



H·CUP
HEALTHCARE COST AND UTILIZATION PROJECT

USER GUIDE:

**SURGERY FLAG SOFTWARE FOR
SERVICES AND PROCEDURES,
v2023.1**

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New Jersey Department of Health
New Mexico Department of Health
New York State Department of Health
North Carolina Department of Health and Human Services
North Dakota (data provided by the Minnesota Hospital Association)
Ohio Hospital Association
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Oregon Association of Hospitals and Health Systems
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WHAT'S NEW IN v2023.1 OF THE SURGERY FLAGS SOFTWARE FOR SERVICES AND PROCEDURES?

- The Surgery Flags Software-Services and Procedures v2023.1 is based on Healthcare Common Procedure Coding System HCPCS Level I codes, also known as Current Procedural Terminology (CPT®) codes, valid as of January 1, 2023.
 - Added 123 new CPT codes.
 - Removed 42 CPT codes that were discontinued during 2022. For the assignment of the Surgery Flags Software-Services and Procedures for data years prior to 2023, refer to the archived older versions of the software tool.

INTRODUCTION

This report provides technical documentation for the Healthcare Cost and Utilization Project (HCUP) Surgery Flags Software for Services and Procedures (referred to in this document as Surgery Flags Software-Services and Procedures).

The Surgery Flags Software-Services and Procedures identifies a subset of Healthcare Common Procedure Coding System (HCPCS) Level I codes, commonly referred to as Current Procedural Terminology (CPT®) codes, as surgical procedures. CPT is a proprietary coding system developed and maintained by the American Medical Association (AMA) for coding services provided by health care professionals.¹ There are three types of five-character CPT codes: Category I, which describe services and procedures performed by providers; Category II, which are used for tracking patient follow up and outcomes; and Category III, which indicate the use of emerging technologies. The Surgery Flags Software-Services and Procedures tool includes CPT codes in the following ranges that include at least some surgical procedures:

- CPT Category I, Surgery: 10004–69990
- CPT Category I, Radiology procedures (added in v2019.2): 70010–79999
- CPT Category I, Medicine services and procedures (added in v2019.2): 90281–99756, excluding the evaluation and management codes in the range 99201-99499, and codes ending in A specific to the administration of COVID-19 vaccines
- CPT Category III Codes, Temporary codes for emerging or experimental services, technology, or procedures (added v2018): 0042T–0783T.

Excluded are all other ranges of CPT Category I codes (i.e., codes specific to anesthesia, pathology and laboratory procedures, evaluation and management services, laboratory analyses, multianalyte assay) and any CPT Category II codes. Also excluded are all HCPCS Level II codes.

Starting with v2020.1, CPT codes in the specified ranges are classified as one of three categories:

- A narrowly defined surgery (Narrow) that is usually a major therapeutic procedure
- A more broadly defined surgery (Broad) that includes major diagnostic and invasive minor therapeutic procedures
- Neither a narrowly nor broadly defined surgery (Neither).

Background on the development of the Surgery Flags Software-Services and Procedures is provided in [Appendix A](#).

¹ More information on CPTs is available at the American Medical Association website at www.ama-assn.org/practice-management/cpt.

The AMA updates CPT codes on a calendar year basis with an extensive update effective on January 1 and a limited “early release” of codes effective on July 1. The Surgery Flags Software-Services and Procedures is updated annually to coincide with the January update. The Surgery Flags Software-Services and Procedures v2023.1 is based on CPT codes valid on January 1, 2023.

Files containing the mapping of CPT codes and their corresponding surgery flag assignment can be downloaded from the [HCUP User Support \(HCUP-US\)](#) website.²

DESCRIPTION OF THE SURGERY FLAGS SOFTWARE-SERVICES AND PROCEDURES

Definition of Surgery Flags

The Surgery Flags Software-Services and Procedures tool includes CPT codes—specifically, Category I codes in the surgery range (10004–69990), radiology range (70010–79999), medicine range (90281–99756, excluding the evaluation and management codes in the range 99201-99499, and codes ending in A specific to the administration of COVID-19 vaccines), and the Category III code range (0042T–0783T). Procedures in these ranges are assigned into one of the three surgery flag assignments:

- **Narrow** surgical procedure
- **Broad** surgical procedure
- **Neither** a narrow nor broad surgical procedure.

