Development of the ICD-10 Procedure Coding System (ICD-10-PCS)

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The ICD-10 Procedure Coding System (ICD-10-PCS) has been developed as a replacement for Volume 3 of ICD-9-CM. This article will describe the development and structure of ICD-10-PCS‹as well as describe the modifications that have been made to the system as a result of extensive review and testing.

In 1995, the Health Care Financing Administration (HCFA) funded a three-year project to develop a replacement for the procedure section of ICD-9-CM (Volume 3). The replacement system, named ICD-10 Procedure Coding System (ICD-10-PCS), was developed to report inpatient procedures. ICD-10-PCS has a multiaxial, seven-character, alphanumeric code structure, which provides a unique code for all substantially different procedures and allows new procedures to be easily incorporated as new codes. Each character in ICD-10-PCS has up to 34 different values, with 10 digits (0-9) and 24 letters (A-H, J-N, and P-Z) comprising the values. The letters O and I are eliminated in order to avoid confusion with the digits 0 and 1. All terminology used in ICD-10-PCS is precisely defined. While the meaning of specific words can vary in common usage, ICD-10-PCS assigns a specific meaning to all terms used in the system.

Procedures in ICD-10-PCS are divided into sections that relate to the general type of procedure (e.g., medical and surgical, imaging). The first character of the procedure code always specifies the section, as seen in Figure 1. The second through seventh characters have a standard meaning within each section but may have different meanings across sections. In most sections, one of the characters specifies the precise type of procedure being performed (e.g., excision, resection), while the other characters specify additional information such as the body part on which the procedure is being performed. In ICD-10-PCS the term "procedure" is used to refer to the complete specification of the seven characters.

Tabular List in ICD-10-PCS Manual

The tabular list in ICD-10-PCS has a very different organization than does the ICD-9-CM. Each page in the tabular list is composed of grids that specify the valid combinations of character values that comprise a particular procedure code. (See Figure 2 for a sample of the tabular list.) The upper portion of each grid contains a box with a description of the first two or three characters of the procedure code. For example, for procedures in the medical and surgical section, the first three characters make up the name of the section, the body system, and the root operation being performed.

In ICD-10-PCS, the characters 027 would indicate that the grid refers to the medical and surgical section (0) of the body system heart and great vessels (2) and a root operation of dilation (7). As shown in Figure 2, the type of procedure (e.g., dilation) is followed by its definition.

The lower portion of the grid specifies all the valid combinations of characters four through seven. The four columns in the grid represent each of the last four characters. For the medical and surgical section, these columns are labeled as body part, approach, device, and qualifier, respectively. Each row in the grid defines the valid combinations of characters four through seven. The tabular list only contains combinations of characters that represent a valid procedure -- excluding any combinations of characters that do not constitute a valid procedure.

The grid shown in Figure 2 generates 48 unique procedure codes. For example, code 02725DZ represents the procedure for dilation of three coronary arteries using an intraluminal device by a percutaneous intraluminal approach (i.e., percutaneous transluminal coronary angioplasty with stent).

Figure 1—Sections
0 Medical and Surgical
1 Obstetrics
2 Placement
3 Administration
4 Measurement and Monitoring
5 Imaging
6 Nuclear Medicine
7 Radiation Oncology
8 Osteopathic
9 Rehabilitation and Diagnostic Audiology
B Extracorporeal Assistance and Performance
C Extracorporeal Therapies
D Laboratory
F Mental Health
G Chiropractic
H Miscellaneous

Medical and Surgical Procedures

The seven characters for medical and surgical procedures are shown in Figure 3. The first character specifying the section is designated with a zero. The second character indicates the general body system (e.g., gastrointestinal). The third character indicates the root operation, which specifies the objective of the procedure (e.g., repair). The fourth character indicates the specific part of the body system on which the procedure was performed (e.g., duodenum). The fifth character indicates the approach used to reach the site of the procedure (e.g., open). The sixth character indicates whether any device was used in the procedure (e.g., synthetic substitute). Finally, the seventh character is a qualifier that has a unique meaning for individual procedures. For example, the qualifier can be used to identify the second site involved in a bypass. Characters one through four must always be assigned a precise value. The approach (character five), the device (character six), and the qualifier (character seven) are not applicable to all procedures. The letter Z is used for characters five, six, and seven to indicate that an approach, device, or qualifier was not applicable for a specific procedure.

