

USER GUIDE:

AHRQ HCUP CLINICAL CLASSIFICATIONS SOFTWARE REFINED (CCSR) FOR ICD-10-PCS PROCEDURES, v2027.1

Issued October 2026

Agency for Healthcare Research and Quality (AHRQ)
Healthcare Cost and Utilization Project (HCUP)
Email: hcup@ahrq.gov
Website: https://hcup-us.ahrq.gov/

TABLE OF CONTENTS

What's New in v2027.1 of the AHRQ HCUP 1
Clinical Classifications Software Refined (CCSR) for ICD-10-PCS Procedures? 1
Introduction 2
Description of the AHRQ HCUP CCSR for ICD-10-PCS 3
Understanding the Taxonomy of the ICD-10-PCS Procedure Codes 3
The Structure of the CCSR for ICD-10-PCS 7
CCSR Assignment Guidelines 11
General Assignment Guidelines 11
Procedure Approach Classification 12
Using the CCSR to Trend ICD-10-PCS procedures Across Data Years 13
Using the Downloadable CCSR for ICD-10-PCS Files 14
System Requirements 14
Downloadable Files 14
Data Elements Required for Input Dataset 16
Representation of ICD-10-PCS Procedure Codes 16
Flexible File Structure for Outputting the CCSR for ICD-10-PCS Procedures 17
Output Option 1, Vertical Output File 17
Output Option 2, Horizontal Array of All CCSR Categories 18
Example of Output from the Two Different Output Files 19
Running the SAS Mapping Program to Add CCSR Categories to Data 21
CCSR for ICD-10-PCS Data Elements in the Output Files 22
Handling of Missing or Invalid Procedures by the SAS Mapping Program to Assign CCSR Categories 23
Appendix A: Background on the Development of the CCSR 24
Impact on the Clinical Classifications Software 24
Planning for the Refinement of the Clinical Classifications Software for ICD-10-PCS 24
Step 1. Defining Clinical Domains 25
Clinical Domain-Specific Structure Notes 30
Step 2. Defining CCSR Categories Within Clinical Domains 31
Summary of Key Changes in the Versions of the CCSR for ICD-10-PCS 32
Appendix B: Comparison of the CCSR for ICD-10-PCS, the Beta Versions of the CCS for ICD-10-PCS, and the CCS for ICD-9-CM 36
Appendix C: Description of ICD-10-PCS Root Operations in the Medical and Surgical Section 38
Appendix D: Acronyms Used in CCSR for ICD-10-PCS Category Descriptions 43
Appendix E. Recommendations for Reporting on Procedures using the CCSR for ICD-10-PCS 44
Principal (or First-Listed) Procedure 44

Limitation of the CCSR when a Surgery or a Specific Procedure Needs to be Reported Using More than One ICD-10-PCS Code 45
Limiting to Major Operating Room Procedures 47

INDEX OF TABLES AND FIGURES

Figure 1. Structure of the ICD-10-PCS Procedure Code 4
Table 1. ICD-10-PCS Character Values 5
Table 2. Three-Character Abbreviation for ICD-10-PCS Clinical Domains 7
Table 3. Contents of the CCSR for ICD-10-PCS Zip File....15
Table 4. Required Input Data Element 16
Table 5. Example of Representation of ICD-10-PCS Procedure Codes in the CCSR for ICD-10-PCS 17
Table 6. Sample of Input File Record 19
Table 7. Example of the Vertical Output File for the Sample Record 19
Table 8. Example of the Horizontal Output File for the Sample Record....20
Table 9. Modifiable Macro Variables and Directory Paths by Type of Information 21
Table A.1. Clinical Domain Assignment for the Medical and Surgical Section, Based on Body System....26
Table A.2. Clinical Domain Assignment for the Medical and Surgical Section, Based on Body Part....28
Table A.3. Clinical Domain Assignment for Sections Other Than the Medical and Surgical Section, Based on Section 29
Table B.1. Differences Among the CCSR for ICD-10-PCS, Beta Version of the CCS for ICD-10-PCS, and CCS for ICD-9-CM....36
Table C.1. Definition and Medical Explanation for ICD-10-PCS Root Operations in the Medical and Surgical Section 38
Table D.1. Acronyms Used in the CCSR for ICD-10-PCS Category Descriptions 43
Table E.1. ICD-10-PCS Coding and CCSR Categories Examples for Four Surgeries[a]....46

ACKNOWLEDGEMENTS

This work was funded initially by the Agency for Healthcare Research and Quality (AHRQ) under contract HHSA-290-2018-00001-C. AHRQ gratefully acknowledges the contributions of American Health Information Management Association (AHIMA)-certified ICD-10-CM/PCS trainers at the Ohio State University; clinical experts from the University of California, Davis and Los Angeles; and the technical team at IBM and ML Barrett, Inc. Annual updates to this software tool continue under AHRQ contract 75Q80123D00001 through the contributions of clinical experts at the University of California, Davis, and the technical team at NORC at the University of Chicago and ML Barrett, Inc. The Healthcare Cost and Utilization Project (HCUP) is a family of healthcare databases and related software tools and products developed through a Federal-State-Industry partnership and sponsored by AHRQ. HCUP would not be possible without the contributions of the following data collection Partners from across the United States:

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

WHAT'S NEW IN v2027.1 OF THE AHRQ HCUP CLINICAL CLASSIFICATIONS SOFTWARE REFINED (CCSR) FOR ICD-10-PCS PROCEDURES?

- Added ICD-10-PCS procedure codes valid starting in fiscal year 2027 so the tool now includes all ICD-10-PCS codes valid from October 2015 through September 2027, including 80 codes that became effective April 1, 2026.
- The software tool has been revised to both map the ICD-10-PCS code to a CCSR category and to identify whether the procedure approach was open, minimally invasive, or could not be classified as either. The designation of approach is based on the fifth character of the ICD-10-PCS code and clinical review. The added information on procedure approach affects the following files:
    - Files provided with the software tool:
        - Both the Reference file and CSV mapping file include information on the procedure approach indicated by the ICD-10-PCS code using two characters: "OA" for open approach, "MI" for minimally invasive, and "NC" for not classified.
    - Files output by the software tool:
        - The vertical output file includes a new data element, APPROACH, which indicates the two-character procedure approach for the ICD-10-PCS code.
        - The horizontal output file with an array of data elements for the CCSR categories has been renamed from "PRCCSR_AAAnn" to "PRCCSR_APPROACH_AAAnnn," and contains the two-character values for procedure approach. Information on procedure position (principal procedure only, secondary procedure only, both principal and secondary procedures) is no longer included.
- Changed the mapping of 151 procedure codes from CAR028 "Inferior vena cava (IVC) filter procedures" to CAR029 "Cardiovascular device procedures, NEC", because the intent of these procedures is not venous thromboembolic filtration.
- Updated guidance regarding reporting on procedure position (i.e. principal vs secondary). See Appendix E.

Detailed changes for v2027.1 of the CCSR for ICD-10-PCS are in the Change Log. A summary of key changes for all release versions of the CCSR for ICD-10-PCS is available in Appendix A.

INTRODUCTION

This report provides technical documentation for the Agency for Healthcare Research and Quality (AHRQ) Healthcare Cost and Utilization Project (HCUP) Clinical Classifications Software Refined (CCSR) for International Classification of Diseases, Tenth Revision, Procedure Coding System (ICD-10-PCS)-coded procedures. Starting on October 1, 2015, procedures for hospital inpatient stays in the United States are reported using ICD-10-PCS codes. ICD-10-PCS consists of more than 80,000 procedure codes. Although it is possible to present descriptive statistics at the individual ICD-10-PCS code level, it is often more useful to aggregate procedures into clinically meaningful categories. The HCUP CCSR for ICD-10-PCS provides a method for aggregating the procedure codes into over 320 clinical categories across 31 clinical domains that generally follow Sections within the ICD-10-PCS Code Book.[1]

Similar to the original AHRQ HCUP Clinical Classifications Software (CCS) for ICD-9-CM-coded procedures, the CCSR for ICD-10-PCS:

- Classifies procedures into clinically meaningful categories
- Provides a means by which to identify specific types of procedures using procedure codes
- Can be used analytically to examine patterns in healthcare cost, utilization, and outcomes, in addition to perform rank utilization by types of procedures.

The HCUP CCSR balances the retention of the clinical concepts included in the CCS categories under ICD-9-CM and capitalizes on the specificity of ICD-10-PCS by creating new clinical categories.

Prior to the availability of ICD-10-PCS-coded data, the ICD-10-PCS codes were categorized into the CCS for ICD-9-CM procedures using the General Equivalence Mappings (GEMS) and released as a beta version. Once ICD-10-PCS-coded data became available, the beta version of the CCS was evaluated using the HCUP databases and unexpected discontinuities between the ICD-9-CM and ICD-10-PCS beta versions of the CCS were revealed. In addition, there was interest in taking advantage of the specificity of ICD-10-PCS procedure codes to refine the CCS tool. These findings led to the development of the CCSR for ICD-10-PCS. The refinement process was informed by American Health Information Management Association (AHIMA)-certified ICD-10-CM trainers and reviewed by a team of clinical experts and surgeons. The team extensively reviewed the mapping of codes into CCSR categories and used the HCUP State Inpatient Databases (SID) for quality control testing. This User Guide describes the CCSR for ICD-10-PCS and the downloadable software and documentation. Additional information on the refinement process is available in Appendix A: Background on the Development of the CCSR.

[1] AHIMA Press/Decision Health, ed. ICD-10-PCS Code Book, 2027. Chicago, IL: American Health Information Management Association; 2026.

Appendix B includes a comparison of the AHRQ HCUP CCSR for ICD-10-PCS, the beta versions of the CCS for ICD-10-PCS, and the CCS for ICD-9-CM. Appendix C includes a medical explanation and examples of the ICD-10-PCS root operations for codes in the Medical and Surgical Section of the ICD-10-PCS Code Book. Appendix D includes acronyms used in the CCSR category names.

ICD-10-PCS procedure coding system is very different than ICD-9-CM coding system because of the granularity of the information in the codes and the fact that a surgery or a specific procedure may need to be defined by a combination of ICD-10-PCS codes. For recommendations on reporting or procedures using the CCSR for ICD-10-PCS, refer to Appendix E.

This User Guide describes the development of the CCSR for ICD-10-PCS and the downloadable software and documentation. The CCSR for ICD-10-PCS is updated annually to coincide with fiscal year (FY) updates to the ICD-10-PCS procedure coding system and retains procedure codes valid from the start of ICD-10-PCS in October 2015. For this reason, it is advisable to always use the most recent version of the tool. Downloadable files for the CCSR for ICD-10-PCS categories are available on HCUP User Support (HCUP-US) website.[2]

DESCRIPTION OF THE AHRQ HCUP CCSR FOR ICD-10-PCS

Understanding the Taxonomy of the ICD-10-PCS Procedure Codes

ICD-10-PCS procedure codes are created and maintained by the Centers for Medicare & Medicaid Services (CMS). There are over 80,000 ICD-10-PCS codes with detailed specificity. One of the distinct attributes of the ICD-10-PCS coding system is the multi-axial nature of the codes, in that codes consist of independent characters with each component retaining its meaning across a broad range of codes, to the extent possible. This built-in taxonomy allows for expandability and structural integrity as new procedures are developed and added. ICD-10-PCS coding provides detailed descriptions of methodology and approach, in addition to using specific terms for body parts and used devices. There are three key differences between ICD-10-PCS and ICD-9-CM procedure codes:

- ICD-10-PCS codes do not reference diagnostic information.
- ICD-10-PCS codes identify each individual action. Multiple ICD-10-PCS codes may be needed to describe a specific clinical procedure.
- ICD-10-PCS specifies all procedures and their variations currently performed. The frequency of a procedure being performed was not a consideration in the development of the coding system.