Each eligible CPT procedure is clinically reviewed to determine the following characteristics that will determine the surgery flag assignment:

- Does the procedure need to be performed in an operating room (i.e., is it a major procedure)? All other procedures would be considered minor.
- Is the purpose of the major or minor procedure to determine the diagnosis of illness (diagnostic) or for the treatment of a condition (therapeutic)?
- How invasive is the procedure to the human body?
- Does the procedure require that the patient receives some type of anesthesia or sedation for pain control?

² The HCUP User Support website can be found at www.hcup-us.ahrq.gov/.

Narrow

An eligible CPT code is classified as a Narrow surgical procedure if it meets the following definition:

- A *major therapeutic procedure* involving incision, excision, manipulation, or suturing of tissue that—
 - Requires the use of an operating room and
 - Penetrates or breaks the skin and
 - Involves regional anesthesia, general anesthesia, or sedation to control pain.

Below are examples of procedures that are classified as Narrow:

- Transplantation of an organ
- Amputation of limb
- Arthroplasty
- Angiographic procedures or other catheter-based procedures that involve a major intervention such as percutaneous transluminal coronary angioplasty (PTCA), vascular stent placement, and transcatheter aortic valve replacement
- Extracorporeal membrane oxygenation (ECMO) if open or by sternotomy or thoracotomy
- Reconstruction (e.g., breast, atria, eyelid)
- Incisions and drainage if the procedure is for a deep abscess, bursa, or below the fascia
- Excision of a malignant lesion with an excised diameter of at least 3.0 cm
- Open treatment of fractures.

There are three notable exceptions to the above definition specifying that the Narrow surgery flag is specific to major therapeutic procedures. 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
- Exploratory laparotomy with or without biopsy.

Broad

An eligible CPT code is classified as a Broad surgical procedure if has not been classified as a Narrow surgical procedure and is defined as:

- A *major diagnostic procedure* or a *minor therapeutic procedure* involving incision, excision, manipulation, or suturing of tissue that—
 - Penetrates or breaks the skin and
 - Often requires the use of an operating room and
 - May involve regional anesthesia, general anesthesia, or sedation to control pain.

Below are examples of procedures that are classified as Broad:

- Endoscopic procedures if they include a therapeutic intervention (e.g., incision, destruction of lesion) or diagnostic removal of tissue (e.g., excision, removal of polyp)
- Biopsy of tissue (not within an internal organ)
- Exploratory laparoscopy if it is performed for a diagnostic purpose
- Episiotomy
- Percutaneous skeletal fixation
- Repair of wounds on the scalp or face
- Excision of a malignant lesion with an excised diameter less than 3.0 cm
- Excision of a non-malignant lesion or tumor, regardless of the excised diameter.

Exceptions to a major diagnostic procedure being classified as a Broad surgical procedure are noted under the definition of Narrow. There are also exceptions to a minor therapeutic procedure being classified as a Broad surgical procedure. The Broad assignment *depends on the invasiveness of the procedure*, including the location where the procedure is performed and the degree of anesthesia. If the minor therapeutic procedure does not qualify, it is assigned to Neither a narrow nor broad surgical procedure. Some examples of minor therapeutic procedures and their assigned surgery flag, with justifications, are provided below:

- Cranial puncture is classified as a Broad surgical procedure. It is a minor (percutaneous) procedure, requires minimal anesthesia, and is not routinely performed in the operating room; however, it involves the cranium, and there is a substantial invasive component to the procedure.
- Repair of wound on eyelid is classified as a Broad surgical procedure because, although it is not complex, requires minimal anesthesia, and is not routinely performed in the operating room, it is an invasive procedure.
- Spinal patch is not classified as a Broad surgical procedure because, although it is performed in the operating room under local anesthesia, it is not an invasive percutaneous procedure. Therefore, this procedure is classified as Neither a narrow nor a broad surgical procedure.
- Injection of chemotherapy is not classified as a Broad surgical procedure because it does not require anesthesia and is not performed in the operating room. Therefore, this procedure is Neither a narrow nor broad surgical procedure.

