2023 NASS contains fields for up to 30 in-scope CPT-coded procedures, and up to 30 out-of-scope CPT-coded procedures, although the number of code fields populated varies by State due to 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 is limited.

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 2023 NASS includes up to 40 diagnoses. The number of diagnosis code fields can vary by State because of reporting differences.

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.

Calculating National Estimates

To produce national estimates, weights MUST be used. The in-scope 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.

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 in-scope ambulatory surgeries was drawn, and then all encounters with in-scope 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 (https://hcup-us.ahrq.gov/). The HCUP NIS prior to 2012 used a stratified sample design similar to the NASS, 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 Computer Software for Applying Weights and Variance Calculations. 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.

Computer Software for Applying Weights and Calculating Variance

Computer programs are readily available to perform weighted variance calculations. Several statistical programming packages allow weighted analyses.[3] 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*

[3] 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.

Nationwide Inpatient Sample (NIS) Variances for Data Years 2011 and Earlier on the HCUP-US website (https://hcup-us.ahrq.gov). For a helpful review of programs to calculate statistics from survey data, visit the Summary of Survey Analysis Software page on the Harvard Medical School 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 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.

Studying Trends

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

The change in the data elements in the 2023 NASS will impact the ability to analyze trends in ambulatory surgeries by these attributes. The data elements for total hospital charge (TOTCHG) and race and ethnicity of the patient (RACE) are unavailable. In addition, the information on the urbanicity of the county of the patient's residence is limited to metropolitan and nonmetropolitan.

All Clinical Classifications Software (CCS) categories considered in scope for the 2023 NASS were also represented in the 2019-2022 NASS. Appendix B lists the CCS categories included in each year of the NASS. Although the categories have been consistent for the last four years, there are three possible reasons for the list of included CCS categories to change across years:

- An increase or decrease in the volume of procedures performed in the outpatient setting, as this determines whether a CCS category meets the threshold for inclusion in the NASS sample.
- A change in the identification of hospitals for the NASS universe
    - *Starting in data year 2023*, the approach to identifying parent-subsidiary facility relationships for hospitals in the SASD was refined. Fewer facilities were combined into a parent hospital; therefore, some hospital-specific procedure volumes may be smaller than in prior data years.
    - *Starting in data year 2019*, the universe was expanded to include specialty hospitals such as surgical, cancer, heart, and orthopedic facilities owned by community hospitals that performed in-scope 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.

- A change in the criteria used to identify ambulatory surgeries
    - *Starting in data year 2019*, the NASS included better reporting of emergent surgeries. These surgeries were 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%).
    - *Starting in data year 2018*, the NASS used an expanded range of possible CPT codes to identify in-scope procedures (consistent with the update to the HCUP Surgery Flag Software for Services and Procedures for v2019.2).

Refer to Appendix E for a summary of CCS procedure category volume totals in the 2020–2023 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 category are not recommended.

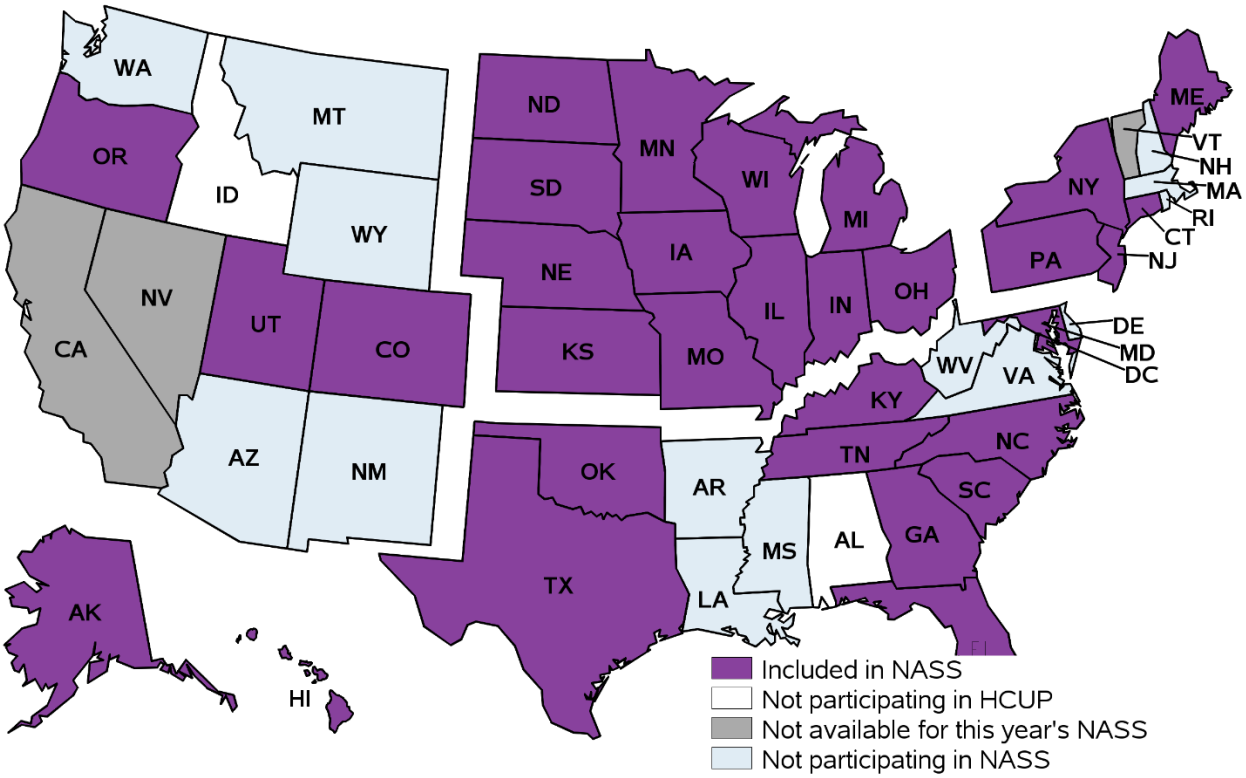
APPENDIX A: TABLES AND FIGURES

Table A1. HCUP Partner Organizations Contributing Data to the 2023 NASS

State	Data Organization
Alaska	Alaska Department of Health
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
Illinois	Illinois Department of Public Health
Indiana	Indiana Hospital Association
Iowa	Iowa Hospital Association
Kansas	Kansas Hospital Association
Kentucky	Kentucky Cabinet for Health and Family Services
Maine	Maine Health Data Organization
Maryland	Maryland Health Services Cost Review Commission
Michigan	Michigan Health & Hospital Association
Minnesota	Minnesota Hospital Association
Missouri	Missouri Hospital Industry Data Institute
Nebraska	Nebraska Hospital Association
New Jersey	New Jersey Department of Health
New York	New York State Department of Health
North Carolina	North Carolina Department of Health and Human Services
North Dakota	North Dakota (data provided by the Minnesota Hospital Association)
Ohio	Ohio Hospital Association
Oklahoma	Oklahoma State Department of Health
Oregon	Oregon Association of Hospitals and Health Systems
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
Wisconsin	Wisconsin Department of Health Services