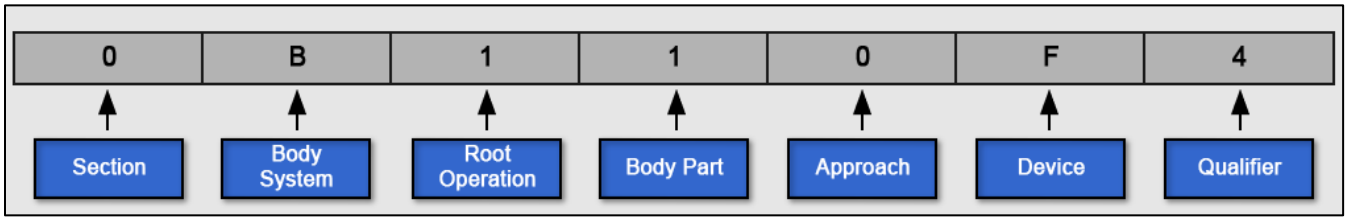
[2] The HCUP User Support website can be found at https://hcup-us.ahrq.gov/.

- ICD-10-PCS code descriptions often do not rely on conventional surgical or procedural terms.

ICD-10-PCS codes are 7 characters long, and each character has a specific meaning in describing the type of procedure.[3] Figure 1 provides a visual representation of the structure for an ICD-10-PCS procedure code using the example code, 0B110F4, Tracheostomy with tracheostomy tube. The characters structuring this code include:

- Section = Medical and Surgical
- Body system = Respiratory System
- Root operation = Bypass
- Body part = Trachea
- Approach = Open
- Device = Tracheostomy
- Qualifier = Cutaneous.

Figure 1. Structure of the ICD-10-PCS Procedure Code



The CCSR for ICD-10-PCS uses the built-in coding taxonomy to organize the CCSR categories into groupings of related codes. Table 1 provides a list of available character values for each position. The character "Z" is used in any position as a placeholder if another meaningful character is not used. For the third character, root operation, only the 31 root operations found under the Medical and Surgical Section of the ICD-10-PCS Code Book are listed as these make up most procedures that are reported in the hospital inpatient setting. The fourth, sixth, and seventh characters exhibit considerable variation across the full range of ICD-10-PCS codes. In the interest of space, the complete set of values for those characters is not listed here. Please see the ICD-10-PCS Code Book for additional details. ICD-10-PCS definitions for root operations found within the Medical and Surgical Section along with medical explanations and example procedures are provided in Appendix C: Description of ICD-10-PCS Root Operations in the Medical and Surgical Section.

[3] Information about ICD-10-PCS characters was obtained from AHIMA Press/Decision Health, ed. ICD-10-PCS Code Book, 2027. Chicago, IL: American Health Information Management Association; 2026.

Table 1. ICD-10-PCS Character Values

Description of ICD-10-PCS Character Values	
First Character – Section	
(0) Medical and Surgical	(9) Chiropractic
(1) Obstetrics	(B) Imaging
(2) Placement	(C) Nuclear Medicine
(3) Administration	(D) Radiation Therapy
(4) Measurement and Monitoring	(F) Physical Rehabilitation and Diagnostic Audiology
(5) Extracorporeal or Systemic Assistance and Performance	(G) Mental Health
(6) Extracorporeal or Systemic Therapies	(H) Substance Abuse Treatment
(7) Osteopathic	(X) New Technology
(8) Other Procedures	
Second Character – Body System[a]	
(0) Central Nervous System and Cranial Nerves	(J) Subcutaneous Tissue and Fascia
(1) Peripheral Nervous System	(K) Muscles
(2) Heart and Great Vessels	(L) Tendons
(3) Upper Arteries	(M) Bursae and Ligaments
(4) Lower Arteries	(N) Head and Facial Bones
(5) Upper Veins	(P) Upper Bones
(6) Lower Veins	(Q) Lower Bones
(7) Lymphatic and Hemic Systems	(R) Upper Joints
(8) Eye	(S) Lower Joints
(9) Ear, Nose, Sinus	(T) Urinary System
(B) Respiratory System	(U) Female Reproductive System
(C) Mouth and Throat	(V) Male Reproductive System
(D) Gastrointestinal System	(W) Anatomical Regions, General
(F) Hepatobiliary System and Pancreas	(X) Anatomical Regions, Upper Extremities
(G) Endocrine System	(Y) Anatomical Regions, Lower Extremities
(H) Skin and Breast	(Z) Used as a placeholder if another meaningful character is not used
Third Character – Root Operation[b]	
(0) Alteration	(J) Inspection
(1) Bypass	(K) Map
(2) Change	(L) Occlusion
(3) Control	(M) Reattachment
(4) Creation	(N) Release
(5) Destruction	(P) Removal
(6) Detachment	(Q) Repair
(7) Dilation	(R) Replacement
(8) Division	(S) Reposition
(9) Drainage	(T) Resection
(B) Excision	(U) Supplement
(C) Extirpation	(V) Restriction

Description of ICD-10-PCS Character Values	
(D) Extraction	(W) Revision
(F) Fragmentation	(X) Transfer
(G) Fusion	(Y) Transplantation
(H) Insertion	(Z) Used as a placeholder if another meaningful character is not used
Fourth Character – Body Part[c]	
Body part values are specific to the root operation and can vary by body system. Please see the ICD-10-PCS Code Book for additional details.	
Fifth Character – Approach	
(0) Open	(8) Via Natural or Artificial Opening Endoscopic
(3) Percutaneous	(F) Via Natural or Artificial Opening Percutaneous Endoscopic
(4) Percutaneous Endoscopic	(X) External
(7) Via Natural or Artificial Opening	(Z) Used as a placeholder if another meaningful character is not used
Sixth Character – Device	
Includes only devices that remain after the procedure is completed such as electronic appliances, grafts, prostheses, implants, and simple or mechanical appliances. Please see the ICD-10-PCS Code Book for additional details.	
Seventh Character – Qualifier with Values Specific to the Root Operation	
There is considerable variation in the seventh character across root operations. For example, the seventh character for the procedure codes 02100ZC and 02100ZF identify whether the open approach coronary artery bypass was for the thoracic artery or abdominal artery, respectively. Please see the ICD-10-PCS Code Book for additional details.	

Abbreviation: ICD-10-PCS, International Classification of Diseases, Tenth Revision, Procedure Coding System.

[a] The second character is not always a body system in all Sections. It can also denote a section qualifier.

[b] The third character is not always a root operation in all Sections. It can also denote imaging type, nuclear medicine type, radiation therapy modality, rehabilitation type, mental health type, or substance use type.

[c] The fourth character is not always a body part in all Sections. It can also denote body region, body system, treatment site, or a qualifier.

AHIMA Press/Decision Health, ed. ICD-10-PCS Code Book, 2027. Chicago, IL: American Health Information Management Association; 2026.

The Structure of the CCSR for ICD-10-PCS

The CCSR for ICD-10-PCS aggregates more than 80,000 ICD-10-PCS procedure codes into a manageable number of clinically meaningful categories organized into 31 clinical domains,[4] which generally follow the structure of the ICD-10-PCS Code Book. The purpose of the clinical domain is to divide the ICD-10-PCS procedure codes into distinct overall concepts of body system or clinical areas. Additional information on the development of the clinical domains is included in Appendix A: Background on the Development of the CCSR.

Each clinical domain is abbreviated using a three-character scheme as shown in Table 2. Individual CCSR categories are numbered sequentially with the numbering scheme starting at "001" within each clinical domain (i.e., there is a CCSR 001 for each clinical domain).

A complete listing of all CCSR categories and their associated descriptions can be found in the CCSR Reference File, available on the CCSR page of the HCUP-US website.

Table 2. Three-Character Abbreviation for ICD-10-PCS Clinical Domains

ICD-10-PCS Clinical Domain	Three-Character Abbreviation	Brief Description (category counts are for v2027.1)
Administration of therapeutic substances	ADM	ADM contains 22 categories that include procedures associated with the administration of therapeutic substances, such as the transfusion of blood and blood products, vaccinations, and chemotherapy.
Cardiovascular procedures	CAR	CAR contains 29 categories that include cardiovascular procedures such as percutaneous coronary intervention (PCI), coronary artery bypass graft (CABG), and aneurysm repair procedures.
Chiropractic treatment	CHP	CHP contains 1 category that includes procedures for chiropractic manipulation.
Central nervous system procedures	CNS	CNS contains 14 categories that include procedures performed on the central nervous system (brain, spinal cord, and CNS nerves) such as spinal cord decompression, lumbar puncture, and spinal epidural catheter placement.
Endocrine procedures	ENP	ENP contains 6 categories that include endocrine procedures such as thyroidectomy, parathyroidectomy, and adrenalectomy.

[4] The term "clinical domain" is used to describe the organization of procedures within the CCSR tool. When referring specifically to the organization of codes within the ICD-10-PCS Code Book, we use the terms "Section" and/or "Body System."

ICD-10-PCS Clinical Domain	Three-Character Abbreviation	Brief Description (category counts are for v2027.1)
Ear, nose, and throat procedures	ENT	ENT contains 17 categories that include procedures performed on the ear, nose, and throat (ENT) as well as the head and neck, such as myringotomy, frenectomy, and tonsillectomy as well as diagnostic audiology.
Extracorporeal or systemic assistance and performance	ESA	ESA contains 12 categories that include procedures that occur outside the body or within a body system to assist the body with performing a physiological function. Examples include hemodialysis, mechanical ventilation, and cardiac pacing.
Extracorporeal or systemic therapies	EST	EST contains 5 categories that include procedures performed outside the body for a therapeutic purpose other than to assist the body with performing a physiological function. Examples include pheresis therapy and hypothermia therapy.
Eye procedures	EYP	EYP contains 2 categories that include procedures performed on the eye and the eyelid.
Female reproductive system procedures	FRS	FRS contains 15 categories that include procedures performed on the female reproduction system, such as fallopian tube ligation and excision, salpingectomy, hysterectomy, and oophorectomy.
Gastrointestinal system procedures	GIS	GIS contains 29 categories that include procedures performed on the gastrointestinal (GI) system, such as appendectomy, gastrostomy, and colonoscopy and proctoscopy with biopsy.
General region procedures	GNR	GNR contains 10 categories that include procedures performed on the general anatomic regions, such as abdominal wall repair (including hernia), inguinal and femoral hernia repair, and endoscopic control of bleeding.
Hepatobiliary and pancreas procedures	HEP	HEP contains 13 categories that include procedures performed on the hepatobiliary system and the pancreas, such as liver biopsy, cholecystectomy, and liver transplant.
Imaging	IMG	IMG contains 10 categories that include procedures comprising ultrasound, magnetic resonance imaging (MRI), fluoroscopy (classified for heart and circulatory versus other structures), computerized tomography (CT), and plain radiography.