Neither (Narrow nor Broad)

The Neither surgery flag is assigned to all eligible CPT codes that are *minor diagnostic procedures*, in addition to *minor therapeutic procedures* that do not meet the definition for a Broad surgical procedure. (All major therapeutic and diagnostic procedures are classified as Narrow or Broad surgical procedures.)

Below are examples of procedures that are classified as Neither (narrow nor broad):

- Lithotripsy
- Radiosurgery
- Shaving of epidermal or dermal lesion
- Endoscopy (including colonoscopy) without biopsy or removal of tissue; visual inspection for diagnostic purpose
- Angiography for diagnostic purpose
- Ablation of nerve or vein
- Injections, even if performed for catheter placement

In addition, a CPT code that is only to be reported in tandem with another code (i.e., the CPT code is paired with another code to provide additional information) is classified as Neither broad nor narrow. These paired codes can be identified, although not limited to, the following description within the CPT label: “List separately in addition to code for primary procedure.” For example, the CPT code for “PTCA for each additional branch of a coronary artery (List separately in addition to code for primary procedure)” is coded as Neither because it must be reported with the CPT code listing the primary procedure “PTCA single major coronary artery or branch.”

USING THE SURGERY FLAGS SOFTWARE-SERVICES AND PROCEDURES WITH THE CLINICAL CLASSIFICATIONS SOFTWARE FOR SERVICES AND PROCEDURES

The Clinical Classifications Software for Services and Procedures (CCS-Services and Procedures) aggregates individual CPT and HCPCS Level II codes into over 240 clinically meaningful categories. The individual CPT codes within a CCS-Services and Procedures category are clinically similar but may vary in their surgery flag assignment. For example, CCS 113 *Transurethral Resection of Prostate (TURP)* includes 7 CPT codes, 5 of which are Broad, and 2 of which are Narrow.³ In contrast, CCS 85 *Inguinal and Femoral Hernia Repair* includes 17 different codes, all of which are considered Narrow.

Counting Major Therapeutic Surgeries Using the CCS-Services and Procedures and Surgery Flags Software-Services and Procedures

The CCS-Services and Procedures is often used to report the occurrence of procedures in the outpatient setting. If the focus is *major therapeutic surgeries*, the Surgery Flags Software-

³ The one HCPCS Level II code in CCS 113 *TURP* is not included in the surgery flag tool.

Services and Procedures can be used to identify the Narrow surgeries and the CCS-Services and Procedures can be used to classify the individual procedure codes into clinical categories. For example, identifying records in the HCUP State Ambulatory Surgery and Services Databases in CCS 113 *TURP* (described above as including Broad and Narrow procedures) and limiting those records to those for which the CPT code in CCS 113 was a Narrow procedure (surgery flag value 2) would result in a count of major therapeutic TURP encounters in the State.

USING THE DOWNLOADABLE SURGERY FLAGS SOFTWARE-SERVICES AND PROCEDURES FILES

System Requirements

Using the Surgery Flags Software-Services and Procedures requires a program to decompress or “unzip” files.⁴ Approximately 0.5 megabytes of disk space available on one’s hard drive also is needed to accommodate all the Surgery Flags Software-Services and Procedures files. Additional space is necessary for saving the Surgery Flags Software-Services and Procedures output files.

Downloadable Files

Before downloading the Surgery Flags Software-Services and Procedures, users must agree to a license agreement with the AMA for using CPT codes.

The Surgery Flags Software-Services and Procedures zip file contains the following:

1. One translation table in comma separated values (CSV) file format that is used to assign surgery flags to data sets that contain CPT information. The surgical flag has the following values:⁵
 - a. 0 (Neither)
 - b. 1 (Broad)
 - c. 2 (Narrow).
2. SAS program to apply the tool to the user’s data
3. Surgery Flags Software-Services and Procedures User Guide (PDF)

⁴ Third-party zip utilities are available from the following reputable vendors on their official websites: ZIP Reader (Windows) (free download offered by PKWARE, Inc.), SecureZIP® for Mac or Windows (free evaluation and licensed/fee software offered by PKWARE, Inc.), WinZip (Windows) (evaluation and fee versions offered by the Corel Corporation), Stuffit Expander® (Mac) (free evaluation and licensed/fee software offered by Smith Micro Software Inc.).