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

Figure A1. HCUP States and the District of Columbia Included in the 2023 NASS



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

Data from HCUP Partner organizations in California, Nevada, and Vermont were not available for the 2023 NASS.
Represented populations from states included in the NASS vary by Census region: 82.2 percent of the population in the West, 100 percent of the population in the Midwest, 79.2 percent of the population in the South, and 19.9 percent of the population in the Northeast. The data element indicating Census region (HOSP_REGION) is not included in the 2023 NASS.

Table A2. Percentage of Encounters and Facilities in NASS Sample, by Census Region, 2023

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	1,682,640	2,184,929	77.0	378	532	71.1
Midwest	3,165,626	3,423,951	92.5	1,070	1,316	81.3
South	3,332,637	4,921,215	67.7	922	1,577	58.5
West	594,100	2,997,339	19.8	184	882	20.9
Total	**8,775,003**	**13,527,434**	**64.9**	**2,554**	**4,307**	**59.3**

Abbreviations: NASS, Nationwide Ambulatory Surgery Sample.

The data element indicating census region (HOSP_REGION) is not included in the 2023 NASS.

[a] Estimated. See the section on Generating the Ambulatory Surgery National Hospital List in Appendix F for information on the estimation process.

[b] Estimated. See the section on NASS Encounter Predictive Model in Appendix F for information on the estimation process.

Table A3. Number of States, Hospital-Owned Facilities, and Encounters in the NASS by Year

Data Year	States in the NASS	Number of States	Number of Hospital-Owned Facilities	Number of AS Encounters, Unweighted	Number of AS Encounters, Weighted for National Estimates
2023	AK, CO, CT, DC, FL, GA, HI, IA, IL, IN, KS, KY, MD, ME, MI, MN, MO, NC, ND, NE, NJ, NY, OH, OK, OR, PA, SC, SD, TN, TX, UT, WI (OK added; CA, NV and VT not available)	32	2,554	8,775,003	13,527,434
2022	AK, CA, CO, CT, DC, FL, GA, HI, IA, IL, IN, KS, KY, MD, ME, MI, MN, MO, NC, ND, NE, NJ, NY, OH, OR, PA, SC, SD, TN, TX, UT, VT, WI (OK and NV not available)	33	2,799	9,097,088	12,380,477
2021	AK, CA, CO, CT, DC, FL, GA, HI, IA, IL, IN, KS, KY, MD, ME, MI, MN, MO, NC, ND, NE, NJ, NY, OH, OK, OR, PA, SC, SD, TN, TX, UT, VT, WI (NV not available)	34	2,881	8,896,507	11,916,522
2020	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	35	2,899	7,828,310	10,337,699
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 (AK, HI, UT added)	35	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 not available)	32	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 not available)	33	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	34	2,751	7,608,879	10,623,113

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

Table A4. AHRQ HCUP NASS Related Reports and Database Documentation Available on HCUP-US

Description of NASS Database

- NASS Overview
  - HCUP Partners in the NASS
- Introduction to the NASS, 2023 (*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
- NASS Summary Statistics—lists means and frequencies on nearly all data elements
- Frequencies by Diagnosis and Procedure 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

Known Data Issues

- 2022
- 2021

HCUP Tools: Labels and Formats

- 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 (https://cdors.ahrq.gov)

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.

APPENDIX B: 2016—2023 NASS IN-SCOPE AMBULATORY SURGERIES

Table B1. NASS In-Scope Ambulatory Surgeries Identified by 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	2016–2023
006	Decompression peripheral nerve	2016–2023
009	Other OR therapeutic nervous system procedures	2016–2023
010	Thyroidectomy, partial or complete	2016–2023
012	Other therapeutic endocrine procedures	2016–2023
013	Corneal transplant	2016–2023
014	Glaucoma procedures	2016–2023
015	Lens and cataract procedures	2016–2023
016	Repair of retinal tear, detachment	2016–2023
017	Destruction of lesion of retina and choroid	2019–2023
019	Other therapeutic procedures on eyelids, conjunctiva, cornea	2018–2023
020	Other intraocular therapeutic procedures	2018–2023
021	Other extraocular muscle and orbit therapeutic procedures	2016–2023
022	Tympanoplasty	2016–2023
023	Myringotomy	2016–2023
024	Mastoidectomy	2016–2023
026	Other therapeutic ear procedures	2016–2023
028	Plastic procedures on nose	2016–2023
030	Tonsillectomy and/or adenoidectomy	2016–2023
033	Other OR therapeutic procedures on nose, mouth and pharynx	2016–2023
042	Other OR therapeutic procedures on respiratory system	2016–2023
043	Heart valve procedures	2019–2023
045	Percutaneous transluminal coronary angioplasty (PTCA)	2016 and 2017[a]
048	Insertion, revision, replacement, removal of cardiac pacemaker or cardioverter/defibrillator	2016–2023
049	Other OR heart procedures	2016–2023
053	Varicose vein stripping, lower limb	2016–2018
057	Creation, revision and removal of arteriovenous fistula or vessel-to-vessel cannula for dialysis	2016–2023
061	Other OR procedures on vessels other than head and neck	2016–2023
063	Other non-OR therapeutic cardiovascular procedures[a]	2016, 2017
067	Other therapeutic procedures, hemic and lymphatic system	2016–2023
078	Colorectal resection	2016–2023
080	Appendectomy	2016–2023
081	Hemorrhoid procedures	2018–2023
084	Cholecystectomy and common duct exploration	2016–2023
085	Inguinal and femoral hernia repair	2016–2023
086	Other hernia repair	2016–2023