Body System

Specified in the second character are the body systems for medical and surgical procedures (see Figure 4). In order to provide necessary detail for body parts, some traditional body systems are assigned multiple body system categories. For instance, body system categories K (muscles), L (tendons), M (bursa, ligaments, fascia), N (head and facial bones), P (upper bones), Q (lower bones), R (upper joints), and S (lower joints) are subsystems of musculoskeletal procedures.

Figure 2—Example from tabular list in the medical and surgical section containing the first three characters of a procedure code and valid combinations of characters four through seven

0: Medical and Surgical
2: Heart & Great Vessels
7: Dilation: Expanding the orifice or the lumen of a tubular body part

Body Part Character 4	Approach Character 5	Device Character 6	Qualifier Character 7
0 Coronary Artery One	**1** Open Intraluminal	**D** Intraluminal Device	**Z** None
1 Coronary Artery Two	**2** Open Intraluminal Endoscopic	**Y** Device NEC	
2 Coronary Artery Three	**5** Percutaneous Intraluminal	**Z** None	
3 Coronary Artery Four or More	**6** Percutaneous Intraluminal Endoscopic		

Root Operations

The root operation is specified in the third character. In the medical and surgical section there are 30 different root operation terms (see Figure 5). This character specifies the underlying objective of the procedure, with each root operation being given a precise definition. The root operation term *excision* is used to indicate that a portion of a body part was cut out, while the root operation term resection is used to indicate that all of a body part was cut out. If the body part that is taken out has biological or synthetic material substituted for it, the root operation term *replacement* is used. If the body part that is taken out has a living body part from a donor put in its place, the root operation term *transplantation* is used. If solid matter such as a foreign body, embolus, clot, thrombus, or stone is taken out of a body part without removing any of the body part, the root operation term extirpation is used. If a device is taken out but no equivalent device is put in, the root term removal is used. The above examples of root operation terminology illustrate the precision used to define these terms. There is always a clear distinction made regarding the differences between each root operation term. A root operation must also constitute a complete procedure. Hence, the term anastomosis would not qualify as a root operation as it is a means of joining body parts together. Thus it is an integral part of another procedure such as a bypass or a resection. An anastomosis cannot be performed as a stand-alone procedure. Similarly, incision is not a root term, since it is a means of opening the site and is always an integral part of another procedure. A revision of a procedure is the correction of a portion of a previously performed procedure that has failed to function as intended. Revisions do not include the redoing of the complete procedure, as this is considered the same as the original procedure. Revisions also exclude the correction of complications which do not require a portion of the original procedure to be redone,

such as the control of bleeding. The specification of the original operation on which the revision is being performed is identified in the qualifier character.

Figure 3—Seven Characters for Medical and Surgical Section

1	2	3	4	5	6	7
Section	Body System	Root Operation	Body Part	Approach	Device	Qualifier

Body Part

The body part is specified in the fourth character. The body part indicates the specific part of the body system on which the procedure was performed (e.g., duodenum).

Approach

The technique used to reach the site of the procedure (i.e., approach) is specified in the fifth character and includes 13 different approaches (see Figure 6). The approach is composed of four components: the access location, method, type of instrumentation, and route.

Access Location

For operations performed on an internal body site, the access location specifies the external body site through which the internal site of the operation is reached. There are two possible access locations: skin/mucous membrane or an external orifice. The skin or mucous membrane can be cut through or punctured by instruments in order to reach the internal site of the operation. The internal site of an operation can also be reached through an external orifice. External orifices can be natural (e.g., mouth) or artificial (e.g., colostomy stoma).