⁵ CPT codes outside the specified ranges of surgical, radiology, and medicine codes (in addition to any HCPCS level II codes) are not included in the CSV file. The SAS mapping program will assign these codes a missing surgery flag value (SAS missing value .).

4. Change log detailing changes between v2022.1 and v2023.1.

Table 1 includes detail on the names and purposes of each file contained in the Surgery Flags Software-Services and Procedures zip file.

Table 1. Contents of the Surgery Flags Software-Services and Procedures Zip File

File Name	Purpose
<p>SurgeryFlags_Services_Procedures_vyyyy-r_mmddyy.csv</p> <p>Where yyyy represents calendar year and <i>r</i> represents a release number within the year,^a and <i>mmddyy</i> is the creation date of the CSV file</p>	<p>The CSV mapping file lists ranges of CPT codes, the surgery flag assignment (a numeric value of 0, 1, or 2), and a header row containing a key that assigns the surgery flag label to the corresponding numeric value.</p> <p>This file can be converted to Excel, where a filter can be applied to examine individual CPT code ranges or surgery flag values.</p>
<p>SurgeryFlags_Services_Procedures_Mapping_Program_vyyyy-r.SAS</p> <p>Where yyyy represents calendar year and <i>r</i> represents a release number within the year,^a</p>	<p>SAS mapping program applies the Surgery Flags Software-Services and Procedures to the user's data.</p>
<p>SF-SvcProc-User-Guide-vyyyy-r.pdf</p> <p>where yyyy represents calendar year and <i>r</i> represents a release number within the year^a</p>	<p>This document (i.e., User Guide for the Surgery Flags Software-Services and Procedures in PDF format).</p>
<p>SurgeryFlags_ServicesProcedures_ChangeLog_vyyyy-vyyyy-r.xlsx</p> <p>Where yyyy represents calendar year and <i>r</i> represents a release number within the year,^a</p>	<p>A log (Microsoft® Excel) comparing two versions of the Surgery Flags Software-Services and Procedures software including a list of changes and assignment of CPT code ranges to a surgery flag value.</p>

Abbreviations: CSV, comma separated values

^a For example, the first mapping file release to include codes valid through calendar year 2023 is named SurgeryFlags_services_procedures_v2023-1_.csv.

Running the SAS Program to Add Surgery Flags to Data

To download, modify, and run the software to apply the Surgery Flags Software-Services and Procedures to an input dataset, follow these steps:

1. Users should download and extract the contents of the zip file containing the Surgery Flags Software-Services and Procedures tool to a saved location on their computer. Files included in the zip file are described in Table 1 and referenced below.
2. Users must set up the SAS program (SurgeryFlags_Services_Procedures_Mapping_vyyy-r.sas) to run on their data. They must specify or modify where appropriate:
 - a. Change the paths in the SAS program to point to the computer location(s) of
 - i. The CSV mapping file (SurgeryFlags_Services_Procedures_vyyyy-r.csv)
 - ii. The input dataset
 - iii. The output dataset
 - b. Set the macro variables in the SAS program to match the data element names and file structure of the input dataset (Table 2).

Table 2. Modifiable Macro Variables and Directory Paths

Description of Macro Variables and Directory Paths	SAS Program Syntax
File Location	
Specify the location of the CSV mapping file	FILENAME INRAW1
Specify the location of the input dataset	LIBNAME IN1
Specify the location of the output dataset	LIBNAME OUT1
File Names	
Specify the file name of the input dataset	%LET CORE=YOUR_SAS_FILE
Specify the file name of the output dataset	%LET SASOUT=OUTPUT_SAS_FILE
Input Characteristics	
Specify the maximum number of CPT codes on any record in the input file. In this example the maximum number of CPT codes on any record is 15. The value of NUMCPT must be numeric and greater than or equal to 1; otherwise, the program will not read in any procedure codes for surgery flag assignment.	%LET NUMCPT=15
Specify the number of observations to use from the input dataset. Use MAX to use all observations; use a smaller value for testing the program.	%LET OBS = MAX

Description of Macro Variables and Directory Paths	SAS Program Syntax
Output File Characteristics	
Specify if you want the output file to include a record-level data element that summarizes if there are any procedures that are Narrow or Broad surgeries. A value of 1 for RECORDLVL will enable the SAS code to create this data element; a value of 0 causes this data element to not be created.	%LET RECORDLVL = 0

Abbreviation: CSV, comma-separate values

Data Elements Required for Input Dataset

The input dataset **must** contain an array of CPT codes. These data elements are required for the assignment of the Surgery Flags (Table 3).