CCS for Services and Procedures Category	Description	Data Years in Scope for the NASS Sample
087	Laparoscopy	2016–2023
094	Other OR upper GI therapeutic procedures	2016–2023
095	Other non-OR lower GI therapeutic procedures[a]	2016, 2017
096	Other OR lower GI therapeutic procedures	2016–2023
099	Other OR gastrointestinal therapeutic procedures	2016–2023
100	Endoscopy and endoscopic biopsy of the urinary tract	2016, 2017
101	Transurethral excision, drainage, or removal urinary obstruction	2018–2023
104	Nephrectomy, partial or complete	2018–2023
106	Genitourinary incontinence procedures	2016–2023
109	Procedures on the urethra	2016–2023
112	Other OR therapeutic procedures of urinary tract	2016–2023
113	Transurethral resection of prostate (TURP)	2016–2023
114	Open prostatectomy	2016–2023
117	Other non-OR therapeutic procedures, male genital[a]	2016, 2017
118	Other OR therapeutic procedures, male genital	2016–2023
119	Oophorectomy, unilateral and bilateral	2016–2023
120	Other operations on ovary	2016–2023
121	Ligation of fallopian tubes	2016–2023
122	Removal of ectopic pregnancy	2016–2023
124	Hysterectomy, abdominal and vaginal	2016–2023
125	Other excision of cervix and uterus	2016–2023
129	Repair of cystocele and rectocele, obliteration of vaginal vault	2016–2023
130	Other diagnostic procedures, female organs	2018
132	Other OR therapeutic procedures, female organs	2016–2023
141	Other therapeutic obstetrical procedures	2016, 2017
142	Partial excision bone	2016–2023
143	Bunionectomy or repair of toe deformities	2016–2023
144	Treatment, facial fracture or dislocation	2016–2023
145	Treatment, fracture or dislocation of radius and ulna	2016–2023
146	Treatment, fracture or dislocation of hip and femur	2017, 2019–2023
147	Treatment, fracture or dislocation of lower extremity (other than hip or femur)	2016–2023
148	Other fracture and dislocation procedure	2016–2023
149	Arthroscopy	2016–2023
150	Division of joint capsule, ligament or cartilage	2016–2023
151	Excision of semilunar cartilage of knee	2016–2023
152	Arthroplasty knee	2016–2023
153	Hip replacement, total and partial	2016–2023
154	Arthroplasty other than hip or knee	2016–2023
157	Amputation of lower extremity	2016–2023
158	Spinal fusion	2016–2023
160	Other therapeutic procedures on muscles and tendons	2016–2023

CCS for Services and Procedures Category	Description	Data Years in Scope for the NASS Sample
161	Other OR therapeutic procedures on bone	2016–2023
162	Other OR therapeutic procedures on joints	2016–2023
164	Other OR therapeutic procedures on musculoskeletal system	2016–2023
166	Lumpectomy, quadrantectomy of breast	2016–2023
167	Mastectomy	2016–2023
170	Excision of skin lesion	2019–2023
171	Suture of skin and subcutaneous tissue	2016–2017, 2019–2023
174	Other non-OR therapeutic procedures on skin and breast[a]	2016, 2017
175	Other OR therapeutic procedures on skin and breast	2016–2023
225	Conversion of cardiac rhythm	2016–2023
244	Gastric bypass and volume reduction	2016–2023

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

[a] CCS categories 63, 95, 117, and 174 did not meet the criteria for inclusion beginning with the 2018 NASS because all in-scope surgeries were moved from these "non-OR therapeutic procedure" categories in an update to the CCS for Services and Procedures Tool. For example, all in-scope surgeries in CCS 95, *Other non-OR lower GI therapeutic procedures* were reassigned to CCS 96, *Other OR lower GI therapeutic procedures*. Therefore, these in-scope surgeries are still included in the NASS, but with a different CCS 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 in-scope surgery volume and hospital-owned facility outpatient market share for multiple CCS categories, resulting in additions to and deletions from the NASS in-scope CCS procedure groups between data year 2017 and 2018. See https://hcup-us.ahrq.gov/toolssoftware/ccs_svcsproc/ccssvcproc.jsp for more information on CCS for Services and Procedures.

APPENDIX C: DATA RESTRICTIONS

Table C1 enumerates the types of restrictions applied to the 2023 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 C1. Data Restrictions

Confidentiality of Hospitals
Limitations on release of identifiers to ensure hospital confidentiality: • Only masked hospital identifiers are included in the NASS, allowing the identification of all ambulatory surgery encounters from a hospital. • State identifiers are not included in the NASS.
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
At least one HCUP Partner excludes records for Human Immunodeficiency Virus (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: DATA ELEMENTS IN THE 2023 AHRQ HCUP NATIONWIDE AMBULATORY SURGERY SAMPLE (NASS)

Table D1. Data Elements in the 2023 NASS Hospital File

Type of Data Element	HCUP Name	Coding Notes
Encounter counts	TOTAL_AS_ENCOUNTERS	SASD 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_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	***Not available in the 2023 NASS***
	NASS_STRATUM	Stratum used to sample hospital-owned facilities. *Starting in data year 2019, the coding of NASS_STRATUM is a sequential number. Prior to data year 2019, the digits in NASS_STRATUM included information on 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. *Starting in data year 2023, information on Census region is excluded. Prior to data year 2023, the first digit of HOSP_NASS identified the Census region.*

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 D2. Data Elements in the 2023 NASS Encounter File

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.
CPT procedure information	CPT1-CPT30	In-scope CPT procedures on the record (maximum of 30)
	CPTCCS1-CPTCCS30	Clinical Classifications Software (CCS) category for in-scope CPT procedures
	NCPT_INSCOPE	Number of in-scope CPT procedures for this encounter
Diagnosis information	I10_DX1-I10_DX30	ICD-10-CM diagnoses (maximum of 30)
	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
NASS sample stratum	NASS_STRATUM	Stratum used to sample hospital-owned facilities, includes geographic region, bed size category, location/teaching status, and control/ownership
NASS hospital identifiers, synthetic	HOSP_NASS	Unique HCUP NASS hospital number, links to other NASS files but not to other HCUP databases *Starting in data year 2023, information on Census region is excluded. Prior to data year 2023, the first digit of HOSP_NASS identified the Census region.*