Method

The method specifies how the external body site is entered. An open method involves cutting through the external body layer or lining of an orifice and any other intervening body layers necessary to expose the internal site of the operation. An instrumental method involves the entry of instrumentation through the access location in order to reach the internal site of the procedure. Instrumentation can be introduced by puncture or minor incision or through an external orifice. The puncture or minor incision used to introduce the instrumentation does not constitute an open approach since it does not expose the site of the procedure.

Type of Instrumentation

Instrumentation may include the capability to visualize the site of the operation. For example, the instrumentation used to perform a sigmoidoscopy permits the internal site of the operation to be visualized while the instrumentation used to perform a needle biopsy of the liver does not. The term endoscopic is used to refer to instrumentation that permits a site to be visualized.

Figure 4—Medical and Surgical Body Systems

Body Systems	
0	Central Nervous System
1	Peripheral Nervous System
2	Heart and Great Vessels
3	Upper Arteries
4	Lower Arteries
5	Upper Veins
6	Lower Veins
7	Lymphatic and Hemic System
8	Eye
9	Ear, Nose, Sinus
B	Respiratory System

Route

Instrumental methods may involve the passage of instrumentation into the lumen of a tubular body part in order to reach the internal site of the operation. An intraluminal route indicates that instrumentation was passed into the lumen of a tubular body part.

Operations performed directly on the skin or mucous membrane constitute an external surface and therefore, the approach is none (e.g., skin excision). Procedures performed indirectly by the application of external force also constitute an external site and the approach is none (e.g., closed repair of fracture). Figure 6 gives a definition of each approach. For cardiovascular procedures, there are three additional open approaches that specify whether cardiopulmonary bypass, inflow occlusion, or a temporary shunt was used during the procedure.

Device

C	Mouth and Throat
D	Gastrointestinal System
F	Hepatobiliary System and Pancreas
G	Endocrine System
H	Skin and Breast
J	Subcutaneous Tissue
K	Muscles
L	Tendons
M	Bursa, Ligaments, Fascia
N	Head and Facial Bones
P	Upper Bones
Q	Lower Bones
R	Upper Joints
S	Lower Joints
T	Urinary System
V	Female Reproductive System
W	Male Reproductive System
X	Anatomical Regions
Y	Upper Extremities
Z	Lower Extremities

The device is specified in the sixth character. This is only used to specify devices that remain after the procedure is completed. There are four general types of devices:

- Biological or synthetic material that takes the place of all or a portion of a body part (e.g, skin grafts, joint prosthesis)
- Biological or synthetic material that assists or prevents a physiological function (e.g., IUD)
- Therapeutic material that is not absorbed by, eliminated by, or incorporated into a body part (e.g., radioactive implant). Therapeutic materials that are considered devices can always be removed
- Mechanical or electronic appliances used to assist, monitor, replace, or prevent a physiological function (e.g., diaphragmatic pacemaker, orthopedic pins)

Instruments that describe how a procedure is performed are not specified in the device character. The approach character specifies whether instrumentation is used only to reach the site of the procedure, or to reach and visualize it. If the objective of the procedure is to put in the device, the root operation is insertion. If the inserted device is used as part of a procedure whose underlying objective is other than insertion of the device, the root operation corresponding to the underlying objective of the procedure is used; and the device is specified in the device character. Thus, even if the repair of a bone includes putting in a fixation device, the root operation is repair and not insertion. Materials that are incidental to a procedure, such as clips, ligatures, and sutures, are not specified in the device character. Since new devices are constantly being developed, a "device NEC" option is available.

Qualifier

The qualifier -- specified in the seventh character -- has a unique meaning for individual procedures. For example, it can be used to identify the second site in a bypass.