Table 3. Required Input Data Element

Data Element Name in Program	Purpose	Data Element Name in HCUP Databases
CPT1-CPTn where n is the dimension of the procedure array	Array of CPT codes used to assign surgery flags	CPT1-CPTn in all HCUP outpatient databases

Representation of CPT Codes

CPT codes are represented by 5 alphanumeric characters. As such, the SAS program that assigns the Surgery Flags-Services and Procedures is expecting CPT codes that are alphanumeric character strings of length 5.

Surgery Flag Data Elements in the Output File

This SAS program assumes the input file includes one or more CPT codes in an array. The output file includes all data elements from the input file, in addition to an array of surgery flag data elements (SURG_CPT_FLGn) with a one-to-one correspondence to the array of CPT codes. For example, SURG_CPT_FLG1 includes the surgery flag indication for the CPT code in the first position of the CPT code array.

The values of the data elements SURG_CPT_FLGn indicate whether the corresponding CPT code is a surgery (value 2 for Narrow or value 1 for Broad) or not (value 0 for Neither broad nor narrow). The values 0–2 are only assigned to CPT codes in the following code ranges:

- CPT Category I, Surgery: 10004–69990
- CPT Category I, Radiology procedures (added in v2019.2): 70010–79999
- CPT Category I, Medicine services and procedures (added in v2019.2): 90281–99756, excluding the evaluation and management codes in the range 99201-99499, and codes ending in A specific to the administration of COVID-19 vaccines
- CPT Category III Codes, Temporary codes for emerging or experimental services, technology, or procedures (added v2018): 0042T–0783T.

CPT codes outside the specified ranges (in addition to any HCPCS level II codes) are assigned a missing value for the surgery flag (SAS missing value .). In addition, if the CPT code is blank or invalid for the time period applicable to the software version, then the surgery flag also is missing.

An additional data element, RECORDLVL, indicates if any CPT on the record is a Narrow or Broad surgery, respectively. It works by scanning the array of surgery flags (SURG_CPT_FLGn) created by the program. The record-level flag will indicate the highest surgery flag value on the record. For example, if a record had at least one surgery classified as Narrow, the record-level flag would have a value of 2 for Narrow.

The data element SURG_CPT_FLG_VERSION includes the version number of the surgery flag software run on the data.

ASSIGNING SURGERY FLAGS FOR SERVICES AND PROCEDURES TO DIFFERENT DATA YEARS

Starting with v2019.2, the Surgery Flags Software-Services and Procedures is specific to codes within a calendar year. Table 4 lists the available versions of the software, the applicable codes, and key changes to the software. Please reference the change log provided with each version for more detail on the codes added and removed between versions. All versions of the software are available on the [HCUP User Support \(HCUP-US\)](#) website.

Table 4. Versions of Surgery Flags Software for Services and Procedures

Version	Applicable CPT Codes	Key Changes to the Software
v2023.1	Codes valid as of January 1, 2023	<ul style="list-style-type: none"> • Added 123 new codes • Removed 42 codes that were discontinued during 2022
v2022.1	Codes valid as of April 1, 2022	<ul style="list-style-type: none"> • Added 286 new codes • Removed 63 codes that were discontinued during 2021