Type of Data Element	HCUP Data Element	Coding Notes
NASS record identifier, synthetic	KEY_NASS	Unique HCUP NASS record number, links to NASS Supplemental and Diagnosis and Procedure Groups Files, but not to other HCUP databases *Starting in data year 2023, information on Census region is excluded. Prior to data year 2023, the first digit of KEY_NASS identified the Census division.*
National quartile for median household income of patient's ZIP Code	ZIPINC_QRTL	Median household income quartiles for patient's ZIP Code: (1) 0-25th; (2) 26th-50th (median); (3) 51st to 75th; and (4) 76th to 100th. Specific thresholds change by year and can be found at https://hcup-us.ahrq.gov/db/vars/zipinc_qrtl/nassnote.jsp
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	***Not available in the 2023 NASS***
Sex of patient	FEMALE	Indicator of sex: (0) male, (1) female
Total charges	TOTCHG	***Not available in the 2023 NASS***
Urban-rural location of patient's residence	PL_NCHS2	Patient Location: NCHS Urban-Rural Code. This is a two-category urban-rural classification scheme for U.S. counties that is like the data element PL_NCHS that is available in the 2013-2022 NIS: (21) Metropolitan counties (consistent with PL_NCHS values 1-4 for large central, large fringe, medium, and small metropolitan areas, respectively) (22) Non-metropolitan counties (consistent with PL_NCHS values 5 and 6 for micropolitan and rural counties, respectively)

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 D3. Data Elements in the 2023 NASS Supplemental File

Type of Data Element	HCUP Data Element	Coding Notes
CPT procedure information[a]	SupCPT1-SupCPT30	Out-of-scope CPT procedures on the record (maximum of 30)
	SupCPTCCS1-SupCPTCCS30	Clinical Classifications Software category for out-of-scope CPT procedures
	NCPT_NOTINSCOPE	Number of out-of-scope CPT procedures for this encounter
Encounter year	YEAR	Encounter year
NASS hospital Identifiers, synthetic	HOSP_NASS	Unique HCUP NASS hospital number, links to other NASS files but not to other HCUP databases *Starting in data year 2023, information on Census region is excluded. Prior to data year 2023, the first digit of HOSP_NASS identified the Census region.*
	KEY_NASS	Unique HCUP NASS record number, links to NASS Encounter and Diagnosis and Procedure Groups Files but not to other HCUP databases *Starting in data year 2023, information on Census region is excluded. Prior to data year 2023, the first digit of HOSP_NASS identified the Census region.*

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).

Table D4. Data Elements in the 2023 NASS Diagnosis and Procedure Groups File

Type of Data Element	HCUP Data Element	Coding Notes
Chronic Condition Indicator Refined (CCIR)	CCIR1-CCIR30	Indication that a diagnosis is a chronic condition or not a chronic condition, identified by the AHRQ CCIR for ICD-10-CM diagnosis codes
	CCIR_VERSION	Version of CCIR for ICD-10-CM diagnoses
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_aaa[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
NASS hospital Identifiers, synthetic	HOSP_NASS	Unique HCUP NASS hospital number, links to other NASS files but not to other HCUP databases *Starting in data year 2023, information on Census region is excluded. Prior to data year 2023, the first digit of HOSP_NASS identified the Census region.*
	KEY_NASS	Unique HCUP NASS record number, links to NASS Encounter and Supplemental Files but not to other HCUP databases *Starting in data year 2023, information on Census region is excluded. Prior to data year 2023, the first digit of HOSP_NASS identified the Census region.*

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: COMPARISON OF IN-SCOPE AMBULATORY SURGERY CATEGORIES

Table E1. Encounter Totals by In-Scope Ambulatory Surgeries Defined by Clinical Classifications Software (CCS) for Services and Procedure Category, 2020–2023

CCS Category	Description	Total Encounter, N				Percentage Change, %			Potential Contributing Reasons for Change in Year-to-Year Percentage Change Greater than 20 Percent
		2020	2021	2022	2023	2020 - 2021	2021 - 2022	2022 - 2023	
003	Laminectomy, excision intervertebral disc	220,940	238,730	233,377	254,725	8.1	-2.2	9.1	
006	Decompression peripheral nerve	332,054	369,574	361,447	391,045	11.3	-2.2	8.2	
009	Other OR therapeutic nervous system procedures	99,886	117,596	123,359	140,929	17.7	4.9	14.2	
010	Thyroidectomy, partial or Complete	88,588	99,604	100,898	109,633	12.4	1.3	8.7	
012	Other therapeutic endocrine procedures	48,429	56,957	61,409	70,182	17.6	7.8	14.3	
013	Corneal transplant	15,904	18,556	18,194	18,746	16.7	-1.9	3.0	
014	Glaucoma procedures	52,373	64,522	48,381	47,688	23.2	-25.0	-1.4	Increase in volume from 2020-2021 may reflect return to 2019 ambulatory surgery volume after first year of a public health emergency. Decrease in volume from 2021-2022 may reflect this type of procedure being performed in clinics or non-hospital owned ambulatory surgery centers not represented in the NASS.
015	Lens and cataract procedures	879,523	1,034,570	1,021,226	1,012,561	17.6	-1.3	-0.8	
016	Repair of retinal tear, detachment	85,378	94,488	91,305	95,597	10.7	-3.4	4.7	

CCS Category	Description	Total Encounter, N				Percentage Change, %			Potential Contributing Reasons for Change in Year-to-Year Percentage Change Greater than 20 Percent
		2020	2021	2022	2023	2020 - 2021	2021 - 2022	2022 - 2023	
017	Destruction of lesion of retina and choroid	4,300	4,969	4,993	6,390	15.6	0.5	28.0	Increase in volume from 2022-2023 may reflect increasing use of ambulatory surgery for this type of procedure.
019	Other therapeutic procedures on eyelids, conjunctiva, cornea	113,054	132,042	133,024	141,836	16.8	0.7	6.6	
020	Other intraocular therapeutic procedures	71,129	80,519	77,233	83,979	13.2	-4.1	8.7	
021	Other extraocular muscle and orbit therapeutic procedures	48,741	59,810	57,314	65,758	22.7	-4.2	14.7	Increase in volume from 2020-2021 may reflect return to 2019 ambulatory surgery volume after first year of a public health emergency.
022	Tympanoplasty	44,158	53,261	47,864	45,953	20.6	-10.1	-4.0	Increase in volume from 2020-2021 may reflect return to 2019 ambulatory surgery volume after first year of a public health emergency.
023	Myringotomy	181,367	173,445	290,283	378,266	-4.4	67.4	30.3	Increase in volume from 2021-2022 may reflect slow return to 2019 ambulatory surgery volume. Increase in volume from 2022-2023 may reflect increasing use of ambulatory surgery for this type of procedure.
024	Mastoidectomy	15,331	17,315	16,835	17,175	12.9	-2.8	2.0	
026	Other therapeutic ear procedures	27,796	34,505	34,576	40,595	24.1	0.2	17.4	Increase in volume from 2020-2021 may reflect return to 2019 ambulatory surgery volume after first year of a public health emergency.
028	Plastic procedures on nose	133,742	161,542	160,821	175,749	20.8	-0.4	9.3	Increase in volume from 2020-2021 may reflect return to 2019 ambulatory surgery volume after first year of a public health emergency.
030	Tonsillectomy and/or adenoidectomy	266,989	246,413	325,176	518,496	-7.7	32.0	59.5	Increase in volume from 2021-2022 may reflect slow return to 2019 ambulatory surgery volume. Increase in volume from 2022-2023 may reflect increasing use of ambulatory surgery for this type of procedure.

