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

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The International Classification of Diseases 10th Revision Procedure Classification System (ICD-10-PCS) has been developed as a replacement for Volume 3 of the International Classification of Diseases 9th Revision (ICD-9-CM). The development of ICD-10-PCS was funded by the U.S. Centers for Medicare and Medicaid Services (CMS). ICD-10-PCS has a multi-axial seven character alphanumeric code structure that provides a unique code for all substantially different procedures, and allows new procedures to be easily incorporated as new codes. ICD-10-PCS was under development for over five years. The initial draft was formally tested and evaluated by an independent contractor; the final version was released in the Spring of 1998, with annual updates since the final release. The design, development and testing of ICD-10-PCS are discussed.

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Introduction

Volume 3 of the *International Classification of Diseases 9th Revision Clinical Modification* (ICD-9-CM) has been used in the U.S. for the reporting of inpatient procedures since 1979. The structure of Volume 3 of ICD-9-CM has not allowed new procedures associated with rapidly changing technology to be effectively incorporated as new codes. As a result, in 1992 the U.S. Centers for Medicare and Medicaid Services (CMS) funded a project to design a replacement for Volume 3 of ICD-9-CM. After a review of the preliminary design, CMS in 1995 awarded 3M Health Information Systems a three-year contract to complete development of the replacement system. The new system is the ICD-10 Procedure Coding System (ICD-10-PCS).

The development of ICD-10-PCS had as its goal the incorporation of four major attributes:

Completeness

There should be a unique code for all substantially different procedures. In Volume 3 of ICD-9-CM, procedures on different body parts, with different approaches, or of different types are sometimes assigned to the same code.

Expandability

As new procedures are developed, the structure of ICD-10-PCS should allow them to be easily incorporated as unique codes.

Multiaxial

ICD-10-PCS codes should consist of independent characters, with each individual axis retaining its meaning across broad ranges of codes to the extent possible.

Standardized Terminology

ICD-10-PCS should include definitions of the terminology used. While the meaning of specific words varies in common usage, ICD-10-PCS should not include multiple meanings for the same term, and each term must be assigned a specific meaning.

If these four objectives are met, then ICD-10-PCS should enhance the ability of health information coders to construct accurate codes with minimal effort.

In the development of ICD-10-PCS, several general principles were followed:

Diagnostic Information is Not Included in Procedure Description

When procedures are performed for specific diseases or disorders, the disease or disorder is not contained in the procedure code. There are no codes for procedures exclusive to aneurysms, cleft lip, strictures, neoplasms, hernias, etc. The diagnosis codes, not the procedure codes, specify the disease or disorder.

Not Otherwise Specified (NOS) Options are Restricted

ICD-9-CM often provides a “not otherwise specified” code option. Certain NOS options made available in ICD-10-PCS are restricted to the uses laid out in the ICD-10-PCS draft guidelines. A minimal level of specificity is required for each component of the procedure.

Limited Use of Not Elsewhere Classified (NEC) Option

ICD-9-CM often provides a “not elsewhere classified” code option.

Because all significant components of a procedure are specified in ICD-10-PCS, there is generally no need for an NEC code option. However, limited NEC options are incorporated into ICD-10-PCS where necessary. For example, new devices are frequently developed, and therefore it is necessary to provide an “Other Device” option for use until the new device can be explicitly added to the coding system. Additional NEC options are discussed later, in the sections of the system where they occur.

Level of Specificity

All procedures currently performed can be specified in ICD-10-PCS. The frequency with which a procedure is performed was not a consideration in the development of the system. Rather, a unique code is available for variations of a procedure that can be performed.

ICD-10-PCS has a seven character alphanumeric code structure. Each character contains up to 34 possible values. Each value represents a specific option for the general character definition (e.g., stomach is one of the values for the body part character). The ten digits 0-9 and the 24 letters A-H, J-N and P-Z may be used in each character. The letters O and I are not used in order to avoid confusion with the digits 0 and 1.

Procedures are divided into sections that identify the general type of procedure (e.g., medical and surgical, obstetrics, imaging). The first character of the procedure code always specifies the section. The sections are shown in table 1.