Several guidelines were followed in the development of the medical and surgical section and other sections of ICD-10-PCS. When procedures are performed for specific diseases or disorders, that disease or disorder is not specified as part of the procedure. Thus, there are no separate ICD-10-PCS codes for procedures performed for aneurysms, cleft lip, strictures, neoplasms, and hernias. The diagnosis codes‹not the procedure codes‹contain the specific information regarding the nature of the disease or disorder.

Examples of Actual Operative Records Coded with ICD-10-PCS

Open reduction internal fixation of left tibia with plate and screws -- 0QQH04Z
Medical and surgical section (0), body system lower bones (Q), root operation repair (Q), body part left tibia (H), approach is open (0) with internal fixation device (4) and without qualifier (Z).

Laparoscopic appendectomy -- 0DTJ4ZZ
Medical and surgical section (0), gastrointestinal system (D), root operation resection (T), body part appendix (J), using a percutaneous endoscopic approach (4) without device (Z) and without qualifier (Z)

Sigmoidoscopy with biopsy -- 0DBN8ZX
Medical and surgical section (0), gastrointestinal system (D), root operation excision (B), body part sigmoid colon (N), transorifice intraluminal endoscopic approach (8) without device (Z), diagnostic (X)

Tracheostomy -- 0B110F5
Medical and surgical section (0), respiratory system (B), root operation bypass (1), body part trachea (1), open approach (0), tracheostomy device (F), opening to the skin (5)

The medical and surgical section constitutes the vast majority of procedures that would normally be reported in an inpatient setting. As an example of one of the other sections, the imaging section is described.

Imaging Procedures

The seven characters for imaging procedures (see Figure 7) is indicated by the number five in the first character. Imaging procedures include plain radiography, fluoroscopy, CT, MRI, and ultrasound. Nuclear medicine procedures including PET, uptakes, and scans are in the nuclear medicine section, and therapeutic radiology is in the radiation oncology section.

As shown in Figure 7, the second character reflects the body system and the fourth character describes the body part. The third character shows the root type of imaging procedure (e.g, MRI, ultrasound), which is further defined in Figure 8. This figure contains the list of all root types for the imaging section with a definition of each root type. The fifth character specifies the type of contrast material used in the imaging procedure (e.g., high or low osmolar). When the concentration of the contrast is not relevant (e.g., air) or for MRIs (e.g., gadoteridol) the specific contrast is specified.

The sixth character either provides further detail about the contrast material by specifying the route of administration (e.g., IV, direct, via colostomy) or contains a qualifier specific to the root type of imaging procedure. For example, for plain radiography procedures without contrast, the sixth character indicates if the procedure was performed at the bedside (portable). The seventh character is a qualifier that has a unique meaning for individual imaging procedures (e.g., Cine evaluation, plain film subtraction). Contrast (character 5), contrast/qualifier (character 6), and qualifier (character 7) are not applicable to all imaging procedures.

Since new contrast material can be developed, a "contrast NEC" option is provided. Across the range of applications of ICD-10-PCS it may not always be necessary -- or desirable -- to report imaging procedures at a level of detail that specifies the precise contrast used. Therefore, an "identification not requested" option is provided for the contrast character. This option permits the reporting of imaging procedures without the specification of the contrast material.

Figure 5—Medical and Surgical Root Operation Definitions

Alteration	Modifying the natural anatomical structure of a body part without affecting the function of the body part
Bypass	Altering the route of passage of the contents of a tubular body part
Change	Taking out or 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 a mucous membrane
Control	Stopping, or attempting to stop, postprocedural bleeding
Creation	Making a new structure that does not physically take the place of a body part
Destruction	Eradicating all or a portion of a body part
Detachment	Cutting off all or a portion of an extremity
Dilation	Expanding the orifice or the lumen of a tubular body part
Division	Separating, without taking out, a body part
Drainage	Taking or letting out fluids and/or gases from a body part
Excision	Cutting out or off, without replacement, a portion of a body part
Extirpation	Taking or cutting out solid matter from a body part
Extraction	Taking out or off all or a portion of a body part
Fragmentation	Breaking down solid matter in a body part
Fusion	Joining together portions of an articular body part rendering the articular body part immobile
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
Inspection	Visually and/or manually exploring a body part
Map	Locating the route of passage of electrical impulses and/or locating functional areas in a body part
Occlusion	Completely closing the orifice or lumen of a tubular body part
Reattachment	Putting back in or on all or a portion of a body part
Release	Freeing a body part