ICD-10-PCS Clinical Domain	Three-Character Abbreviation	Brief Description (category counts are for v2027.1)
Lymphatic and hemic system procedures	LYM	LYM contains 11 categories that include procedures performed on the lymphatic and hemic system, such as bone marrow biopsy, lymph node biopsy, lymph node dissection, and splenectomy.
Measurement and monitoring	MAM	MAM contains 15 categories that include procedures related to the measurement and monitoring of the function of various organs (e.g., brain, heart) and body systems (e.g., cardiovascular system, respiratory system; excludes fetal measurement and monitoring).
Mental health therapy	MHT	MHT contains 5 categories that include procedures related to therapies for mental health, such as electroconvulsive therapy, crisis intervention, and pharmacotherapy for mental health.
Male reproductive system procedures	MRS	MRS contains 7 categories that include procedures performed on the male reproduction system, such as circumcision and prostatectomy.
Musculoskeletal, subcutaneous tissue, and fascia procedures	MST	MST contains 30 categories that include procedures performed on the musculoskeletal, subcutaneous tissue, and fascia. Examples include hip arthroplasty, knee arthroplasty, spine fusion, and toe and midfoot amputation.
Nuclear medicine	NCM	NCM contains 4 categories that include nuclear medicine procedures such as planar nuclear medicine imaging, tomographic nuclear medicine imaging, radionuclide therapy and non-imaging procedures, and positron emission tomographic (PET) imaging.
Osteopathic treatment	OST	OST contains 1 category that includes procedures for osteopathic treatment.
Other procedures	OTR	OTR contains 5 categories that include procedures related to robotic-assisted procedures, computer-assisted procedures, fluorescence-guided procedures, isolation procedures, and therapeutic massage and related procedures.
Pregnancy-related procedures	PGN	PGN contains 9 categories that include procedures related to pregnancy, such as spontaneous vaginal delivery, Cesarean section, episiotomy, and abortion.
Dressings and other placements	PLC	PLC contains 2 categories that include procedures involving immobilization by splint or other external device and packing and dressing procedures.

ICD-10-PCS Clinical Domain	Three-Character Abbreviation	Brief Description (category counts are for v2027.1)
Peripheral nervous system procedures	PNS	PNS contains 6 categories that include procedures performed on the peripheral nervous system such as lumbosacral nerve decompression, nerve repair, and peripheral nerve denervation.
Radiation therapy	RAD	RAD contains 4 categories that include procedures comprising beam radiation, brachytherapy, stereotactic radiosurgery, and other types of radiation therapy.
Respiratory system procedures	RES	RES contains 14 categories that include procedures performed on the respiratory system such as airway intubation, bronchoscopy, chest tube placement and therapeutic thoracentesis, and tracheostomy.
Rehabilitation, evaluation, and treatment	RHB	RHB contains 4 categories that include procedures comprising physical, occupational, respiratory therapy (evaluation and treatment) and speech evaluation and treatment.
Skin and breast procedures	SKB	SKB contains 10 categories that include procedures related to the skin and breast, such as perineal skin repair (1st degree obstetrical and other), mastectomy and lumpectomy, breast reconstruction, and skin graft.
Substance use disorder treatment	SUD	SUD contains 4 categories that include procedures related to psychotherapy for substance use, detoxification services, counseling for substance use, in addition to medication management and pharmacotherapy for substance use.
Urinary system procedures	URN	URN contains 12 categories that include procedures performed on the urinary system, such as kidney transplant, nephrectomy and ureter resection, and removal of calculi from urinary tract.

Abbreviations: ICD-10-PCS, International Classification of Diseases, Tenth Revision, Procedure Coding System

CCSR Assignment Guidelines

During the development of the CCSR, several guidelines were adopted to address common decision points that the team encountered. This section describes the general guidelines that apply to all clinical domains. Guidelines that are specific to individual clinical domains are provided in Appendix A.

General Assignment Guidelines

1. Each ICD-10-PCS code is assigned to one and only one CCSR category (i.e., mutually exclusive categories).
2. The overarching goal of the CCSR is to categorize codes into a manageable number of clinically meaningful categories. The categories themselves should capture clinical/surgical concepts relevant for inpatient care.
3. While there was no requirement to keep specific categories or to match the trends or utilization counts of the CCS for ICD-9-CM or the beta versions of the CCS for ICD-10-PCS, the team did consider, where possible, to retain the same clinical/surgical concepts from prior CCS versions.
4. The CCSR category descriptions provide a clinically relevant name that represents most of the codes in the category whenever possible, avoiding PCS terminology not used by clinicians. In some cases, acronyms are used for specific procedure types without an accompanying full description. Appendix D includes a complete list of these acronyms as well as their full description. For users interested in the complete listing of ICD-10-PCS root operations, body parts, approaches, and devices/substances included in each CCSR, please see the CCSR Reference File, available on the CCSR page of the HCUP-US website.
5. Due to the granular nature of ICD-10-PCS, multiple procedure codes may be required to define a complete surgical procedure. This is because each code represents an individual action within a surgical procedure. This was a design decision built into ICD-10-PCS by CMS and no attempt was made by HCUP to define a single surgical procedure using combinations of ICD-10-PCS codes. Some procedure codes may be applicable to more than one surgical procedure. For example, pancreatic resection and excision codes, which can be part of a Whipple procedure, also can be done as part of other surgical procedures.
6. The number of catch-all categories (those that start with “Other procedures” or end with “NEC” for not elsewhere classified) are minimized, because they are of limited value for research if the ICD-10-PCS codes within the category are highly heterogeneous. However, generally, most clinical domains have at least one catch-all category to include procedure codes that do not fit into specific categories, and the inpatient procedure volume was insufficient to warrant a separate category.

7. Procedure codes are generally located in a CCSR clinical domain consistent with the ICD-10-PCS Section (1st character) assigned by CMS. The Medical and Surgical Section of the ICD-10-PCS Code Book contains approximately 87 percent of all ICD-10-PCS codes, so procedure codes in this section are further organized into clinical domains based on Body System (2nd character). Procedure codes with the Body System of Anatomical Regions, General are assigned to clinical domains based on Body Part (4th character) whenever possible. The *General regions* clinical domain was retained to capture codes that could not be assigned to a domain based on the Body Part of the code. Refer to Appendix A for additional information on clinical domain assignments.
8. CCSR categories in each clinical domain were often created based on Root Operation (3rd character) and Body Part (4th character). CCSR categories were at times further divided by Approach (5th character) and Qualifier (7th character). When possible, CCSR categories were created to represent specific and known procedures. Examples include CAR006 (Coronary artery bypass graft), GIS004 (Appendectomy), and PGN003 (Cesarean section). See the Procedure CCSR Reference File for additional information on the PCS taxonomy elements included in each CCSR category.
9. Diagnostic (ICD-10-PCS procedure codes with a 7th character of "X") and therapeutic procedures are generally not mixed in the same CCSR category. However, exceptions are possible if the clinical review team decided that there was not a meaningful difference between a procedure marked as diagnostic or therapeutic.

Procedure Approach Classification

Researchers and analysts using the CCSR for ICD-10-PCS are often interested in comparing utilization or outcomes across alternative approaches to the same surgical objective. Many procedures, particularly those involving intrathoracic and intraperitoneal structures, can be performed using either open (traditional) or minimally invasive approaches, and a single CCSR category may include a mixture of ICD-10-PCS codes reflecting both approaches. To enhance the usability of the CCSR tool beginning with v2026.2, a classification scheme has been added that identifies procedure approach. Each ICD-10-PCS procedure code is assigned to one of these three types of approaches.

- **Open approach**. Most codes with a fifth character of "0" are identified as open approach.
- **Minimally invasive approach.** Most codes with a fifth character of "3" for percutaneous, "4" for percutaneous endoscopic, "7" for via natural or artificial opening, or "8" for via natural or artificial opening endoscopic are identified as having a minimally invasive approach.
- **Approach not classified**. Neither open nor minimally invasive. This category includes over 7,000 codes for which the fifth character does not indicate approach such as "5" for extracorporeal or systemic assistance and performance, "6" extracorporeal or systemic

therapies, “B” for imaging, “C” for nuclear medicine, “D” for radiation therapy, “F” for physical rehabilitation and diagnostic audiology, “G” for mental health, and “H” substance abuse treatment do not use an approach character.

Note: Clinical review sometimes overrides the designation indicated by the fifth character. For example, the procedure codes 6A600ZZ *Phototherapy of Skin, Single*, and F13Z0ZZ *Hearing Screening Assessment* have a fifth character of “0” and are not classified as having an open approach. These codes are marked as not classified as either open or minimally invasive.

On a discharge-level record that has an array of ICD-10-PCS codes, a single CCSR category can be triggered by multiple codes with varying approaches. As a result, the identification of approach within the CCSR category is based on the following hierarchy:

- **Open approach (value "OA"):** ICD-10-PCS code(s) in this CCSR category are reported on the discharge record and at least one reported ICD-10-PCS code is open approach, according to the classification above.
- **Minimally invasive (value "MI"):** ICD-10-PCS code(s) in this CCSR category are reported on the discharge record, no reported procedures are open approach, and at least one reported procedure code is minimally invasive, according to the classification above.
- **Approach is not classified (value "NC"):** ICD-10-PCS code(s) in this CCSR category are reported on the discharge record, but none are classified as either an open approach or a minimally invasive approach, meaning the individual codes are “NC” according to the classification above.
- **No procedure codes present for this CCSR (value "ZZ"):** No ICD-10-PCS code(s) in this CCSR category are reported on the discharge record.

USING THE CCSR TO TREND ICD-10-PCS PROCEDURES ACROSS DATA YEARS

The ICD-10-PCS procedure codes included in the CCSR are cumulative starting on October 1, 2015, when the United States transitioned to reporting of procedures for hospital inpatient stays in the ICD-10-PCS coding system. The CCSR for ICD-10-PCS was not designed for trending across ICD-9-CM and ICD-10-PCS codes.

ICD-10-PCS codes are updated each year with new codes becoming effective on October 1. Coding instructions may also be updated. Changes in coding instructions may impact trending within and across data years. For example, effective October 1, 2017, the definition for the Root Operation (3rd Character), Control, changed from “stopping, or attempting to stop, postprocedural bleeding” to “stopping, or attempting to stop, postprocedural **or other acute bleeding**”. This causes a large increase in inpatient stays with any-listed procedure code indicating control of bleeding starting October 2017.

USING THE DOWNLOADABLE CCSR FOR ICD-10-PCS FILES

System Requirements

Using the CCSR for ICD-10-PCS requires a program to decompress or "unzip" files.[5] Approximately 6.5 megabytes of disk space available on one's hard drive also will be needed to accommodate all the CCSR files. Additional space is necessary for saving CCSR output files. See below for additional details on the options for CCSR output and the disk space considerations for each option.

Downloadable Files

The following files related to the CCSR for ICD-10-PCS are contained in a downloadable zip file:

1. CSV file that includes the mapping of ICD-10-PCS codes into their respective CCSR category with a label for the individual CCSR category with the procedure approach: OA (open approach), MI (minimally invasive), or NC (no approach classified – neither open nor minimally invasive).
2. SAS mapping program to apply the tool to the user's data
3. CCSR for ICD-10-PCS User Guide (PDF)
4. CCSR for ICD-10-PCS Reference File (Excel)
5. Change log with specific detail on coding changes between versions (Excel)

Table 3 includes additional details on the names and purpose of the files included in the CCSR for ICD-10-PCS zip file.

[5] 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.).

Table 3. Contents of the CCSR for ICD-10-PCS Zip File

File Name	Purpose
PRCCSR_v*yyyy-r*.csv where *yyyy* represents fiscal year and *r* represents a release number within fiscal year. For example, the first mapping file release to include codes valid through fiscal year 2027 is named PRCCSR_v2027-1.csv.	The CSV mapping file lists ICD-10-PCS procedure codes along with a description for each ICD-10-PCS code, the CCSR category assigned, the full description corresponding to each CCSR category, and the procedure approach: OA (open approach), MI (minimally invasive), or NC (not classified as open or minimally invasive). This is the file that the SAS program uses as input to build the tool. This file can be converted to Microsoft Excel where a filter can be applied to examine individual ICD-10-PCS procedure codes or CCSR categories.
PRCCSR_Mapping_Program_v*yyyy-r*.sas where *yyyy* represents fiscal year and *r* represents a release number within fiscal year	SAS mapping program applies the CCSR to the user's ICD-10-PCS-coded data. The mapping program includes two options for the file structure of CCSR output.
PRCCSR-User-Guide-v*yyyy-r*.pdf where *yyyy* represents fiscal year and *r* represents a release number within fiscal year	This document (i.e., the User Guide for the CCSR in PDF format).
PRCCSR-Reference-File-v*yyyy-r*.xlsx where *yyyy* represents fiscal year and *r* represents a release number within fiscal year	A reference file (Microsoft Excel) includes five tabs: (1) The first tab is a table of contents with links to the other tabs. (2) The second tab includes a list of the ICD-10-PCS clinical domains and the corresponding 3-character CCSR abbreviation. (3) The third tab includes a list of CCSR categories and their corresponding CCSR abbreviation/number. In addition, this tab includes a complete list of ICD-10-PCS root operations, body parts, approaches, and device/supplements included in each CCSR category. (4) The fourth tab includes a list of the acronyms used within the CCSR category descriptions along with their accompanying definitions. (5) The fifth tab lists all ICD-10-PCS procedure codes with descriptions, the assigned CCSR category with a description, and the approach. A filter is applied to examine individual ICD-10-PCS procedure codes or CCSR categories.