CCS Category	Description	Total Encounter, N				Percentage Change, %			Potential Contributing Reasons for Change in Year-to-Year Percentage Change Greater than 20 Percent
		2020	2021	2022	2023	2020 - 2021	2021 - 2022	2022 - 2023	
033	Other OR therapeutic procedures on nose, mouth and pharynx	226,081	258,397	265,073	302,866	14.3	2.6	14.3	
042	Other OR therapeutic procedures on respiratory system	30,176	37,458	37,310	39,890	24.1	-0.4	6.9	Increase in volume from 2020-2021 may reflect return to 2019 ambulatory surgery volume after first year of a public health emergency.
043	Heart valve procedures	3,961	4,859	4,890	4,781	22.7	0.6	-2.2	Increase in volume from 2020-2021 may reflect return to 2019 ambulatory surgery volume after first year of a public health emergency.
048	Insertion, revision, replacement, removal of cardiac pacemaker or cardioverter/defibrillator	257,606	284,354	294,542	306,960	10.4	3.6	4.2	
049	Other OR heart procedures	14,210	16,613	18,357	23,105	16.9	10.5	25.9	Increase in volume from 2022-2023 may reflect a continuing trend in the increasing use of ambulatory surgery for this type of procedure.
057	Creation, revision and removal of arteriovenous fistula or vessel-to-vessel cannula for dialysis	141,773	146,464	143,094	139,516	3.3	-2.3	-2.5	
061	Other OR procedures on vessels other than head and neck	200,379	207,269	200,669	204,008	3.4	-3.2	1.7	

CCS Category	Description	Total Encounter, N				Percentage Change, %			Potential Contributing Reasons for Change in Year-to-Year Percentage Change Greater than 20 Percent
		2020	2021	2022	2023	2020 - 2021	2021 - 2022	2022 - 2023	
067	Other therapeutic procedures, hemic and lymphatic system	277,619	309,222	321,852	356,225	11.4	4.1	10.7	
078	Colorectal resection	11,608	13,847	14,658	15,772	19.3	5.9	7.6	
080	Appendectomy	263,929	281,913	271,070	313,093	6.8	-3.8	15.5	
081	Hemorrhoid procedures	47,709	58,627	58,675	60,219	22.9	0.1	2.6	Increase in volume from 2020-2021 may reflect return to 2019 ambulatory surgery volume after first year of a public health emergency.
084	Cholecystectomy and common duct exploration	541,909	600,924	594,880	643,434	10.9	-1.0	8.2	
085	Inguinal and femoral hernia Repair	399,740	446,198	476,637	509,894	11.6	6.8	7.0	
086	Other hernia repair	366,704	432,328	455,299	462,463	17.9	5.3	1.6	
087	Laparoscopy	77,524	85,695	83,237	89,705	10.5	-2.9	7.8	
094	Other OR upper GI therapeutic procedures	21,694	24,422	26,185	28,601	12.6	7.2	9.2	
096	Other OR lower GI therapeutic procedures	63,145	73,481	74,559	76,515	16.4	1.5	2.6	
099	Other OR gastrointestinal therapeutic procedures	17,034	20,345	19,985	20,635	19.4	-1.8	3.3	
101	Transurethral excision, drainage, or removal urinary obstruction	149,311	162,178	164,535	172,523	8.6	1.5	4.9	

CCS Category	Description	Total Encounter, N				Percentage Change, %			Potential Contributing Reasons for Change in Year-to-Year Percentage Change Greater than 20 Percent
		2020	2021	2022	2023	2020 - 2021	2021 - 2022	2022 - 2023	
104	Nephrectomy, partial or complete	10,229	13,810	16,032	19,769	35.0	16.1	23.3	Increase in volume from 2020-2021 may reflect increasing use of ambulatory surgery for this type of procedure. Increase in volume from 2022-2023 may reflect a continuing trend in the increasing use of ambulatory surgery for this type of procedure.
106	Genitourinary incontinence procedures	93,999	109,508	116,271	126,579	16.5	6.2	8.9	
109	Procedures on the urethra	16,256	18,641	18,189	20,215	14.7	-2.4	11.1	
112	Other OR therapeutic procedures of urinary tract	19,968	23,002	23,870	28,593	15.2	3.8	19.8	
113	Transurethral resection of prostate (TURP)	79,868	91,946	97,213	102,899	15.1	5.7	5.8	
114	Open prostatectomy	40,903	49,369	54,801	71,251	20.7	11.0	30.0	Increase in volume from 2020-2021 may reflect increasing use of ambulatory surgery for this type of procedure. Increase in volume from 2022-2023 may reflect a continuing trend in the increasing use of ambulatory surgery for this type of procedure.
118	Other OR therapeutic procedures, male genital	162,850	184,628	188,540	209,128	13.4	2.1	10.9	
119	Oophorectomy, unilateral and bilateral	163,259	190,996	221,115	242,442	17.0	15.8	9.6	
120	Other operations on ovary	13,486	16,021	15,946	14,724	18.8	-0.5	-7.7	
121	Ligation of fallopian tubes	45,659	43,003	38,163	26,636	-5.8	-11.3	-30.2	Decrease in volume from 2022-2023 may reflect a continuing trend of women choosing not to have this type of surgery.
122	Removal of ectopic pregnancy	28,001	29,648	28,928	31,894	5.9	-2.4	10.3	