v2021.1	Codes valid as of April 1, 2021	<ul style="list-style-type: none"> • Added 114 new codes • Removed 223 codes that were discontinued during 2020
v2020.1	Codes valid at any time during calendar year 2020	<ul style="list-style-type: none"> • Added 188 new codes • Removed 66 codes that were discontinued during 2019
v2019.2	Codes valid at any time during calendar year 2018 and 2019	<ul style="list-style-type: none"> • Added the following types of codes that were not included in previous versions of the software: <ul style="list-style-type: none"> ○ CPT Category I, Radiology Procedures: 70010–79999 ○ CPT Category I, Medicine Services and Procedures: 90281–99756, excluding the evaluation and management codes in the range 99201-99499 • Reviewed the following types of codes that had been included in previous versions of the software: <ul style="list-style-type: none"> ○ CPT Category I, Surgery: 10004–69990 ○ CPT Category III Codes, Emerging Technology: 0042T–0593T
v2019.1	Codes valid at any time between January 2013 and January 1, 2019	<ul style="list-style-type: none"> • The mapping of codes into Narrow or Broad surgeries may not take into consideration longitudinal changes in code definitions

APPENDIX A: BACKGROUND ON THE DEVELOPMENT OF THE SURGERY FLAGS SOFTWARE FOR SERVICES AND PROCEDURES

The [Surgery Flags Software for ICD-9-CM](#) was used as the starting point for the Surgery Flags Software-Services and Procedures. The initial mapping of CPTs into the surgical and assignments utilized crosswalks that mapped ICD-9-CM procedure codes to CPT codes for data year 2013.⁶ The information was used to identify CPT codes that were equivalent to ICD-9-CM procedure codes with a surgical assignment of Broad or Narrow. The CPT range was limited to the American Medical Association (AMA) code range for surgical codes 10021-69990. The code range was consistent with the CPTs listed as covered surgical procedures by the Centers for Medicare & Medicaid Services (CMS) for ambulatory surgery centers (ASCs) in calendar year 2013. If the crosswalk mapped the CPT code to an ICD-9-CM procedure that was Narrow or Broad, the CPT code was also considered Narrow or Broad, respectively. A certified clinical coding specialist, a general surgeon, and AHRQ staff systematically reviewed questionable coding through the following process:

- Each CPT code was reviewed by a coder and categorized based on the definitions and key terms described under the above section, [Definition of Surgery Flags](#). A coder rationale was provided for each questionable code.
- If there was not one best category or if there was lack of clarity about what the procedure involved, the general surgeon reviewed the code and categorized it based on the definitions. A surgeon rationale was provided for each questionable code.
- AHRQ staff reviewed the codes and the rationale.
- CPT code assignments were re-reviewed and discussed and reassignments were made based on consensus.
- A final review was conducted by AHRQ staff.

The Surgery Flags Software-Services and Procedures was first released in September 2014. Periodic updates to the tool were released with the range of eligible CPT codes expanded to include Category III emerging technology codes in 2018. Each new release replaced the old version and retained historical CPT codes.

In 2020, the Surgery Flags Software-Services and Procedures expanded the range of eligible codes to include Category I CPT codes under radiology and medicine services and procedures. The calendar year 2020 CMS list of covered surgical procedures for ASCs also includes cardiac CPT codes under medical services (codes in the range 92920–93986). During the review of the additional CPT codes, some inconsistencies were identified and as a result, all codes in the following ranges were reviewed in 2020:

⁶ The crosswalk was provided by Optum and Truven Health Analytics.

- CPT Category I, Surgery:10004–69990
- CPT Category I, Radiology Procedures: 70010–79999
- CPT Category I, Medicine Services and Procedures: 90281–99756, excluding the evaluation and management codes in the range 99201-99499
- CPT Category III Codes, Emerging Technology: 0042T–0593T.

A team of certified clinical coding specialists, surgeons, and AHRQ staff reviewed the assignment of CPT codes included in these ranges that were valid in 2018–2020. Codes were separately reviewed by the clinical coding expert and the surgeons. Coding assignments that were in disagreement were reviewed with AHRQ staff and resolved. In addition, the surgery flag designation was compared to the Clinical Classification Software (CCS) for Services and Procedures to ensure consistency between procedures identified as Narrow and CCS categories for operating room procedures. The updated coding is included in v2019.2 of the Surgery Flags Software-Services and Procedures in addition to v2020.1.

Additional analysis of the updated coding of the tool is needed to see how the surgery flags align with utilization and costs. Ongoing analyses may also be needed as changes in surgical techniques and advancement of technology transition major surgeries into minor procedures and, therefore, affect the designation of surgery flags over time.