File Name	Purpose
PRCCSR-ChangeLog-vyyyyr-vyyyyr.xlsx where *yyyy* represents fiscal year and *r* represents a release number within fiscal year	A log of changes (Microsoft Excel) between two versions of the CCSR software tool including lists of changes in categories and the mapping of ICD-10-PCS codes into categories.

Abbreviations: CCSR, Clinical Classifications Software Refined; CSV, comma separated values; ICD-10-PCS, International Classification of Diseases, Tenth Revision, Procedure Coding System

Data Elements Required for Input Dataset

The input dataset **must** contain a data element that uniquely identifies the record and an array of ICD-10-PCS procedure codes. These data elements are required for the assignment of the CCSR for ICD-10-PCS (Table 4).

Table 4. Required Input Data Element

Data Element Names in Program	Purpose	How to Modify the Data Element Name Used in the Program	Data Element Name in HCUP Databases
Macro data element &RECID	The unique record identifier on the input SAS file that can be used to link the CCSR output files back to original input SAS dataset	Specify the name of the variable using macro statement %LET RECID=	KEY in the HCUP State Databases
PR1-PRn where n is the dimension of the procedure array	Array of ICD-10-PCS procedures used to assign CCSR categories	Specify prefix for PR array using macro statement %LET PRPREFIX=	I10_PR1-I10PRn in all HCUP databases starting in data year 2016

Abbreviations: ICD-10-PCS, International Classification of Diseases, Tenth Revision, Procedure Coding System

Representation of ICD-10-PCS Procedure Codes

ICD-10-PCS procedure codes are represented by 7 alphanumeric codes. In the CSV mapping file, the ICD-10-PCS procedure codes are enclosed in quotation marks. Table 5 provides examples for how the ICD-10-PCS codes are represented in the CSV mapping file. In the SAS mapping program that assigns the CCSR categories, ICD-10-PCS codes in the input dataset are expected to be alphanumeric character strings of length 7.

Table 5. Example of Representation of ICD-10-PCS Procedure Codes in the CCSR for ICD-10-PCS

Procedure	ICD-10-PCS Procedure Code	Alphanumeric Code (With Quotation Marks) in the CSV File
Delivery of products of conception, external approach	10E0XZZ	'10E0XZZ'
Insertion of infusion device into superior vena cava, percutaneous approach	02HV33Z	'02HV33Z'
Respiratory ventilation, 24-96 consecutive hours	5A1945Z	'5A1945Z'

Abbreviations: CCSR, Clinical Classifications Software Refined; CSV, comma separated values; ICD-10-PCS, International Classification of Diseases, Tenth Revision, Procedure Coding System

Flexible File Structure for Outputting the CCSR for ICD-10-PCS Procedures

Within the SAS mapping program, users are given two options for the file structure of their output once the CCSR tool is applied to the data. The program assumes that the input file will have one record per inpatient stay with a unique record identifier and an array of ICD-10-PCS procedure codes. There is no restriction on the maximum length of the input procedure array. Users will need to modify the SAS macros in the mapping program to specify the file characteristics of their data and the desired output file structure.

The two output options differ primarily in how information for each input record is organized. The vertical output creates a separate row for each reported ICD-10-PCS procedure code and retains information about the CCSR category, procedure position, and approach for each code. The horizontal output retains one row per input record and creates a separate data element for each CCSR category. When multiple procedure codes on the same record map to the same CCSR category, the horizontal output summarizes their approaches using the hierarchy described below.

Output Option 1, Vertical Output File

Users can specify the SAS mapping program to create a “vertical” file with one or more observations (i.e., rows) for each input record. The number of observations created from each input record depends on the number of ICD-10-PCS procedure codes on the input record. For example, if an input record has ten ICD-10-PCS codes, the vertical file for that record would have ten observations to display the CCSR records.

The vertical file contains five data elements (i.e., columns):

- The record identifier (data element specified by the RECID macro)
- A CCSR category (data element PRCCSR)
- The procedure position (data element PR_Position) which indicates which ICD-10-PCS code in the procedure array on the record triggered the CCSR category assignment

- The procedure approach (data element APPROACH) which indicates the approach for the procedure (open (OA), minimally invasive (MI), or not classified (NC))
- A CCSR version identifier (data element PRCCSR_VERSION)

The vertical file option affords users more efficient storage—about 20 bytes per record. It also maintains information on the exact position of the ICD-10-PCS code that triggered the CCSR category. However, because this option outputs multiple observations corresponding to a single input record, its practical application may be challenging for users with limited statistical programming experience.

Output Option 2, Horizontal Array of All CCSR Categories

Users also can specify the SAS mapping program to create a horizontally structured CCSR output file. The output file will indicate which CCSR categories are triggered by the ICD-10-PCS codes reported on the input record. If this option is selected, the SAS program creates a file with only one observation (i.e., row) for each input record that includes the record identifier and a horizontal array of over 300 data elements corresponding to the CCSR categories. There is one data element for each CCSR category, with the data element name corresponding to the CCSR category along with a “PRCCSR _APPROACH” prefix, where PR stands for procedure. For example, the data element name for the CCSR category for Airway intubation (RES007) is “PRCCSR_APPROACH_RES007”.

The horizontal file allows users to identify procedure approach classifications for all qualifying ICD-10-PCS procedures on a record. When multiple ICD-10-PCS procedure codes on the same record map to the same CCSR category, a single value using the hierarchy below. In prior versions of the HCUP PRCCSR tool, values for each CCSR category on the horizontal file indicated whether procedures in that category were principal (or first-listed), secondary or both. Beginning with v2026.2, the file no longer differentiates between the principal procedure, secondary procedures, or both types of procedures (i.e., CCSR category was triggered by both a principal (or first-listed) procedure and at least one secondary procedure). See more information on assignment of principal procedure Appendix E.

The SAS program assigns one of four values for each PRCCSR data element based on the following hierarchy:

- **Open approach (value "OA"):** ICD-10-PCS codes in this CCSR category are reported on the record and at least one reported procedure code is open approach
- **Minimally invasive (value "MI"):** ICD-10-PCS codes in this CCSR category are reported on the record, no reported procedures are open approach, and at least one reported procedure code is minimally invasive.
- **Not classified (value "NC"):** The procedure codes in this CCSR category are reported on the record, but none are classified as either an open approach or a minimally invasive approach.
- **No procedure codes present for this CCSR (value "ZZ"):** ICD-10-PCS procedure codes in this CCSR category are not reported on the record.

For example, if two procedure codes on the same record map to the same CCSR category and one has an open approach (OA) while the other has a minimally invasive approach (MI), the horizontal output assigns OA to that CCSR category because OA has precedence in the hierarchy. In contrast, the vertical output retains separate rows showing the approach for each procedure code that triggered an individual CCSR category.

The SAS program produces a SAS data set with the following data elements:

- The record identifier (data element specified by the RECID macro)
- Horizontal array of over 300 “PRCCSR_APPROACH_AAAnnn” data elements, where AAA is the 3-letter clinical domain abbreviation and nnn is the 3-digit number identifying the CCSR category
- A CCSR version identifier (data element PRCCSR_VERSION)

This option is conceptually straightforward for analysis because all CCSR categories triggered by procedures on a record are kept at the record level. However, the horizontal structure includes a data element for every CCSR category, and as a result, it retains CCSR categories that are not triggered by a record. Each record of horizontal output takes up approximately 1.5 KB disk space, potentially presenting computational or data storage challenges for users with large datasets or limited disk space.

When using the horizontal file to count records associated with a CCSR category, users should count records for which the corresponding PRCCSR_APPROACH_AAAnnn variable has a value of “OA,” “MI,” or “NC.” Records with a value of “ZZ” should not be counted because “ZZ” indicates that no procedure code on the record mapped to that CCSR category.

Example of Output from the Two Different Output Files

Table 6 displays a sample input record, where five ICD-10-PCS codes are stored in an array of data elements I10_PR1-I10_PR5 for a record with RECID equal to 0001. The following two tables display the different output file formats. Table 7 displays the vertical file output for this sample input record. Table 8 contains an example of the horizontal output file, using the same sample input record.

Table 6. Sample of Input File Record

RECID	I10_PR1	I10_PR2	I10_PR3	I10_PR4	I10_PR5
0001	5A1955Z	0W3P8ZZ	0W3J0ZZ	0DC98ZZ	0BH18EZ

Table 7. Example of the Vertical Output File for the Sample Record

Row	RECID	PRCCSR	PR_POSITION	APPROACH	PRCCSR_VERSION
1	0001	ESA003	1	NC	V2027.1
2	0001	GNR005	2	MI	V2027.1
3	0001	GNR005	3	OA	V2027.1

Row	RECID	PRCCSR	PR_POSITION	APPROACH	PRCCSR_VERSION
4	0001	GIS027	4	MI	V2027.1
5	0001	RES007	5	MI	V2027.1

Given that five ICD-10-PCS procedure codes were on the input record, there are five rows for RECID 0001 in the vertical output file in Table 7. The first row indicates that the first procedure code (PR_POSITION=1) for RECID 0001 maps to CCSR category ESA003 (Mechanical ventilation) and has an approach of NC. The second and third procedure codes (PR_POSITION=2 and 3) both map to CCSR categories GNR005 (Endoscopic control of bleeding) but have different approaches: MI and OA. The fourth procedure code (PR_POSITION=4) maps to GIS027 (Upper GI therapeutic procedures, NEC (endoscopic)) with an MI approach, and the fifth procedure (PR_POSITION=5) maps to RES007 (Airway intubation, also an MI approach.

In the example of the horizontal output file (Table 8), the five procedure-level rows shown in Table 7 are summarized in a single row for RECID 0001 with a corresponding array for all CCSR categories. There is one procedure code on this record that triggered assignment of CCSR category ESA003 resulting in data element PRCCSR_ APPROACH_ESA003 being assigned the value representing that procedure's approach, "NC".

GNR005 illustrates how the horizontal file handles multiple procedure codes that map to the same CCSR category. PRCCSR_ APPROACH_GNR005 was triggered by two procedure codes on this record, one with an open approach and one with a minimally invasive approach. In the horizontal file, this means the data element PRCCSR_APPORACH_GNR005 has a value of "OA" since at least one procedure in that CCSR that is on the record has an open approach.

PRCSSR_APPROACH_GIS027 and PRCCSR_APPROACH_RES007 are triggered only by minimally invasive procedure codes on this record and therefore assigned the value "MI". Data elements PRCCSR_APPROACH_ADM001, PRCCSR_ APPROACH_MST013, and PRCCSR_ APPROACH_SKB002 (as well as other "PRCCSR_ APPROACH_" data elements not shown in Table 8) are assigned the value "ZZ" because they are not triggered by any ICD-10-PCS procedure codes on the input record.