CCS Category	Description	Total Encounter, N				Percentage Change, %			Potential Contributing Reasons for Change in Year-to-Year Percentage Change Greater than 20 Percent
		2020	2021	2022	2023	2020 - 2021	2021 - 2022	2022 - 2023	
124	Hysterectomy, abdominal and vaginal	362,270	422,864	445,052	511,417	16.7	5.2	14.9	
125	Other excision of cervix and uterus	45,368	56,524	60,244	61,903	24.6	6.6	2.8	Increase in volume from 2020-2021 may reflect return to 2019 ambulatory surgery volume after first year of a public health emergency.
129	Repair of cystocele and rectocele, obliteration of vaginal vault	85,242	98,173	106,145	116,580	15.2	8.1	9.8	
132	Other OR therapeutic procedures, female organs	204,583	242,542	252,502	291,916	18.6	4.1	15.6	
142	Partial excision bone	233,487	240,696	228,456	246,617	3.1	-5.1	7.9	
143	Bunionectomy or repair of toe deformities	145,009	153,165	157,304	162,980	5.6	2.7	3.6	
144	Treatment, facial fracture or dislocation	34,101	37,987	38,249	38,360	11.4	0.7	0.3	
145	Treatment, fracture or dislocation of radius and ulna	132,590	141,349	139,975	136,905	6.6	-1.0	-2.2	
146	Treatment, fracture or dislocation of hip and femur	7,812	13,741	11,291	11,749	75.9	-17.8	4.1	Increase in volume from 2020-2021 may reflect increasing use of ambulatory surgery for this type of procedure.
147	Treatment, fracture or dislocation of lower extremity (other than hip or femur)	190,041	209,312	210,257	214,964	10.1	0.5	2.2	
148	Other fracture and dislocation Procedure	123,403	131,294	130,927	139,067	6.4	-0.3	6.2	

CCS Category	Description	Total Encounter, N				Percentage Change, %			Potential Contributing Reasons for Change in Year-to-Year Percentage Change Greater than 20 Percent
		2020	2021	2022	2023	2020 - 2021	2021 - 2022	2022 - 2023	
149	Arthroscopy	75,626	90,568	94,628	98,379	19.8	4.5	4.0	
150	Division of joint capsule, ligament or cartilage	47,137	49,702	47,023	49,881	5.4	-5.4	6.1	
151	Excision of semilunar cartilage of knee	327,348	344,790	328,294	325,244	5.3	-4.8	-0.9	
152	Arthroplasty knee	397,276	581,376	700,158	816,062	46.3	20.4	16.6	Yearly increase in volume from 2020-2022 may reflect increasing use of ambulatory surgery for this type of procedure.
153	Hip replacement, total and Partial	207,857	339,653	405,414	466,730	63.4	19.4	15.1	Yearly increase in volume from 2020-2022 may reflect increasing use of ambulatory surgery for this type of procedure.
154	Arthroplasty other than hip or knee	62,708	152,901	194,937	253,034	143.8	27.5	29.8	Yearly increase in volume from 2020-2023 may reflect increasing use of ambulatory surgery for this type of procedure.
157	Amputation of lower extremity	43,724	47,338	47,887	53,313	8.3	1.2	11.3	
158	Spinal fusion	96,087	144,044	134,464	157,499	49.9	-6.7	17.1	Increase in volume from 2020-2021 may reflect increasing use of ambulatory surgery for this type of procedure.
160	Other therapeutic procedures on muscles and tendons	782,577	856,605	854,716	907,804	9.5	-0.2	6.2	
161	Other OR therapeutic procedures on bone	256,529	290,005	291,941	319,719	13.0	0.7	9.5	
162	Other OR therapeutic procedures on joints	455,452	481,878	465,008	494,876	5.8	-3.5	6.4	
164	Other OR therapeutic procedures on musculoskeletal system	49,358	53,877	51,246	54,619	9.2	-4.9	6.6	

CCS Category	Description	Total Encounter, N				Percentage Change, %			Potential Contributing Reasons for Change in Year-to-Year Percentage Change Greater than 20 Percent
		2020	2021	2022	2023	2020 - 2021	2021 - 2022	2022 - 2023	
166	Lumpectomy, quadrantectomy of breast	291,853	332,177	339,254	340,351	13.8	2.1	0.3	
167	Mastectomy	92,734	104,353	108,980	116,381	12.5	4.4	6.8	
170	Excision of skin lesion	107,707	122,765	128,557	159,676	14.0	4.7	24.2	Increase in volume from 2022-2023 may reflect increasing use of ambulatory surgery for this type of procedure.
171	Suture of skin and subcutaneous tissue	100,817	110,128	102,574	115,166	9.2	-6.9	12.3	
175	Other OR therapeutic procedures on skin and breast	330,690	394,619	394,545	415,765	19.3	0.0	5.4	
225	Conversion of cardiac rhythm	158,750	201,665	225,417	277,492	27.0	11.8	23.1	Increase in volume from 2020-2021 may reflect increasing use of ambulatory surgery for this type of procedure. Increase in volume from 2022-2023 may reflect a continuing trend in the increasing use of ambulatory surgery for this type of procedure.
244	Gastric bypass and volume Reduction	25,629	38,402	43,851	37,444	49.8	14.2	-14.6	Increase in volume from 2020-2021 may reflect increasing use of ambulatory surgery for this type of procedure.

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

[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.

Notes: Totals represent weighted estimates. CCS category totals are unduplicated, such that if two or more CPT codes on the same encounter record mapped to the same CCS category, the record was only counted once. Totals are missing if the CCS 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.

APPENDIX F. SAMPLE METHODOLOGY FOR THE NASS

Creation of the NASS

The creation of the NASS requires the following steps:

- ***Identify in-scope ambulatory surgeries.*** The HCUP Surgery Flag Software is used to identify in-scope ambulatory surgeries (see Selection of In-Scope Ambulatory Surgeries). The ambulatory surgeries selected for inclusion in the NASS are therapeutic procedures which require the use of an operating room, penetrate or break the skin, and involve regional anesthesia, general anesthesia, or sedation to control pain. Additional empirical criteria are used to define qualifying CCS-Services and Procedures[1] categories or in-scope 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 in-scope ambulatory surgery volume in the SASD ***or*** at least .05% of total charges associated with in-scope ambulatory surgery encounters in the SASD) and evidence that SASD hospitals are reliably reporting in-scope 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 rehabilitation and long-term acute care hospitals) in the SASD that perform in-scope ambulatory surgeries. Additional restrictions imposed for the NASS sampling frame were that the hospitals have no gross irregularities in quarterly reporting volume, submit data to the SASD in all four quarters of the data year, and not have an unusually low volume of encounters containing an in-scope ambulatory surgery. (For the 2020 NASS, only quarters 1, 3, and 4 were used to judge irregularities in quarterly volume because almost all facilities had a severe drop in surgeries in quarter 2 of 2020 because of the COVID-19 pandemic.)
- ***Build encounter predictive models.*** NASS sampling frame hospitals are used to create models for volumes of encounters containing in-scope 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 the SASD and hospitals reporting outpatient surgery volume in the American Hospital Association (AHA) Annual Survey of Hospitals™. 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. At least 10 hospitals are required in each stratum.
- ***Compute sample weights.*** Hospitals performing in-scope procedures are sampled from the NASS sampling frame. On the basis of the set of NASS sample hospitals and universe totals, sample weights that project the NASS encounters and in-scope ambulatory surgeries to the universe are computed.