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

Table 1: Sections

The second through seventh characters mean the same thing within each section, but may mean different things in other sections.

In all sections, the third character specifies the general type of procedure performed (e.g., resection, transfusion, fluoroscopy), while the other characters give additional information such as the body part and approach. In ICD-10-PCS, the term “procedure” refers to the complete specification of the seven characters.

ICD-10-PCS Format

The ICD-10-PCS is made up of three separate parts.

Tables
Index
List of Codes

The Index allows codes to be located by an alphabetic lookup. The index entry refers to a specific location in the Tables. The Tables must be used in order to

construct a complete and valid code. The List of Codes provides a comprehensive listing of all valid codes, with a complete text description accompanying each code.

Tables in ICD-10-PCS

The Tables in ICD-10-PCS are organized differently from ICD-9-CM. Each page in the Tables is composed of rows that specify the valid combinations of code values. Table 2 is an excerpt from the ICD-10-PCS tables. In the system, the upper portion of each table specifies the values for the first three characters of the codes in that table. In the medical and surgical section, the first three characters are the section, the body system and the root operation.

In ICD-10-PCS, the values 027 specify the section *medical and surgical* (0), the body system *heart and great vessels* (2) and the root operation *dilation* (7). As shown in table 2, the root operation (i.e., *dilation*) is accompanied by its definition.

The lower portion of the table specifies all the valid combinations of the remaining characters four through seven. The four columns in the table specify the last four characters. In the medical and surgical section they are labeled Body Part, Approach, Device and Qualifier, respectively. Each row in the table specifies the valid combination of values for characters four through seven. The Tables contain only those combinations of values that result in a valid procedure code.

The row in table 3 can be used to construct 96 unique procedure codes. For example, code 02703DZ specifies the procedure for dilation of one coronary artery using an intraluminal device via percutaneous approach (i.e., percutaneous transluminal coronary angioplasty with stent).

0: Medical and Surgical 2: Heart and Great Vessels 7: Dilation: Expanding an 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 Site 1 Coronary Arteries, Two Sites 2 Coronary Arteries, Three Sites 3 Coronary Arteries, Four or More Sites	0 Open 3 Percutaneous 4 Percutaneous Endoscopic	4 Drug-eluting Intraluminal Device D Intraluminal Device Z No Device	6 Bifurcation Z No Qualifier

Table 2: Row from the Tables specifies the valid combinations of characters 4 through 7 for the medical and surgical root operation dilation of the heart and great vessels body system(027)

027004Z	Dilation of Coronary Artery, One Site with Drug-eluting Intraluminal Device, Open Approach
02700DZ	Dilation of Coronary Artery, One Site with Intraluminal Device, Open Approach
02700ZZ	Dilation, Coronary Artery, One Site, Open Approach
027034Z	Dilation, Coronary Artery, One Site with Drug-eluting Intraluminal Device, Percutaneous Approach
02703DZ	Dilation, Coronary Artery, One Site with Intraluminal Device, Percutaneous Approach
02703ZZ	Dilation, Coronary Artery, One Site, Percutaneous Approach
027044Z	Dilation, Coronary Artery, One Site with Drug-eluting Intraluminal Device, Percutaneous Endoscopic Approach
02704DZ	Dilation, Coronary Artery, One Site with Intraluminal Device, Percutaneous Endoscopic Approach
02704ZZ	Dilation, Coronary Artery, One Site, Percutaneous Endoscopic Approach

Table 3: Code descriptions for dilation of one coronary artery (0270)

List of Codes

The valid codes that can be constructed using the first body part value in table 2 (i.e., one coronary artery) and no specific qualifier are shown in table 3. The 16 codes listed in table 3 are examples of entries in the List of Codes. Each code has a text description that is complete and easy to read.