Removal	Taking out or off a device from a body part
Repair	Restoring, to the extent possible, a body part to its natural anatomic structure
Replacement	Putting in or on biological or synthetic material that physically takes the place of all or a portion of a body part
Reposition	Moving to its normal location or other suitable location all or a portion of a body part
Resection	Cutting out or off, without replacement, all of a body part
Restriction	Partially closing the orifice or lumen of a tubular body part
Revision	Correcting a portion of a previously performed procedure
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
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

Modifications to ICD-10-PCS

Throughout the development of ICD-10-PCS, extensive input from a wide range of organizations has been obtained. A technical advisory panel -- which includes representatives from AHIMA, the American Hospital Association, and the American Medical Association -- have provided review and comment throughout the development of ICD-10-PCS.

The initial draft of ICD-10-PCS has been widely disseminated, with both a paper and computerized version made available. Copies of ICD-10-PCS have been distributed to all major physician specialty societies, and HCFA has made it available on its Web site. As an informal test in October 1996, 70 HIM professionals were trained in the new system. After training, they coded a sample of records from their institutions using ICD-10-PCS and gave feedback to the ICD-10-PCS project staff. HCFA also used the CDACs to conduct a formal independent test of the suitability of ICD-10-PCS. (See "Testing ICD-10-PCS")

As a result of feedback from the extensive review, ICD-10-PCS has been modified from its initial version to reflect the reviewers' suggestions. The most frequent issue identified was that of missing tabular entries (i.e., identified procedures for which there was no corresponding tabular entry). Missing tabular entries most often relate to the need to allow additional approaches for a specific procedure (e.g., a wide range of procedures that previously could only be performed by an open approach can now be performed by a percutaneous or percutaneous endoscopic approach). Several additional root operations were defined in the medical and surgical section (e.g., fusion). The approaches were also simplified. Originally, 17 different approaches existed. The approaches that were eliminated were those that specified whether the access location was the lining of an orifice or was within the orifice itself, as they did not constitute a critical distinction in describing the procedure performed. These approaches were incorporated into the others by modifying the definitions of various approaches, thus reducing the number of approaches to 13. Biopsy is not a root operation since it is often a form of an excision. However, based on reviewers' suggestions to distinguish biopsies from therapeutic excisions, a qualifier specifying that the excision was diagnostic was added.

Figure 6—Medical and Surgical Approach Definitions

Open	Cutting through the skin or mucous membrane and any other body layers necessary to expose the site of the operation
Open Intraluminal	Cutting through the skin or mucous membrane and any other body layers necessary to expose a tubular body part and introduction of instrumentation into the lumen to reach the site of the operation
Open Intraluminal Endoscopic	Cutting through the skin or mucous membrane and any other body layers neccessary to expose a tubular body part and introduction of instrumentation into the lumen to reach and visualize the site of the operation
Percutaneous	Entry, by puncture or minor incision, of instrumentation through the skin or mucous membrane and any other body layers necessary to reach the site of the operation
Percutaneous Endoscopic	Entry, by puncture or minor incision, of instrumentation through the skin or mucous membrane and any other body layers necessary to reach and visualize the site of the operation