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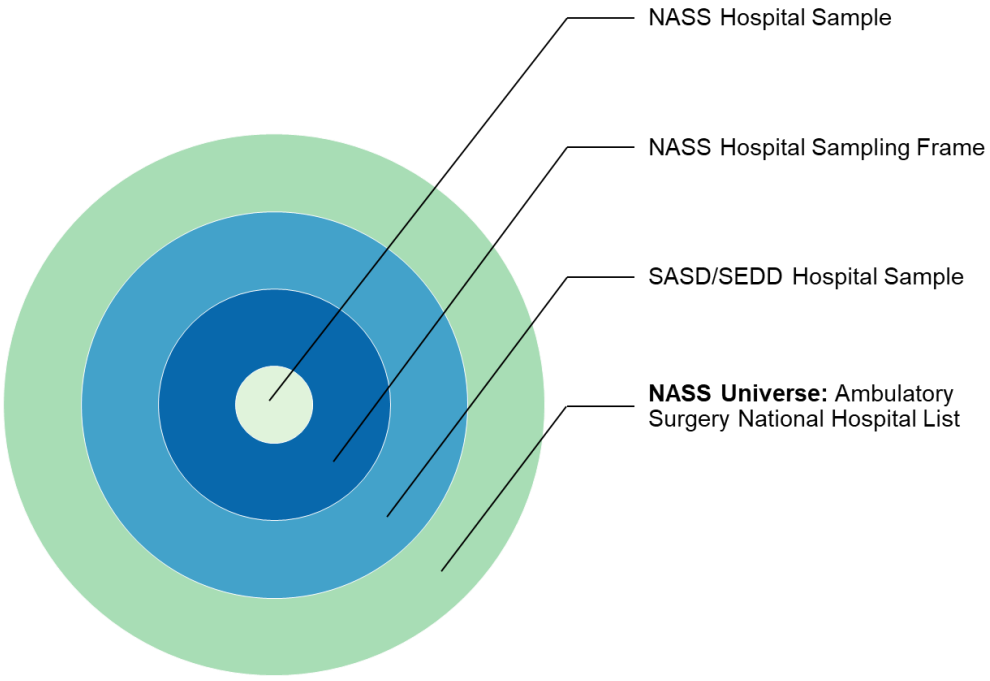
[1] Agency for Healthcare Research and Quality. Clinical Classifications Software (CCS) for Services and Procedures. Healthcare Cost and Utilization Project (HCUP). Last modified July 16, 2025. https://hcup-us.ahrq.gov/toolssoftware/ccs_svcsproc/ccssvcproc.jsp. Accessed August 19, 2025.

- ***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 sample, and the NASS sampling frame is portrayed in Figure F.1. The predictive model for hospital 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 2023, the NASS sample and sampling frame were identical because 100 percent of hospitals were sampled.

Figure F1. NASS Hospital Universe, SASD Sample, and NASS Sampling Frame



Abbreviations: NASS, Nationwide Ambulatory Surgery Sample; SASD, State Ambulatory Surgery and Services Databases.

The following sections provide a detailed description of several key NASS development steps.

Selection of In-Scope Ambulatory Surgeries

HCUP Surgery Flag Software[2] was used to identify surgical procedures of interest for the NASS. The Surgery Flag Software classifies CPT procedure codes as *narrow*, *broad,* or *neither*. The NASS focuses on surgeries in the *narrow* class, or **in-scope ambulatory surgeries**. These surgeries consist of procedures that (1) require the use of an operating room, (2) penetrate or

[2] Agency for Healthcare Research and Quality. Surgery Flag Software for Services and Procedures. Healthcare Cost and Utilization Project (HCUP). https://hcup-us.ahrq.gov/toolssoftware/surgeryflags_svcproc/surgeryflagssvc_proc.jsp. Accessed August 19, 2025.

break the skin, and (3) involve regional anesthesia, general anesthesia, or sedation to control pain. Examples of in-scope procedures include cataract surgery, cholecystectomy, appendectomy, gastric bypass, hysterectomy, hernia repair, spinal fusion, and hip replacement.

The following three procedures, which are primarily performed for a diagnostic purpose, are assigned a *narrow* surgery flag 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.

Starting with v2019.2 of the HCUP Surgery Flag Software (used for the 2018–2019 NASS), *narrow* surgeries are identified in the following ranges of CPT codes: surgical, emerging technology, radiology, and medical (excluding the evaluation and management codes). For the 2023 NASS, v2023.1 of the HCUP Surgery Flag Software was used because v2023.1 is relevant to CPT codes valid in calendar year 2023.

Several selection criteria were used to **define in-scope ambulatory surgeries** for the NASS. Prior to application of selection criteria, all in-scope ambulatory surgeries identified by HCUP Surgery Flag Software (as *narrow*) were grouped in categories defined by CCS for Services and Procedures.[3] For the 2023 NASS, v2023.1 of the CCS for Services and Procedures was used because it is relevant to CPT codes valid in calendar year 2023.

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 ambulatory surgery volume in the SASD ***or*** at least .05% of total charges associated with ambulatory surgery encounters in the SASD.
2. *Reporting quality*. Hospitals are reliably submitting ambulatory surgery data. Four CCS-Services and Procedures categories are excluded because an examination of the data in the SASD showed evidence of unreliable reporting or underreporting of dental services, skin grafts, wound debridement, and percutaneous transluminal coronary angioplasty (PTCA)[4] at the hospital-level.

The final set of included, or *in-scope*, CCS-Services and Procedures categories for the 2023 NASS is provided in Appendix B. Appendix B also includes a running list of changes to the in-scope procedure groups over time.

Figure F2 illustrates the relationship between ambulatory surgeries, major ambulatory surgeries, and in-scope ambulatory surgeries. Note that although encounters are limited to those with at least one in-scope ambulatory surgery on the record, the NASS Supplemental File provides information on other (or *out-of-scope*) procedures performed during these encounters.