Table 8. Example of the Horizontal Output File for the Sample Record

RECID	PRCCSR_ APPROACH _ADM001	…	PRCCSR_ APPROACH _ESA003	…	PRCCSR_ APPROACH _GNR005	…	PRCCSR_ APPROACH _GIS027	…	PRCCSR_ APPROACH _MST013	PRCCSR_ APPROACH _SKB002	…	PRCCSR_ APPROACH_ RES007	PRCCSR_ VERSION
0001	ZZ		NC		OA		MI		ZZ	ZZ		MI	V2027.1

Running the SAS Mapping Program to Add CCSR Categories to Data

To download, modify, and run the software to apply the CCSR for ICD-10-PCS to an input dataset, follow these steps:

1. Users should download and extract the contents of the zip file containing the CSSR for ICD-10-PCS procedure tool to a saved location on their computer. Files included in the zip file are described in Table 3 and referenced below.
2. Users must set up the SAS program (PRCCSR_Mapping_Program_vyyyy-r.sas) to run on their data. They must specify or modify the following where appropriate:
    a. Change the paths in the SAS program to point to the computer location(s) of
        i. the CSV mapping file (PRCCSR_v*yyyy-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 (see Table 9).

Table 9. Modifiable Macro Variables and Directory Paths by Type of Information

Description of Macro Variables and Directory Paths	SAS Program Syntax
File Locations	
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(s)	LIBNAME OUT1
Input File Characteristics	
Specify the unique record identifier on the input SAS file that can be used to link the CCSR output files back to original input SAS dataset. NOTE: If there are any missing values in this unique record identifier, this mapping program will have an error.	%LET RECID=KEY;
Specify the prefix used to name the ICD-10-PCS procedure data element array of the input dataset. In this example, the procedure data elements would be named I10_PR1, I10_PR2, etc., similar to the name of ICD-10-PCS data elements in HCUP databases.	%LET PRPREFIX=I10_PR;

Description of Macro Variables and Directory Paths	SAS Program Syntax
Specify the maximum number of procedure codes on any record in the input file. In this example, the maximum number of procedure codes on any record is 15. The value of NUMPR must be numeric and greater than or equal to 1.	%LET NUMPR=15;
Specify the name of the variable that contains a count of the ICD-10-PCS codes reported on a record. If no such variable exists in the input data file, leave this blank. In this example, the count variable is available and named I10_NPR.	%LET NPRVAR=I10_NPR;
Specify the number of observations to use from the input dataset. Use MAX to use all observations and use a smaller value for testing the program.	%LET OBS=MAX;
Output File Types	
Choose whether to have the program to build the vertical output file (1=yes, 0=no).	%LET VERT=1;
Choose whether to have the program to build the horizontal output file (1=yes, 0=no).	%LET HORZ=1;
Input and Output File Names	
Specify the file member name of the input dataset	%LET CORE=INPUT_SAS_FILE;
Specify a file member name for the vertical output file	%LET VERTFILE=OUTPUT_VERT_FILE_NAME;
Specify a file member name for the horizontal output file	%LET HORZFILE=OUTPUT_HORZ_FILE_NAME;

Abbreviation: CSV, comma separated values

CCSR for ICD-10-PCS Data Elements in the Output Files

The SAS mapping program can generate up to two output datasets. The vertical file contains the following data elements:

- Record identifier (data element specified by the RECID macro)
- CCSR category (data element PRCCSR)
- The position of the procedure (data element PR_Position)
- The surgical approach of the procedure (data element APPROACH)
- The CCSR version number (data element PRCCSR_VERSION).

In this file, there is one observation for all non-missing procedures on the input record.

The horizontal file contains the following data elements:

- Record identifier (data element specified by the RECID macro)
- The data elements PRCCSR_APPROACH_AAAnnn where "AAAnnn" are the values of CCSR categories. See the CCSR Reference File for specific names and descriptions of the CCSR categories.[6]
- The CCSR version number (data element PRCCSR_VERSION).

In this file, there is one observation for each input record. This file can be merged back to the original input dataset using the variable specified in RECID.

Handling of Missing or Invalid Procedures by the SAS Mapping Program to Assign CCSR Categories

If a record in the input file includes no procedures (i.e., the procedure array is filled with blank values), the output files will handle the record as follows:

- In the vertical output file, no record will be included in this file because there were no procedures on the record.
- In the horizontal output file, there will be a record with the record identifier (data element RECID) and the array of categorical data elements PRCCSR_ APPROACH_AAAnnn, but all of the categorical data elements will have the value "ZZ" because no procedures triggered a CCSR category.

If a record in the input file includes a procedure that is not valid for the time period covered by the version of the software (v2027.1 covers ICD-10-PCS codes valid from October 1, 2015, to September 30, 2027),[7] the output files will handle the record as follows:

- In the vertical output file, there will be a record with the record identifier (data element RECID) and the corresponding procedure CCSR (data element PRCCSR) will be set to "invlPR" to indicate an invalid procedure.
- In the horizontal output file, there will be a record with the record identifier (data element RECID) and the array of categorical data elements PRCCSR_ APPROACH_AAAnnn. The categorical data elements will only be set based on valid procedures.

[6] See the CCSR Reference File for a complete list of categories in the CCSR. The CCSR Reference File is only available on the CCSR page of the HCUP-US website (https://hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp).

[7] Please note that with the publication of the Final Rule for the inpatient prospective payment system (IPPS) for fiscal year 2022, the Centers for Medicare & Medicaid Services releases ICD-10-CM/PCS code updates twice a year (every April 1 and October 1). ICD-10-PCS codes that will become effective on April 1, 2027, are not included in v2027.1.

APPENDIX A: BACKGROUND ON THE DEVELOPMENT OF THE CCSR

In October 2015, the United States transitioned to a modified version of the World Health Organization International Classification of Diseases, Tenth Revision, Procedure Coding System (ICD-10-PCS), replacing the ICD-9-CM procedure coding system with the ICD-10-PCS procedure coding system for inpatient stays. An overview of differences between ICD-10-PCS and ICD-9-CM is available on the HCUP User Support website at https://hcup-us.ahrq.gov/datainnovations/icd10_resources.jsp.

Impact on the Clinical Classifications Software

In preparation for the October 2015 implementation of ICD-10-PCS, the Healthcare Cost and Utilization Project (HCUP) software tools were converted to the new coding system. The initial mapping was completed by linking ICD-10-PCS (Procedure Coding System) codes to the ICD-9-CM-based Clinical Classifications Software (CCS) Agency for Healthcare Research and Quality (AHRQ) classification assignments via the General Equivalence Mappings (GEMs) available from the Centers for Medicare & Medicaid Services (CMS) website (see www.cms.gov/medicare/coding-billing/icd-10-codes/icd-10-cm-icd-10-pcs-gem-archive for more information on GEMS). The GEMs files were processed to create GEMs-driven maps between ICD-9-CM and ICD-10-PCS codes. Credentialed coders trained in both ICD-9-CM and ICD-10-PCS reviewed the maps to ensure the validity of the CCS. The goal of the team was to create a set of surgical coding definitions that matched the categories in the CCS for ICD-9-CM and would ease the transition of users from ICD-9-CM- to ICD-10-PCS-coded data. The CCS categories remained the same, although some categories received slight naming modifications to remain accurate descriptions for the codes included in ICD-10-PCS and seven categories were dropped as they could no longer be created under ICD-10-PCS. The resultant first iteration of the ICD-10-PCS classification was considered a beta version.

However, the development of the beta version of the CCS for ICD-10-PCS was completed before ICD-10-PCS-coded data became available. Once ICD-10-PCS coded data became available, the beta version of the CCS was evaluated through preliminary analyses on HCUP data, which revealed unexpected discontinuities between the ICD-9-CM and ICD-10-PCS versions of the CCS. These initial analyses encouraged AHRQ to reconsider the need for a refined ICD-10-PCS version of the CCS.

Planning for the Refinement of the Clinical Classifications Software for ICD-10-PCS

In June 2019, AHRQ initiated planning for a refined version of the CCS, the Clinical Classifications Software Refined (CCSR) for ICD-10-PCS, which would take advantage of the taxonomy and specificity built into ICD-10-PCS codes. The new goal was to optimize a categorization tool for use with the ICD-10-PCS coding system. To adequately map the codes to clinically and surgically meaningful categories, it was important to have expert input from a coding and a clinical/surgical perspective from a variety of specialties.

The team first discussed and debated the intricacies and specificity of ICD-10-PCS coding, departures from the previous design features of ICD-9-CM procedure coding, shortcomings of the existing beta versions of the CCS tool, and potential revisions and modifications that could be implemented in a new procedure categorization tool. AHRQ staff reviewed the team's recommendations and made overarching decisions about the structure and design of the tool. The new CCSR tool was not restricted to include the same set of categories as the beta versions of the CCS tool, but rather the team was tasked with creating a set of categories that were identifiable in ICD-10-PCS codes and valuable for health services research. Some clinical/surgical concepts were retained in the new classification tool from the beta versions of the CCS for ICD-10-PCS, but the specific ICD-10-PCS codes included in the category may have been revised. The coding and clinical review teams were encouraged to create new categories or disaggregate existing categories when they identified opportunities to increase the value of the tool to health services researchers.

The refinement process had two phases. First, was the creation of clinical domains that included large groups of the ICD-10-PCS codes. Second, was the development of the detailed CCSR categories within each clinical domain.

Step 1. Defining Clinical Domains

The purpose of defining clinical domains was to divide over 80,000 ICD-10-PCS codes into large meaningful groups that align with overall concepts of body system or clinical areas. The clinical domains generally align with the sections in the ICD-10-PCS Code Book.[8]

Based on the first character of the taxonomy, ICD-10-PCS codes fall into 10 sections. The majority (over 85 percent) are in the Medical and Surgical Section of the ICD-10-PCS Code Book. Within this section, clinical domains were usually assigned based on Body System (2nd Character) as shown in Table A.1.

[8] AHIMA Press/Decision Health, ed. ICD-10-PCS Code Book, 2027. Chicago, IL: American Health Information Management Association; 2026.

Table A.1. Clinical Domain Assignment for the Medical and Surgical Section, Based on Body System

Clinical Domain (CCSR Structure)	Body System (ICD-10-PCS Code Book Taxonomy, 2nd Character)
Cardiovascular procedures	Heart and Great Vessels
	Lower Arteries
	Lower Veins
	Upper Arteries
	Upper Veins
Central nervous system procedures	Central Nervous System and Cranial Nerves
Ear, nose, and throat procedures	Ear, Nose, Sinus
	Mouth and Throat
	Diagnostic Audiology
Endocrine procedures	Endocrine System
Eye procedures	Eye
Female reproductive system procedures	Female Reproductive System
Gastrointestinal system procedures	Gastrointestinal System
Hepatobiliary and pancreas procedures	Hepatobiliary System and Pancreas
Lymphatic and hemic system procedures	Lymphatic and Hemic Systems
Male reproductive system procedures	Male Reproductive System
Musculoskeletal, subcutaneous tissue, and fascia procedures	Anatomical Regions, Lower Extremities
	Anatomical Regions, Upper Extremities
	Bursae and Ligaments
	Head and Facial Bones
	Lower Bones
	Lower Joints
	Muscles
	Subcutaneous Tissue and Fascia
	Tendons
	Upper Bones
	Upper Joints
Peripheral nervous system procedures	Peripheral Nervous System

Clinical Domain (CCSR Structure)	Body System (ICD-10-PCS Code Book Taxonomy, 2nd Character)
Respiratory system procedures	Respiratory System
Skin and breast procedures	Skin and Breast
Urinary system procedures	Urinary System

Within the Medical and Surgical Section of the ICD-10-PCS Code Book, there are cases where the Body System (2nd Character) corresponded to Anatomical Regions, General. In these cases, clinical domains were assigned based on Body Part (4th character) as shown in Table A.2.