Percutaneous Intraluminal	Entry, by puncture or minor incision, of instrumentation through the skin or mucous membrane and any other body layers necessary to reach a tubular body part and introduction of instrumentation into the lumen to reach the site of the operation
Percutaneous Intraluminal Endoscopic	Entry, by puncture or minor incision, of instrumentation through the skin or mucous membrane and any other body layers necessary to reach a tubular body part and introduction of instrumentation into the lumen to reach and visualize the site of the operation
Transorifice Intraluminal	Entry of instrumentation through a natural or artificial external orifice into the lumen of the connected tubular body part to reach the site of the operation
Transorifice Intraluminal Endoscopic	Entry of instrumentation through a natural or artificial external orifice into the lumen of the connected tubular body part to reach and visualize the site of the operation
Open with Cardiopulmonary Bypass	Cutting through the skin or mucous membrane and any other body layers necessary to expose the site of the operation with the use of cardiopulmonary bypass during a portion of the procedure
Open with Inflow Occlusion	Cutting through the skin or mucous membrane and any other body layers necessary to expose the site of the operation with the use of inflow occlusion during a portion of the procedure
Open with Temporary Shunt	Cutting through the skin or mucous membrane and any other body layers necessary to expose the site of the operation with the use of a temporary shunt during a portion of the procedure
None	Procedures performed directly on the skin or mucous membrane and procedures performed indirectly by the application of external force through the skin or mucous membrane

Figure 7—Seven Characters for Imaging Section

1	2	3	4	5	6	7
Section	Body System	Root Type	Body Part	Contrast	Contrast/ Qualifier	Qualifier

One of the most frequent issues raised concerning ICD-10-PCS is the issue of NOS codes. The concern is that there may not be sufficient specificity of documentation in the medical record to support the detail required by ICD-10-PCS, which did not originally provide for NOS codes. The NOS issue primarily relates to the root operation, body part, and approach characters and was addressed separately for each of them. For the root operation character, repair was designated as the NOS option. The ICD-10-PCS coding instructions were modified to indicate that if the root operation cannot be determined from the documentation and the necessary information could not be obtained from the physician, then the root operation repair should be coded. In order to address the issue of insufficient anatomic specificity in the medical record, the use of generic body parts was expanded -- if the precise body part was not specified, then the option of coding a generic body part was added. There are four broad approach types: open, percutaneous, transorifice, and none. The ICD-10-PCS coding instructions were modified to indicate that if the full detail on the type of approach cannot be determined, then the most basic open, percutaneous, or transorifice approach should be coded. At a minimum, the coder will still need to be able to specify whether the approach was open, percutaneous, transorifice, or none. This distinction is so fundamental to the description of the procedure that any less specificity relative to the approach would not be appropriate. The modifications made to ICD-10-PCS to address the NOS issue strike a balance between a precise description of the procedure and the realities of the current state of medical records documentation.

Figure 8—Imaging Procedure Root Type Definitions

Plain Radiography	Planar display of an image developed from the capture of external ionizing radiation on photographic or photo-conductive plate
Fluoroscopy	Single plane or biplane real time display of an image developed from the capture of external ionizing radiation on fluorescent screen. The image may also be stored by either digital or analog means
Computerized Tomography (CT Scan)	Computer-reformatted digital display of multiplanar images developed from the capture of multiple exposures of external ionizing radiation
Magnetic Resonance Imaging (MRI)	Computer-reformatted digital display of multiplanar images developed from the capture of radio frequency signals emitted by nuclei in a body site excited within a magnetic field

Ultrasonography	Real-time display of images of anatomy or flow information developed from the capture of reflected and attenuated high-frequency sound waves

Conclusion

ICD-10-PCS has been developed as a replacement for Volume 3 of ICD-9-CM. The system has evolved during its three-year development based on extensive input from many segments of the healthcare industry. The multiaxial structure of the system, combined with its detailed definition of all terminology, will permit a precise specification of procedures for use in research, epidemiology, healthcare, statistical analysis, and administrative areas. It will also enhance the ability of health information coders to determine accurate procedure codes with minimal effort.

For a more complete description of ICD-10-PCS, contact Richard Averill, research director, 3M Health Information Systems, 100 Barnes Road, Wallingford, CT 06492.

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