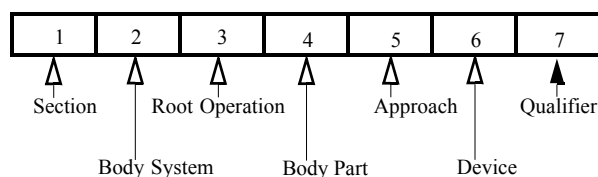
Index

The Index allows codes to be located based on an alphabetic lookup. Codes may be found in the index based on the general type of the procedure (e.g., resection, transfusion, fluoroscopy), or a more commonly used term (e.g., appendectomy). The code for percutaneous intralu-

minal dilation of the coronary arteries with an intraluminal device can be found in the index under *dilation*, or a synonym of dilation (e.g., angioplasty). Once the desired term is located in the index, the index specifies the first three or four values of the code, followed by three or four periods (e.g., 027....), or directs the user to see another term. Each table also identifies the first three values of the code (e.g., 027). Based on the first three values of the code obtained from the index, the corresponding table can be located. The table is then used to obtain the complete code by specifying the last four values.

Medical and Surgical Section

The seven characters for medical and surgical procedures have the following meaning:



CHARACTER MEANINGS

The medical and surgical section codes represent the vast majority of procedures reported in an inpatient setting. Medical and surgical procedure codes have a first character value of "0". The second character indicates the general body system (e.g., gastrointestinal). The third character indicates the root operation, or specific objective, of the procedure (e.g., excision). The fourth character indicates the specific body part on which the procedure was performed (e.g., duodenum). The fifth character indicates the approach used to reach the procedure site (e.g., open). The sixth character indicates whether any device was used and remained at the end of the procedure (e.g., synthetic substitute). The seventh character is a qualifier that may have a specific meaning for a limited range of values. For example, the qualifier can be used to identify the destination site of the root operation bypass. The first through fifth characters are always assigned a specific value, but the device (sixth character) and the qualifier (seventh character) are not applicable to all procedures. The value Z is used for the sixth and seventh characters to indicate that a specific device or qualifier does not apply to the procedure.

The body systems for medical and surgical section codes are specified in the second character, as shown in table 4. In order to provide necessary detail, some

traditional body systems are subdivided. For example, body system values K (muscles), L (tendons), M (bursae and ligaments), N (head and facial bones), P (upper bones), Q (lower bones), R (upper joints) and S (lower joints) are subsystems of the musculoskeletal system.

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

Table 4: Medical and Surgical Body Systems

ROOT OPERATIONS

The root operation is specified in the third character. In the medical and surgical section there are 31 different root operation values, as shown in table 5.

The root operation identifies the objec-

Root Operation	Definition
Alteration	Modifying the anatomic 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 genital structure that does not take over the function of a body part
Destruction	Physical eradication of all or a portion of a body part by the direct use of energy, force or a destructive agent
Detachment	Cutting off all or part of the upper or lower extremities
Dilation	Expanding an orifice or the lumen of a tubular body part
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
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	Pulling or stripping out or off all or a portion of a body part by the use of force
Fragmentation	Breaking solid matter in a body part into pieces
Fusion	Joining together portions of an articular body part rendering the articular body part immobile
Insertion	Putting in a non-biological 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 an orifice or the lumen of a tubular body part
Reattachment	Putting back in or on all or a portion of a separated body part to its normal location or other suitable location
Release	Freeing a body part from an abnormal physical constraint by cutting or by use of force
Removal	Taking out or off a device from a body part
Repair	Restoring, to the extent possible, a body part to its normal anatomic structure and function
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 an orifice or the lumen of a tubular body part
Revision	Correcting, to the extent possible, a malfunctioning or displaced device
Supplement	Putting in or on biological or synthetic material that physically reinforces and/or augments the function of a portion of a body part
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

Table 5: Medical and Surgical Root Operation Definitions

tive of the procedure. Each root operation has a precise definition. For example, the root operation *insertion* is used for procedures where devices are put in or on a body part. If a device is taken out but no equivalent device is put in, then the root operation *removal* is used. The root operation *extirpation* is used when solid matter such as a foreign body, embolus or calculus is taken out of a body part without taking out any of the body part. The root operation *excision* is used when a portion of a body part is cut out, while the root operation *resection* is used when all of a body part as defined by the body part value is cut out. If biological or synthetic material is put in to take the place of all or a portion of a body part, then the root operation *replacement* is used. If the body part has a living body part from a donor put in its place, then the root operation *transplantation* is used. The above examples of root operation terminology illustrate the precision of the values defined in the system. There is a clear distinction between each root operation.