Table A.2. Clinical Domain Assignment for the Medical and Surgical Section, Based on Body Part

Clinical Domain (CCSR Structure)	Body System (ICD-10-PCS Code Book Taxonomy, 2nd Character)	Body Part (ICD-10-PCS Code Book Taxonomy, 4th Character)
Cardiovascular procedures	Anatomical Regions, General	Pericardial Cavity
Ear, nose, and throat procedures	Anatomical Regions, General	Head
	Anatomical Regions, General	Face
	Anatomical Regions, General	Upper Jaw
	Anatomical Regions, General	Lower Jaw
	Anatomical Regions, General	Neck
	Anatomical Regions, General	Cranial Cavity
	Anatomical Regions, General	Oral Cavity and Throat
Female reproductive system procedures	Anatomical Regions, General	Perineum, Female
Gastrointestinal system procedures	Anatomical Regions, General	Gastrointestinal Tract
	Anatomical Regions, General	Peritoneal Cavity
	Anatomical Regions, General	Pelvic Cavity
General region	Anatomical Regions, General	Chest Wall
	Anatomical Regions, General	Abdominal Wall
	Anatomical Regions, General	Mediastinum
	Anatomical Regions, General	Genitourinary Tract
	Anatomical Regions, General	Retroperitoneum
Male reproductive system procedures	Anatomical Regions, General	Perineum, Male
Musculoskeletal, subcutaneous tissue, and fascia procedures	Anatomical Regions, General	Upper Back
	Anatomical Regions, General	Lower Back
Respiratory system procedures	Anatomical Regions, General	Pleural Cavity, Left
	Anatomical Regions, General	Pleural Cavity, Right
	Anatomical Regions, General	Respiratory Tract

For procedure codes that are not included in the Medical and Surgical Section of the ICD-10-PCS Code Book, the intent was to align with the ICD-10-PCS Code Book and create separate clinical domains for each section. These clinical domains are shown in Table A.3.

Table A.3. Clinical Domain Assignment for Sections Other Than the Medical and Surgical Section, Based on Section

Clinical Domain (CCSR Structure)	Section (ICD-10-PCS Code Book Taxonomy, 1st Character)
Administration of therapeutic substances	Administration
Chiropractic treatment	Chiropractic
Extracorporeal or systemic assistance and performance	Extracorporeal or Systemic Assistance and Performance
Extracorporeal or systemic therapies	Extracorporeal or Systemic Therapies
Imaging	Imaging
Measurement and monitoring	Measurement and Monitoring
Mental health therapy	Mental Health
Nuclear medicine	Nuclear Medicine
Osteopathic treatment	Osteopathic
Other procedures	Other Procedures
Dressings and other placements	Placement
Pregnancy-related procedures	Obstetrics
Radiation therapy	Radiation Therapy
Rehabilitation, evaluation, and treatment	Rehabilitation
Substance use disorder treatment	Substance Abuse Treatment
Distributed to the appropriate Medical and Surgical clinical domains	New Technology

Clinical Domain-Specific Structure Notes

Several guidelines were defined in the development of the clinical domains and the underlying list of included ICD-10-PCS codes.

1. All ICD-10-PCS procedure codes in the Medical and Surgical Section of the ICD-10-PCS Code Book (1st character) with a Device or Substance (6th character) indicating Radioactive Element or Radioactive Substance or Radioactive Element, Cesium-131 Collagen Impact are assigned to the *Radiation therapy* clinical domain. Similarly, ICD-10-PCS procedure codes with a Qualifier (7th character) indicating Liquid Brachytherapy Radioisotope are assigned to the *Radiation therapy* clinical domain.
2. Several ICD-10-PCS procedure codes found within the Physical Rehabilitation and Diagnostic Audiology Section of the ICD-10-PCS Code Book are assigned to the *Ear, nose, and throat procedures* clinical domain.
    a. ICD-10-PCS codes with a Body System (2nd character) Diagnostic Audiology.
    b. ICD-10-PCS codes with a Root Operation (3rd character) Hearing Treatment, Cochlear Implant Treatment, Vestibular Treatment, and Device Fitting (hearing devices).
3. Several ICD-10-PCS procedure codes with Root Operation (3rd character) Vestibular Treatment found within the Physical Rehabilitation and Diagnostic Audiology Section of the ICD-10-PCS Code Book are assigned to the *Eye procedures* clinical domain.
4. ICD-10-PCS procedure codes with Root Operation (3rd character) Insertion or Removal, Body Part (4th character) Temporal Bone, Right, Temporal Bone, Left, and Skull, and a Device (6th Character) Hearing Device are assigned to the *Ear, nose, and throat procedures* clinical domain. Other ICD-10-PCS procedure codes with the same Body Parts are found within the *Musculoskeletal, subcutaneous tissue, and fascia procedures* clinical domain.
5. Some ICD-10-PCS procedure codes with a Body System (2nd character) of Subcutaneous Tissue and Fascia are assigned to CCSR categories in the *Female reproductive system procedures* and *Cardiovascular procedures* clinical domains. Specifically, codes with a Root Operation (3rd character) of Insertion, Introduction, Removal, and Revision and a Device (6th character) of Contraceptive Device were moved to the *Female reproductive system procedures* clinical domain. Codes with a Root Operation (3rd character) of Insertion, Removal, and Revision and a Device (6th character) of Vascular Access Device were moved to the *Cardiovascular procedures* clinical domain. All other ICD-10-PCS codes in this Body System are in the *Musculoskeletal, subcutaneous tissue, and fascia procedures* clinical domain.
6. ICD-10-PCS procedure codes with a Body Part (4th character) of Products of Conceptions are assigned to the *Pregnancy-related procedures* clinical domain.

a. Exception is when the procedure code also has a Device (6th character) Radioactive Substance. These procedure codes are assigned to the *Radiation therapy* clinical domain.

7. There are several ICD-10-PCS procedure codes related to labor and delivery that are not found within the *Pregnancy-related procedures* clinical domain.
    a. Codes commonly used for obstetrical laceration repairs are included in clinical domains specific to the Body Part (4th character) because they can also represent therapeutic procedures other than obstetrical laceration repair. The CCSR labels include an indication of the OB laceration, including the degree.
    b. Codes that may be used for the administration of anesthetics during labor are included in the *Central nervous system* and *Administration* clinical domains.
    c. Codes that may be used for the administration of a hormone to induce or hasten labor are included in the *Administration* clinical domain.
8. All codes with a Root Operation (3rd character) Alteration or Control are included in the *General region* clinical domain.

Step 2. Defining CCSR Categories Within Clinical Domains

During the development of the CCSR categories, the team took advantage of the taxonomic structure of the ICD-10-PCS codes and used mapped taxonomy values to facilitate review and rule development. The codes included in each proposed category were reviewed thoroughly by expert clinical coders and a team of surgeons. Together, the team worked through the list of all ICD-10-PCS codes to define CCSR categories within each clinical domain. The grouping of codes was informed in part by annualized inpatient procedure volume derived from the HCUP State Inpatient Databases (SID). Many ICD-10-PCS codes are included in the Code Book for comprehensiveness but are rarely performed during an inpatient hospitalization. The development team aimed to develop categories that captured high-volume procedures and low-volume, but high-impact, procedures (e.g., transplant) when deriving the CCSR categories.

Within each clinical domain, an AHIMA-certified ICD-10-CM/PCS trainer first suggested a set of relevant categories and assigned individual ICD-10-PCS codes to each category. Each assignment was reviewed by a second AHIMA-certified ICD-10-CM/PCS trainer who checked for completeness, appropriate categorization for each code, and recognition of both ICD-10-PCS Code Book directions and published coding guidelines. Following the initial code assignments for each clinical domain, a team of two surgeons reviewed all categories and code assignments within surgical specialties and refined the code assignments to improve their clinical relevance. A surgeon worked with medical clinicians on the CCSR categories for procedure codes that were not specific to surgical specialties such as imaging, nuclear medicine, or bedside procedures. When necessary, specialty physicians were identified and called on to add domain-specific expertise, such as procedures related to pregnancy.

Although the team was amenable to having ICD-10-PCS codes map to more than one CCSR category, this was not needed. Mutual exclusivity was feasible for two reasons that are related

to ICD-10-PCS taxonomy: (1) lack of diagnostic information and (2) specificity of the code description in that they represent individual actions or procedures.

After the clinical review team had defined the CCSR categories, another round of review was conducted to define CCSR category descriptions that would resonate with health services researchers and clinicians. The goal of CCSR category labels was to provide an approximate clinical description for most of the procedures captured by the category, even if it did not technically capture the concepts specific to all included codes. The PRCCSR Reference File provides additional information about each CCSR category, such as a complete set of PCS Root Operations, Body Parts, Approaches, and Devices/Substances.

After the categories were defined, descriptive statistics were generated based on the HCUP SID. These descriptive tables included for each CCSR category the distribution of discharges by age, sex, principal diagnosis, and diagnosis-related group (DRG), in addition to information on length of stay and total charges. These tabulations were for informational purposes and assisted in further refinements.

At all steps, AHRQ provided oversight and additional guidance. The review process included multiple iterations of review and refinements. The team conducted various tests of the CCSR tool to identify potential improvements and modifications after its initial build with the aim of a more parsimonious set of categories. These tests resulted in creating new categories, renaming categories, combining or rolling up categories, and/or shifting categories from one clinical domain to another. Such changes were the result of extensive input across multiple organizations and clinical specialties that evaluated the CCSR category assignments for accuracy and clinical significance.

Summary of Key Changes in the Versions of the CCSR for ICD-10-PCS

The following is a summary of key features and changes between released versions of the CCSR for ICD-10-PCS:

- v2027.1 (released October 2026)
    - Added ICD-10-PCS procedure codes valid starting in fiscal year 2027 so the tool now includes all ICD-10-PCS codes valid from October 2015 through September 2027, including 80 codes that became effective April 1, 2026.
    - The software tool has been revised to both map the ICD-10-PCS code to a CCSR category and to identify whether the procedure approach was open, minimally invasive, or could not be classified as either. The designation of approach is based on the fifth character of the ICD-10-PCS code and clinical review. The added information on procedure approach affects the following files:
        - Files provided with the software tool:
            - Both the Reference file and CSV mapping file include information on the procedure approach indicated by the ICD-10-PCS code

using two characters: “OA” for open approach, “MI” for minimally invasive, and “NC” for not classified.
        - Files output by the software tool:
            - The vertical output file includes a new data element, APPROACH, which indicates the two-character procedure approach for the ICD-10-PCS code.
            - The horizontal output file with an array of data elements for the CCSR categories has been renamed from “PRCCSR_AAAnn” to “PRCCSR_APPROACH_AAAnnn,” and contains the two-character values for procedure approach. Information on procedure position (principal procedure only, secondary procedure only, both principal and secondary procedures) is no longer included.
    - Changed the mapping of 151 procedure codes from CAR028 “Inferior vena cava (IVC) filter procedures” to CAR029 “Cardiovascular device procedures, NEC”, because the intent of these procedures is not venous thromboembolic filtration.
    - Updated guidance regarding reporting on procedure position (i.e. principal vs secondary). See Appendix E.

- v2026.2 (not released)
    - The software tool has been revised to both map the ICD-10-PCS code to a CCSR category and to identify whether the procedure approach was open, minimally invasive, or could not be classified as either. The designation of approach is based on the fifth character of the ICD-10-PCS code and clinical review. See the User Guide for v2027.1 for details.

- v2026.1 (released October 2025)
    - Added ICD-10-PCS procedure codes valid starting in fiscal year 2026 so the tool now includes all ICD-10-PCS codes valid from October 2015 through September 2026, including 50 codes that became effective April 1, 2025.