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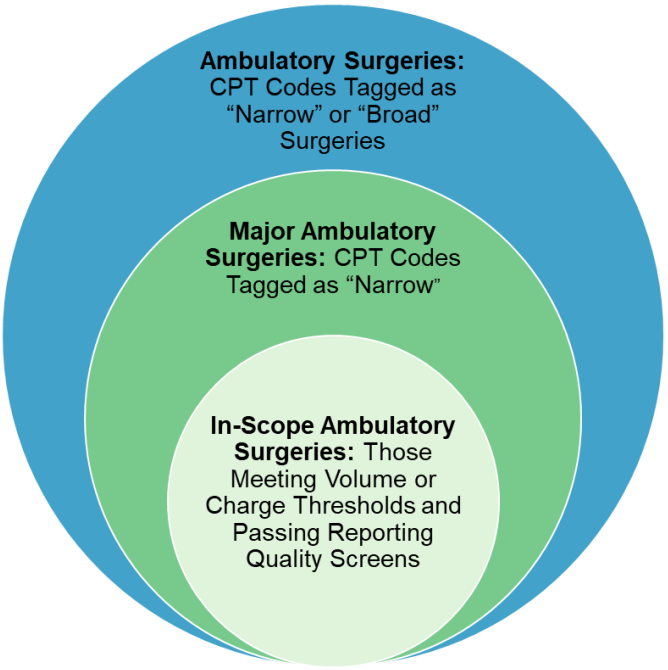
[3] Agency for Healthcare Research and Quality. Clinical Classifications Software (CCS) for Services and Procedures. Healthcare Cost and Utilization Project (HCUP). https://hcup-us.ahrq.gov/toolssoftware/ccs_svcsproc/ccssvcproc.jsp. Accessed August 19, 2025.

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

Figure F2. Ambulatory Surgeries, Major Ambulatory Surgeries, and In-Scope Ambulatory Surgeries



Abbreviation: CPT, Current Procedural Terminology.

Sampling Design of the NASS

The NASS is a stratified cluster sample of in-scope ambulatory surgery encounters occurring in hospital-owned facilities (see Selection of In-Scope Ambulatory Surgeries). 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.

Ambulatory Surgery Setting and Universe Definition

Ambulatory surgeries can be 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 in-scope 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."[5] 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 in-scope 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.[6] 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 **in-scope ambulatory surgeries** (see Selection of In-Scope Ambulatory Surgeries). Self-reported hospital ambulatory surgery volumes from the AHA may or may not be consistent with the HCUP definition of *in-scope ambulatory surgeries*, and it is challenging to ascertain that consistency. Consequently, rather than using an external reference source for in-scope ambulatory surgery volumes, the NASS universe of in-scope 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 in-scope ambulatory surgeries. Estimated encounter volumes were generated using a predictive model, described in NASS Sampling Frame.

Generating the Ambulatory Surgery National Hospital List

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

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[5] See the AHA "community hospital designation" at www.ahadataviewer.com/glossary.
[6] 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. 2021 AHA Annual Survey. https://www.ahadata.com/system/files/media/file/2022/11/AHA-Annual-Survey-2021_0.pdf. Accessed August 19, 2025.)

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

NASS Sampling Frame

Selection of SASD hospitals for the NASS sampling frame was limited to facilities owned by community hospitals, excluding rehabilitation and LTAC hospitals.[7]

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 in all four quarters of the year, and (3) not have an unusually low volume of encounters containing an in-scope ambulatory surgery.

A comparison between the 2023 NASS hospital universe and the final NASS sample is provided in Table F.1.

Table F1. NASS Target Universe, Sampling Frame, and Final Sample Characteristics, 2023

Sample	Description	Number of Hospitals Providing Outpatient Surgery	Number of In-Scope Ambulatory Surgery Encounters
2023 target universe	Community hospitals (excluding rehabilitation and LTAC)	4,307[a]	13,527,434[b]
2023 NASS	Sample of target universe drawn from the sampling frame	2,554	8,775,003

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

[a] Estimated. See the section on Generating the Ambulatory Surgery National Hospital List in Appendix F for information on the estimation process.

[b] Estimated. See the section on NASS Encounter Predictive Model in Appendix F for information on the estimation process.

NASS Encounter Predictive Model

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

[7] 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.

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

Table F2. 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)	001–025
	026–049
	050–099
	100–199
	200–299
	300–399
	400–499
	500+
AHA Annual Survey: self-reported outpatient surgery volume	Log scale

Abbreviation: AHA, American Hospital Association.

Post-Stratification for Weighting

Post-stratification for the purpose of weighting allows for compensation of any over- or under-represented types of hospitals in the NASS sampling frame with respect to the distribution in the target universe. Hospital characteristics for post-stratification were selected using results from the encounter predictive model (which quantifies the importance of stratification factors in encounter volume variation) and a study of the current NIS and NEDS stratification schemes. Table F3 contains values for the NASS stratification variables: census region, bed size

category,[8] location and teaching status, and ownership.[9] There are over 100 possible strata (i.e., unique combinations of region, bed size, location/teaching status, and ownership categories).

Table F3. Stratification Variables for the Nationwide Ambulatory Surgery Sample (NASS)

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 0.20.[10]

Assignment of hospitals to the initial stratification scheme of over 100 levels results in a number of strata with fewer than 10 sampling frame hospitals and small sampling fractions. In those cases, ownership category was collapsed, first by combining local and State government with voluntary hospitals.[11] If the goal still was not achieved, all the ownership types were combined.

After the initial strata collapsing was completed, additional adjustments were made to ensure no single stratum had a large percentage of total encounter or hospital volume. This led to relaxing

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[8] Bed size categories were originally established for the development of the 1998 Nationwide Inpatient Sample (NIS). Cutoff points were 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 https://hcup-us.ahrq.gov/db/nation/nis/nisdbdocumentation.jsp.

9 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.

[10] *The sampling fraction* is defined as (number units in sample)/(number units in universe). The overall sampling fraction for the 2023 universe of hospitals and sampling frame is (2,554/4,307) = 0.59.

[11] 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.

the number of sampling frame hospitals or sampling fraction criteria for some strata. Following these additional adjustments, the 2023 NASS had 48 strata. In the end, all strata had at least 12 hospitals and sampling fractions greater than 0.17.

Encounter 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 encounter weights is straightforward. Given a universe of encounter volumes in stratum *s*, the encounter 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.

Frame Sampling Rate

For the 2023 NASS, all hospitals in the sampling frame were selected for inclusion in the NASS, resulting in an approximate 59.3 percent sample of universe hospitals.

Calculation of 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:

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

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 ($Q_i = 4$ 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. The NASS sampling frame required that all hospitals qualifying for the frame submit data in all four quarters of the year, with the exception of data year 2020 in which quarter 2 (April-June) was not counted because of the emergence of COVID-19.