A root operation specifies the objective of the procedure. The term “anastomosis” is not a root operation, because it is a means of joining and is always an integral part of another procedure (e.g., bypass, resection) with a specific objective. Similarly, “incision” is not a root operation, since it is always part of the objective of another procedure (e.g., division, drainage).

The root operation *repair* in the medical and surgical section functions as a “not elsewhere classified” option. It is used when the procedure performed is not one of the other specific root operations.

Appendix A provides additional explanation and representative examples of the medical and surgical root operations. Appendix B groups all root operations in

the medical and surgical section into sub-categories and provides an example of each root operation.

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). Tubular body parts are defined in ICD-10-PCS as those hollow body parts that provide a route of passage for solids, liquids, or gases. They include the cardiovascular system, and body parts such as those contained in the gastrointestinal tract, genitourinary tract, biliary tract, and respiratory tract.

APPROACH

The technique used to reach the site of the procedure is specified in the fifth character. There are seven different approaches, as shown in table 6.

The approach is comprised of three components: the access location, method, and type of instrumentation.

Access Location

For procedures performed on an internal body part, the access location specifies the external site through which the site of the procedure is reached. There are two general types of access locations: skin or mucous membranes, and external orifices. Every approach value except *external* includes one of these two access locations. The skin or mucous membrane can be cut or punctured to reach the procedure site. All open and percutaneous approach values use this access location. The site of a procedure can also be reached through an external opening. External openings can be natural (e.g., mouth) or artificial (e.g., colostomy stoma).

Approach Value	Approach Definition
Open	Cutting through the skin or mucous membrane and any other body layers necessary to expose the site of the procedure
Percutaneous	Entry, by puncture or minor incision, of instrumentation through the skin or mucous membrane and/or any other body layers necessary to reach the site of the procedure
Percutaneous Endoscopic	Entry, by puncture or minor incision, of instrumentation through the skin or mucous membrane and/or any other body layers necessary to reach and visualize the site of the procedure
Via Natural or Artificial Opening	Entry of instrumentation through a natural or artificial external opening to reach the site of the procedure
Via Natural or Artificial Opening Endoscopic	Entry of instrumentation through a natural or artificial external opening to reach and visualize the site of the procedure
Open with Percutaneous Endoscopic Assistance	Cutting through the skin or mucous membrane and any other body layers necessary to expose the site of the procedure, and entry, by puncture or minor incision, of instrumentation through the skin or mucous membrane and any other body layers necessary to aid in the performance of the procedure
External	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

Table 6: Medical and Surgical Approach Definitions

Method

For procedures performed on an internal body part, the method specifies how the external access location is entered. An open method specifies cutting through the skin or mucous membrane and any other intervening body layers necessary to expose the site of the procedure. An instrumental method specifies the entry of instrumentation through the access location to the internal procedure site. Instrumentation can be introduced by puncture or minor incision, or through an external opening. The puncture or minor incision does not constitute an open approach, because it does not expose the site of the procedure. An approach can define multiple methods. For example, the open endoscopic approach includes both the open method to expose the body part and the introduction of instrumentation into the body part to perform the procedure.

Type of Instrumentation

For procedures performed on an internal body part, instrumentation means that specialized equipment is used to perform the procedure. Instrumentation is used in all internal approaches other than the basic open approach. Instrumentation may or may not include the capacity to visualize the procedure site. For example, the instrumentation used to perform a sigmoidoscopy permits the internal site of the procedure to be visualized, while the instrumentation used to perform a needle biopsy of the liver does not. The term “endoscopic” as used in approach values refers to instrumentation that permits a site to be visualized.

External Approaches

Procedures performed directly on the skin or mucous membrane are identified by the external approach (e.g., skin excision). Procedures performed indirectly by the application of external force are also

identified by the external approach (e.g., closed reduction of fracture).