- v2025.1 (released November 2024)
    - Added ICD-10-PCS procedure codes valid starting in fiscal year 2025 so the tool now includes all ICD-10-PCS codes valid from October 2015 through September 2025, including 41 codes that became effective April 1, 2024.
    - Added CCSR Category ESA012 Extracorporeal or systemic assistance and performance, NEC.
    - Changed mapping of ICD-10-PCS code X2RX0N7 “Replacement of Thoracic Aorta, Arch using Branched Synthetic Substitute with Intraluminal Device, Open Approach, New Technology Group 7” from CCSR Category CAR029 “Cardiovascular device procedures, NEC” to CAR012 “Vessel repair and replacement”, since this code is for a vessel replacement procedure.
    - Changed mapping of ICD-10-PCS code X2V73Q7 “Restriction of Coronary Sinus with Reduction Device, Percutaneous Approach, New Technology Group 7” from

CCSR Category CAR011 “Aneurysm repair procedures” to CAR021 “Artery, vein, and great vessel procedures, NEC”, since this code is for a vein procedure, not aneurysm repair.
    - Changed mapping of ICD-10-PCS code XXEBXQ6 “Measurement of Infection, Lower Respiratory Fluid Nucleic Acid-base Microbial Detection, New Technology Group 6” from MAM014 “Pulmonary function tests” to MAM015 “Measurement and monitoring, NEC”, since this is not a pulmonary function test procedure.

- v2024.1 (released March 2024)
    - Added ICD-10-PCS procedure codes valid starting in fiscal year 2024 so the tool now includes all ICD-10-PCS codes valid from October 2015 through September 2024, including 34 codes that became effective April 1, 2023.

- v2023.1 (released November 2022)
    - Added ICD-10-PCS procedure codes valid starting in fiscal year 2023 so the tool now includes all ICD-10-PCS codes valid from October 2015 through September 2023, including the nine procedure codes related to the administration of therapeutic substances that became effective on April 1, 2022.[9]
        - It should be noted that three procedure codes related to the introduction of fostamatinib (XW0DXR7, XW0G7R7, and XW0H7R7) have been included in the CCSR category ADM016 (Administration of anti-inflammatory agents). Although these tablets can potentially be used as a COVID-19 therapy, the Food and Drug Administration approved the drug for the treatment of chronic immune thrombocytopenia (ITP).[10] For this reason, the three procedure codes are not classified in the CCSR category ADM019 (Potential COVID-19 therapies).

- v2022.1 (released October 2021)
    - Added ICD-10-PCS procedure codes that became effective in FY 2022 so the tool includes ICD-10-PCS codes valid from October 2015 through September 2022, including the 21 codes for COVID-19 therapies that became effective on January 1, 2021.

- v2021.1 (released December 2020)

---

[9] Please note that with the publication of the Final Rule for the inpatient prospective payment system (IPPS) for fiscal year 2022, the Centers for Medicare & Medicaid Services releases ICD-10-CM/PCS code updates twice a year (every April 1 and October 1). ICD-10-PCS codes that will become effective on April 1, 2027, are not included in v2027.1.
[10] Food and Drug Administration (FDA). *FDA approves fostamatinib tablets for ITP*. www.fda.gov/drugs/resources-information-approved-drugs/fda-approves-fostamatinib-tablets-itp.

- Transitioned the software out of beta status after empirical testing and clinical review.
- Includes ICD-10-PCS procedure codes valid from October 2015 through September 2021.

APPENDIX B: COMPARISON OF THE CCSR FOR ICD-10-PCS, THE BETA VERSIONS OF THE CCS FOR ICD-10-PCS, AND THE CCS FOR ICD-9-CM

There are several differences to note across the HCUP ICD-based procedure classification software: the CCSR for ICD-10-PCS, the beta versions of the CCS for ICD-10-PCS, and the CCS for ICD-9-CM procedures. Table B.1 summarizes key differences.

Table B.1. Differences Among the CCSR for ICD-10-PCS, Beta Version of the CCS for ICD-10-PCS, and CCS for ICD-9-CM

CCSR for ICD-10-PCS	Beta Version of the CCS for ICD-10-PCS	CCS for ICD-9-CM Procedures
Over 80,000 codes are categorized into more than 300 categories	More than 80,000 codes are categorized into 224 categories	Approximately 4,000 codes are categorized into more than 230 categories
Valid for ICD-10-PCS procedure codes from October 1, 2015 – September 30, 2027 (v2027.1) and updated annually for each fiscal year update to ICD-10-PCS codes	Valid for ICD-10-PCS procedure codes from October 1, 2015 – September 30, 2020 (v2020.1). Not updated for ICD-10-PCS codes effective after September 2020.	Valid for ICD-9-CM procedure codes through September 30, 2015
Capitalizes on the taxonomy and specificity of ICD-10-PCS coding by creating new clinical categories with additional detail	Uses the same categories as previously available under CCS for ICD-9-CM (seven categories were dropped from the original CCS, as they could not be created with ICD-10-PCS)	More than 230 CCS procedure categories
Categories are organized into 31 clinical domains, generally following the structure of the ICD-10-PCS Code Book	Uses the same categories and order as previously available under CCS for ICD-9-CM procedures	Categories are ordered to generally follow the ICD-9-CM Code Book
Each ICD-10-PCS code maps to one CCSR category	Each ICD-10-PCS code maps to one CCS category	Each ICD-10-PCS code maps to one CCS category
No multi-level system with additional procedure specificity has been developed	Multi-level system with additional procedure specificity available for up to two levels	Multi-level system with additional procedure specificity available for up to three levels
SAS® programming code available. Comma separated values (CSV) mapping file available to use with other programming languages.	SAS programming code available. CSV mapping file available to use with other programming languages.	SAS and Stata® programming code available. CSV mapping file available to use with other programming languages.

CCSR for ICD-10-PCS	Beta Version of the CCS for ICD-10-PCS	CCS for ICD-9-CM Procedures
Allows user the flexibility to choose between output files structured horizontally or vertically. The vertical file structure improves storage efficiency.	Horizontal output only, one CCS data element for every procedure code.	Horizontal output only, one CCS data element for every procedure code.

Abbreviations: CCS, Clinical Classifications Software; CCSR Clinical Classifications Software Refined; CSV, comma separated values; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10-PCS, International Classification of Diseases, Tenth Revision, Procedure Coding System.

APPENDIX C: DESCRIPTION OF ICD-10-PCS ROOT OPERATIONS IN THE MEDICAL AND SURGICAL SECTION

Table C.1 provides definitions for the 31 ICD-10-PCS root operations found within the Medical and Surgical Section of the ICD-10-PCS Code Book along with medical explanations and example procedures.

Table C.1. Definition and Medical Explanation for ICD-10-PCS Root Operations in the Medical and Surgical Section

Root Operation	ICD-10-PCS Definition	Medical Explanation	Example Procedures
Alteration	Modifying the anatomic structure of a body part without affecting the function of the body part	Cosmetic surgery, where the principal purpose is to improve appearance	Face lift, breast augmentation
Bypass	Altering the route of passage of the contents of a tubular body part	Rerouting contents of a body part to a downstream area of the normal route, to a similar route and body part, or to an abnormal route and dissimilar body part. Includes one or more anastomoses, with or without the use of a device	Coronary artery bypass, colostomy formation
Change	Taking out of off a device from a body part and putting back an identical or similar device in or on the same body part without cutting or puncturing the skin or mucous membrane	Device-related procedure; all procedure codes with the root operation Change are coded using the External approach	Urinary catheter change, gastrostomy tube change
Control	Stopping or attempting to stop, postprocedural bleeding or other acute bleeding	The site of the bleeding is coded as an anatomical region and not to a specific body part	Control of post-prostatectomy hemorrhage, control of post-tonsillectomy hemorrhage
Creation	Making a new genital structure that does not take over the function of a body part	Used only for sex reassignment surgeries	Creation of a vagina in a male, creation of penis in a female
Destruction	Physical eradication of all or a portion of a body part by the direct use of energy, force, or destructive agent	None of the body part is physically taken out	Fulguration of rectal polyp, cautery of skin lesion
Detachment	Cutting off all or a portion of the upper or lower extremities	The body part value is the site of the detachment, with a qualifier if applicable to further specify the level where the extremity was detached	Below knee amputation, disarticulation of shoulder

Root Operation	ICD-10-PCS Definition	Medical Explanation	Example Procedures
Dilation	Expanding an orifice or lumen of a tubular body part	The orifice can be a natural orifice or an artificially created orifice. Accomplished by stretching a tubular body part using intraluminal pressure or by cutting part of the orifice or wall of the tubular body part.	Percutaneous transluminal angioplasty, pyloromyotomy
Division	Cutting into a body part, without draining fluids and/or gases from the body part, in order to separate or transect a body part	All or a portion of the body part is separated into two or more portions	Spinal cordotomy, osteotomy
Drainage	Taking or letting out fluids and/or gases from a body part	The suffix “centesis” pertains to a procedure that percutaneously drains fluid from a body cavity, joint or vertebral disc. The Qualifier (7th character) “X” indicating Diagnostic, is used to identify drainage procedures that are biopsies. Endoscopy procedures occur when the biopsy has an approach of via natural or artificial opening endoscopic.	Thoracentesis, incision and drainage
Excision	Cutting out or off, without replacement, a portion of a body part	The Qualifier (7th character) “X” indicating Diagnostic, is used to identify excision procedures that are biopsies.	Partial nephrectomy, liver biopsy
Extirpation	Taking or cutting out solid matter from a body part	The solid matter may be an abnormal byproduct of a biological function or a foreign body; it may be imbedded in a body part or in the lumen of a tubular body part. The solid matter may or may not have been previously broken into pieces.	Thrombectomy, choledocholithotomy
Extraction	Pulling or stripping out or off all or a portion of a body part by the use of force	The Qualifier (7th character) “X” indicating Diagnostic, is used to identify extraction procedures that are biopsies.	Dilation and curettage, vein stripping

Root Operation	ICD-10-PCS Definition	Medical Explanation	Example Procedures
Fragmentation	Breaking solid matter in a body part into pieces	Physical force (e.g., manual, ultrasonic) applied directly or indirectly is used to break the solid matter into pieces. The solid matter may be an abnormal byproduct of a biological function or a foreign body. The pieces of solid matter are not taken out.	Extracorporeal shockwave lithotripsy, transurethral lithotripsy
Fusion	Joining together portions of an articular body part rendering the articular body part immobile	The body part is joined together by fixation device, bone graft, or other means	Spinal fusion, ankle arthrodesis
Insertion	Putting in a nonbiological appliance that monitors, assists, performs, or prevents a physiological function but does not physically take the place of a body part	Device-related procedure	Insertion of radioactive implant, insertion of central venous catheter
Inspection	Visually and/or manually exploring a body part	Visual exploration may be performed with or without optical instrumentation. Manual exploration may be performed directly or through intervening body layers.	Diagnostic arthroscopy, exploratory laparotomy
Map	Locating the route of passage of electrical impulses and/or locating functional areas in a body part	Appliable only to the cardiac conduction mechanism and the central nervous system	Cardiac mapping, cortical mapping
Occlusion	Completely closing an orifice or the lumen of a tubular body part	The orifice can be a natural orifice or an artificially created orifice	Fallopian tube ligation, ligation of inferior vena cava
Reattachment	Putting back in or on all or a portion of a separated body part to its normal location or other suitable location	Vascular circulation and nervous pathways may or may not be reestablished	Reattachment of hand, reattachment of avulsed kidney
Release	Freeing a body part from an abnormal physical constraint by cutting or by the use of force	Some of the restraining tissue may be taken out but none of the body part is taken out	Adhesiolysis, carpal tunnel release