Table 6 contains a definition of each approach. Appendix C compares the components (access location, method, and type of instrumentation) of each approach, and provides an example of each approach.

DEVICE

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

1. Biological or synthetic material that takes the place of all or a portion of a body part (e.g., skin graft, joint prosthesis).
2. Biological or synthetic material that assists or prevents a physiological function (e.g., IUD).
3. Therapeutic material that is not absorbed by, eliminated by, or incorporated into a body part (e.g., radioactive implant).
4. Mechanical or electronic appliances used to assist, monitor, take the place of or prevent a physiological function (e.g., cardiac pacemaker, orthopedic pin).

While all devices can be removed, some devices cannot be removed without putting in another nonbiological appliance or body part substitute. Specific device values may be coded with the root operations *alteration*, *bypass*, *creation*, *dilation*, *drainage*, *fusion*, *occlusion*, *reposition*, and *restriction*. Specific device values must be coded with the root operations *change*, *insertion*, *removal*, *replacement*, and *revision*. Instruments used to visualize the procedure site are not specified in the device value. This information is specified

in the approach value.

If the objective of the procedure is to put in the device, then the root operation is *insertion*. If the device is put in to meet an objective other than insertion, then the root operation defining the underlying objective of the procedure is used, with the device specified in the device character. For example, if a procedure to replace the hip joint is performed, the root operation *replacement* is coded and the prosthetic device is specified in the device character. Materials incidental to a procedure such as clips, ligatures and sutures are not specified in the device character. Because new devices can be developed, the value "Other Device" is provided as a temporary option for use until a specific device value is added to the system.

QUALIFIER

The qualifier is specified in the seventh character. The qualifier contains unique values for individual procedures as needed. For example, the qualifier can be used to identify the destination site in a bypass.

Medical and Surgical Section Principles

In developing the medical and surgical procedure codes, several specific principles were followed:

Composite Terms are not Root Operations

The only component of a procedure specified in the root operation is the objective of the procedure. Composite terms such as colonoscopy and sigmoidectomy are not root operations because they specify multiple components of a procedure. The term "colonoscopy" is a composite of information contained in the root operation value, i.e., *inspection*, the body part value, i.e., large intestine,

and the endoscopic approach value, i.e., via natural or artificial opening endoscopic. In ICD-10-PCS, the components of a procedure are defined separately. The underlying objective of the procedure is specified by the root operation (third character), the precise part of the gastrointestinal tract inspected is specified by the body part (fourth character), and the method used to reach and visualize the procedure site is specified by the approach (fifth character). A partial sigmoidectomy is likewise a composite of information contained in the root operation value, i.e., *excision*, and the body part value, i.e., sigmoid colon. In ICD-10-PCS, a partial sigmoidectomy is coded as *excision* (cutting out or off, without replacement, a portion of a body part) of the sigmoid body part. While the terms colonoscopy and sigmoidectomy are listed in the index, they do not constitute separate root operations in the Tables, but instead refer to the correct root operation and body system in the Tables.

Root Operation Based on Objective of Procedure

The root operation is based on the objective of the procedure, such as resection of transverse colon or dilation of an artery. The assignment of the root operation is based on the procedure actually performed, which may or may not have been the intended procedure. If the intended procedure is modified or discontinued (e.g., excision instead of resection is performed), the root operation is determined by the procedure actually performed. If the desired result fails to persist after completion of the procedure (i.e., the artery does not remain expanded after the dilation procedure), the root operation is still determined by the procedure actually performed.

If the procedure performed takes out a foreign body, then the procedure is coded to the root operation *extirpation*. Dilating the urethra is coded as *dilation*, since the objective of the procedure is to dilate the urethra. If dilation of the urethra includes putting in an intraluminal stent, the root operation remains *dilation* and not *insertion* of the intraluminal device, because the underlying objective of the procedure is dilation of the urethra. The stent is identified by the intraluminal device value in the sixth character of the dilation procedure code. If the objective is solely to put a radioactive element in the urethra, then the procedure is coded to the root operation *insertion*, with the radioactive element identified in the sixth character of the code. If the objective of the procedure is to correct a malfunctioning or displaced device, then the procedure is coded to the root operation *revision*. In the root operation *revision*, the original device being revised is identified in the device character. *Revision* is typically performed on mechanical appliances (e.g., pacemaker), or materials used in replacement procedures (e.g., synthetic substitute). Typical *revision* procedures include adjustment of pacemaker position and correction of malfunctioning knee prosthesis.

Combination Procedures are Coded Separately

If multiple procedures as defined by distinct objectives are performed during an operative episode, then multiple codes are used. For example, obtaining the vein graft used for coronary bypass surgery is coded as a separate procedure from the bypass itself.

Redo of Procedures

The complete or partial redo of the original procedure is coded to the root

operation that identifies the procedure performed rather than *revision*. For example, a complete redo of a hip replacement procedure which requires putting in a new prosthesis is coded to the root operation *replacement* rather than *revision*. The correction of complications arising from the original procedure other than device complications as defined in the root operation *revision* are also coded to the procedure performed. For example, a procedure to control hemorrhage arising from the original procedure is coded to *control* rather than *revision*.

Examples of procedures coded in ICD-10-PCS

The following are examples of procedures from the medical and surgical section, coded in ICD-10-PCS.

Suture of skin laceration, left lower arm: 0HQEXZZ

Medical and surgical section (0), body system skin and breast (H), root operation repair (Q), body part skin left lower arm (E), external approach (X) no device (Z) and no qualifier (Z).

Laparoscopic appendectomy: 0DTJ4ZZ

Medical and surgical section (0), body system gastrointestinal (D), root operation resection (T), body part appendix (J), percutaneous endoscopic approach (4), no device (Z) and no qualifier (Z).

Sigmoidoscopy with biopsy: 0DBN8ZX

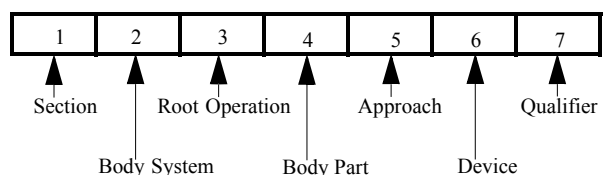
Medical and surgical section (0), body system gastrointestinal (D), root operation excision (B), body part sigmoid colon (N), via natural or artificial opening endoscopic approach (8), no device (Z) and with qualifier diagnostic (X).

Tracheostomy using tracheostomy tube: 0B110F4

Medical and surgical section (0), body system respiratory (B), root operation bypass (1), body part trachea (1), open approach (0), with tracheostomy device (F) and qualifier cutaneous (4).

Obstetrics Section

The seven characters in the obstetrics section have the same meaning as in the medical and surgical section.



Obstetrics procedure codes have a first character value of "1". The second character value for body system is *pregnancy*. The root operations *change*, *drainage*, *extraction*, *insertion*, *inspection*, *removal*, *repair*, *reposition*, *resection* and *transplantation* are used in the obstetrics section, and have the same meaning as in the medical and surgical section. The obstetrics section also includes two additional root operations, *abortion* and *delivery*, defined below:

Abortion:	Artificially terminating a pregnancy
Delivery:	Assisting the passage of the products of conception from the genital canal

A cesarean section is not a separate root operation, because the underlying objective is *extraction* (i.e., pulling out all or a portion of a body part).

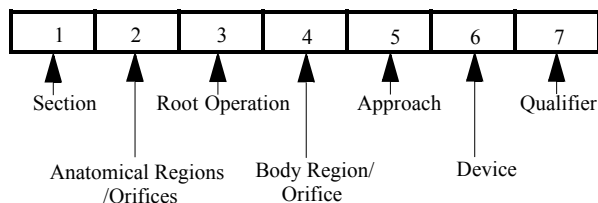
The body part values in the obstetrics section are:

- Products of conception
- Products of conception, retained
- Products of conception, ectopic