Root Operation	ICD-10-PCS Definition	Medical Explanation	Example Procedures
Removal	Taking out or off a device from a body part	Device-related procedure; if a device is taken out and a similar device put in without cutting or puncturing the skin or mucous membrane, the procedure is coded to the root operation Change. Otherwise, the procedure for taking out a device is coded to the root operation Removal.	Drainage tube removal, cardiac pacemaker removal
Repair	Restoring, to the extent possible, a body part to its normal anatomic structure and function	Used only when the method to accomplish the repair is not one of the other root operations	Colostomy takedown, suture of laceration
Replacement	Putting in or on biological or synthetic material that physically takes the place and/or function of all or a portion of a body part	The body part may have been taken out or replaced, or may be taken out, physically eradicated, or rendered nonfunctional during the Replacement procedure. A Removal procedure is coded for taking out the device used in a previous replacement procedure.	Total hip replacement, bone graft, free skin graft
Reposition	Moving to its normal location, or other suitable location, all or a portion of a body part	The body part is moved to a new location from an abnormal location or from a normal location where it is not functioning correctly. The body part may or may not be cut out or off to be moved to the new location.	Reposition of undescended testicle, fracture reduction
Resection	Cutting out of off, without replacement, all of a body part		Total nephrectomy, total lobectomy of lung
Restriction	Partially closing an orifice or the lumen of a tubular body part	The orifice can be a natural orifice or an artificially created orifice	Esophagogastric fundoplication, cervical cerclage
Revision	Correcting, to the extent possible, a portion of a malfunctioning device or the position of a displaced device	Device-related procedure; revision can include correcting a malfunctioning or displaced device by taking out or putting in components of the device such as a screw or pin	Adjustment of position of pacemaker lead, recementing of hip prosthesis

Root Operation	ICD-10-PCS Definition	Medical Explanation	Example Procedures
Supplement	Putting in or on biological or synthetic material that physically reinforces and/or augments the function of a portion of a body part	The biological material is non-living or is living and from the same individual. The body part may have been previously replaced, and the Supplement procedure is performed to physically reinforce and/or augment the function of the replaced body part.	Herniorrhaphy using mesh, free nerve graft, mitral valve ring annuloplasty, put a new acetabular liner in a previous hip replacement
Transfer	Moving, without taking out, all or a portion of a body part to another location to take over the function of all or a portion of a body part	The body part transferred remains connected to its vascular and nervous supply	Tendon transfer, skin pedicle flap transfer
Transplantation	Putting in or on all or a portion of a living body part taken from another individual or animal to physically take the place and/or function of all or a portion of a similar body part	The native body part may or may not be taken out, and the transplanted body part may take over all or a portion of its function	Kidney transplant, heart transplant

Source: Utter GH, Cox GL, Owens PL, Romano PS. Challenges and Opportunities with ICD-10-CM/PCS: Implications for Surgical Research Involving Administrative Data. J Am Coll Surg. 2013; 217(3):516-526.

APPENDIX D: ACRONYMS USED IN CCSR FOR ICD-10-PCS CATEGORY DESCRIPTIONS

In some cases, a CCSR category description will include an acronym representing a specific procedure, body system, or clinical concept without an accompanying description. Table D.1 provides a complete list of all acronyms used within the category descriptions for the CCSR for ICD-10-PCS.

Table D.1. Acronyms Used in the CCSR for ICD-10-PCS Category Descriptions

Acronym	Definition
CABG	Coronary artery bypass graft
CNS	Central nervous system
COVID-19	Coronavirus disease 2019
EEG	Electroencephalogram
ENT	Ear, nose, and throat
ERCP	Endoscopic retrograde cholangiopancreatography
GI	Gastrointestinal
ICP	Intracranial pressure
NEC	Not elsewhere classified
PCI	Percutaneous coronary intervention
Rh	Rhesus factor

APPENDIX E. RECOMMENDATIONS FOR REPORTING ON PROCEDURES USING THE CCSR FOR ICD-10-PCS

The ICD-10-PCS coding system was designed for reporting inpatient hospital procedures.

Principal (or First-Listed) Procedure

The Uniform Hospital Discharge Data Set (UHDDS) defines the principal, or first-listed, procedure reported on an inpatient discharge record as the procedure that was performed for definitive treatment (rather than one performed for diagnostic or exploratory purposes) or was necessary to take care of a complication.[11] The concept of *principal procedure* (performed for definitive treatment most related to principal diagnosis) differs from the concept of *principal diagnosis* (condition established after study to be chiefly responsible for occasioning the admission of the patient to the hospital).[12] The distinction between the first-listed procedure and other procedures is generally less meaningful than the distinction between principal and secondary diagnoses. For these reasons (with more detail enumerated below), users should exercise caution when interpreting the first-listed procedure and should consider all reported procedures when conducting procedure-based analyses.

Coding guidance: The assignment of a first-listed procedure is driven by coding conventions (i.e., specific sequencing rules established in the UHDDS and ICD-10-PCS Coding Guidelines), rather than a determination of which procedure was the most clinically important, resource-intensive, or complex. The ICD-10-PCS Coding Guidelines provides additional information about the sequencing of procedures.[13] Specifically the coding rule notes:

- Sequence procedure performed for definitive treatment most related to principal diagnosis as principal procedure.
- If there is both therapeutic and diagnostic treatment for the principal diagnosis, the therapeutic procedure takes precedence.
- If only a diagnostic procedure was performed for treatment of the principal diagnosis and a therapeutic procedure was performed for a secondary diagnosis, the diagnostic procedure is coded as principal because it was most related to the principal diagnosis.
- If no procedure is related to the principal diagnosis and a therapeutic procedure was performed for a secondary diagnosis, then the therapeutic procedure is reported as principal procedure.

---

[11] Core Health Data Elements: Report of the National Committee on Vital and Health Statistics. Core Data Elements. https://aspe.hhs.gov/report/core-health-data-elements-report-national-committee-vital-and-health-statistics.

[12] Core Health Data Elements: Report of the National Committee on Vital and Health Statistics. Core Data Elements. https://aspe.hhs.gov/report/core-health-data-elements-report-national-committee-vital-and-health-statistics.

[13] ICD-10-PCS Official Guidelines for Coding and Reporting, 2027. Section F Selection of Principal Procedure. https://www.cms.gov/files/document/2027-official-icd-10-pcs-coding-guidelines.pdf.

For example, consider a patient with a principal diagnosis of osteoarthritis; the patient may go specifically to the hospital for a knee arthroplasty to treat the condition, so the ICD-10-PCS code for the knee arthroplasty would be the principal procedure code. In contrast, consider in-hospital births (principal diagnosis of liveborn). A common principal procedure for a liveborn is vaccination. The vaccination is the principal treatment performed on the newborns but was not the specific reason for the admission to the hospital.

Limitation of the CCSR when a Surgery or a Specific Procedure Needs to be Reported Using More than One ICD-10-PCS Code

Another consideration is that multiple ICD-10-PCS codes may be used in combination to indicate a single surgical concept. Because the CCSR assigns each individual code to a category independently, the mapping may or may not fully capture the surgery as a whole, depending on whether the component codes happen to map to the same CCSR category.

Clinical coding experts (American Health Information Management Association (AHIMA)-certified ICD-10-CM/PCS trainers) at the Ohio State University provided the following insight on the choices the medical coders need to make when reporting the principal procedure code on medical forms:

- The forms used to submit information were not designed to handle the fact that in ICD-10-PCS more than one ICD-10-PCS procedure code may be needed to report a surgery or specific procedure.
- There are no current rules for which ICD-10-PCS procedure code to place in the principal position if more than one ICD-10-PCS code is needed to define the surgery or specific surgery most related to the principal diagnosis.[14]

The CCSR for ICD-10-PCS development team aimed to create CCSR categories that captured high-volume procedures and high-impact low-volume procedures (e.g., transplant) when deriving the CCSR categories. The individual codes within each CCSR are clinically similar. In some cases, this means that the individual codes needed to define a surgery, or a specific procedure are, in fact, included in the same CCSR category. It is advisable to use the CCSR for ICD-10-PCS, rather than individual ICD-10-PCS codes, for analyses of procedures to facilitate reporting by these surgical concepts relevant for inpatient care. Table E.1 provides coding examples of four surgeries; three of the four have all codes mapped to the same CCSR.

[14] There is anecdotal information that grouping software may give preference to therapeutic procedure codes and shift order of the codes around for an enhanced DRG assignment.

Table E.1. ICD-10-PCS Coding and CCSR Categories Examples for Four Surgeries[a]

Surgery / Specific Procedure	Combination ICD-10-PCS Codes	CCSR Category
Coronary Bypass	021109W, Bypass Coronary Artery, Two Arteries from Aorta with Autologous Venous Tissue, Open Approach	CAR003 (Coronary artery bypass grafts (CABG))
	02100Z9, Bypass Coronary Artery, One Artery from Left Internal Mammary, Open Approach	CAR003 (Coronary artery bypass grafts (CABG))
Tonsillectomy and Adenoidectomy	0CTPXZZ, Resection of Tonsils, External Approach	ENT007 (Tonsillectomy and adenoidectomy)
	0CTQXZZ, Resection of Adenoids, External Approach	ENT007 (Tonsillectomy and adenoidectomy)
Percutaneous Transluminal Coronary Angioplasty (PTCA) with atherectomy	02C03ZZ, Extirpation of Matter from Coronary Artery, One Artery, Percutaneous Approach	CAR003 (Percutaneous coronary interventions (PCI))
	027034Z, Dilation of Coronary Artery, One Artery with Drug-eluting Intraluminal Device, Percutaneous Approach	CAR003 (Percutaneous coronary interventions (PCI))
	02713EZ, Dilation of Coronary Artery, Two Arteries with Two Intraluminal Devices, Percutaneous Approach	CAR003 (Percutaneous coronary interventions (PCI))
Norwood Procedure for hypoplastic heart syndrome[b]	021K0ZW, Bypass Right Ventricle to Aorta, Open Approach	CAR013 (Heart and great vessel bypass procedures)
	02UX0KZ, Supplement Thoracic Aorta, Ascending/Arch with Nonautologous Tissue Substitute, Open Approach	CAR012 (Vessel repair and replacement)
	021Q0JB, Bypass Right Pulmonary Artery from Subclavian with Synthetic Substitute, Open Approach	CAR013 (Heart and great vessel bypass procedures)
	02LR0ZT, Occlusion of Ductus Arteriosis, Open Approach	CAR010 (Ligation and embolization of vessels)
	02160Z7, Bypass Right Atrium to Left Atrium, Open Approach	CAR013 (Heart and great vessel bypass procedures)

[a] These are examples of ICD-10-PCS codes that can be used to define these surgeries but should not be considered the only (or best) combination of codes to define these surgeries.

[b] This is a rare surgery performed on babies. Only one record with this coding was found in the 2018 National Inpatient Sample (NIS) and the first-listed ICD-10-PCS code was mapped to CAR013 (Heart and great vessel bypass procedures).

Limiting to Major Operating Room Procedures

When reporting utilization statistics and outcomes using the CCSR for ICD-10-PCS, users should consider limiting the ICD-10-PCS codes within the CCSR to operating room (OR) procedures because some CCSR categories include a combination of major OR procedures and minor non-OR procedures.

Minor non-OR procedures are often underreported on hospital administrative discharge records for a few reasons:

- Billing for the procedure may have been done by the physician, not the hospital.
- The minor procedure is not expected to affect reimbursement for the inpatient stay and therefore is not coded on the discharge record.
- There may be limited room for reporting procedure codes on the hospital discharge record. Some HCUP Partners include no more than six procedures on the files provided to HCUP.

OR procedures can be identified by using the HCUP software tool Procedures Classes Refined for ICD-10-PCS[15] that differentiates between minor and major diagnostic and therapeutic procedures.

[15] Procedure Classes Refined for ICD-10-PCS. Healthcare Cost and Utilization Project (HCUP). Agency for Healthcare Research and Quality, Rockville, MD. hcup-us.ahrq.gov/toolssoftware/procedureicd10/procedure_icd10.jsp.