The obstetrics section includes procedures performed on the products of conception only; procedures on the pregnant female are coded in the medical and surgical section (e.g., episiotomy). The term “products of conception” refers to all physical components of a pregnancy, including the fetus, amnion, umbilical cord and placenta. There is no differentiation of the products of conception based on gestational age. Thus, the specification of the products of conception as a zygote, embryo or fetus, or the trimester of the pregnancy, is not part of the procedure code but can be found in the diagnosis code. The fifth character specifies approaches as defined in the medical and surgical section. The sixth character is used for devices such as fetal monitoring electrodes. Qualifier values are specific to the root operation, and are used to specify the type of extraction (e.g., low forceps, high forceps, low cervical cesarean, etc.), the type of fluid taken out during a drainage procedure (e.g., amniotic fluid, fetal blood, etc.) or the body system of the products of conception on which a repair was performed.

Placement Section

The seven characters in the placement section have the following meaning:



Placement section codes represent procedures for putting an externally placed device in or on a body region for the purpose of protection, immobilization, stretching, compression or packing. Placement procedure codes have a first character value of “2”. The second character value

for body system is either *anatomical regions* or *anatomical orifices*. The root operations *change* and *removal* are contained in the placement section, and have the same meaning as in the medical and surgical section. The placement section also includes five additional root operations, defined as follows.

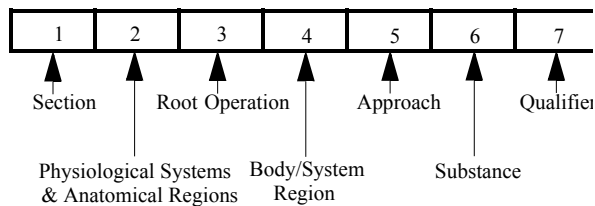
Compression:	Putting pressure on a body region
Dressing:	Putting material on a body region for protection
Immobilization:	Limiting or preventing motion of an external body region
Packing:	Putting material in a body region
Traction:	Exerting a pulling force on a body region in a distal direction

The fourth character values are either body regions (e.g., upper leg) or natural orifices (e.g., ear). Since all placement procedures are performed directly on the skin or mucous membrane, or performed indirectly by the application of external force through the skin or mucous membrane, the approach value is always external. The device character is always specified (except in the case of manual traction) and indicates the device placed during the procedure (e.g., cast, splint, bandage, etc.). Except for casts for fractures and dislocations, devices in the placement section are off the shelf and do not require any extensive design, fabrication or fitting. Placement of devices that require extensive design, fabrication or fitting are coded in the rehabilitation section. The qualifier character is not specified in the placement section; thus the qualifier value is always *no qualifier*.

Administration Section

The seven characters in the administra-

tion section have the following meaning:



Administration section codes represent procedures for putting in or on a therapeutic, prophylactic, protective, diagnostic, nutritional or physiological substance. Administration procedure codes have a first character value of "3". The body system character contains three values: *circulatory system*, *indwelling device*, and *physiological systems and anatomical regions*. The circulatory body system is used for transfusion procedures. There are three root operations in the administration section.

Introduction: Putting in or on a therapeutic, diagnostic, nutritional, physiological or prophylactic substance except blood or blood products

Irrigation: Putting in or on a cleansing substance

Transfusion: Putting in blood or blood products

The fourth character specifies the body system/region. It identifies the site where the substance is administered, not the site where the substance administered takes effect. Sites include skin and mucous membrane, subcutaneous tissue and muscle. These differentiate intradermal, subcutaneous, and intramuscular injections respectively. Other sites include eye, respiratory tract, peritoneal cavity, and epidural space. The fifth character specifies approaches as defined in the medical and surgical section. The approach for intradermal, subcutaneous and intramuscular introductions (i.e., injections) is percutaneous. If a catheter is placed to introduce a

substance into an internal site within the circulatory system, then the approach is percutaneous. For example, if a catheter is advanced directly into the heart to introduce contrast for angiography, then the procedure would be coded as a percutaneous introduction of contrast into the heart.

The body systems/regions for arteries and veins are peripheral artery, central artery, peripheral vein and central vein. The peripheral artery or vein is typically used when a substance is introduced locally into an artery or vein. For example, chemotherapy is the introduction of an antineoplastic substance into a peripheral artery or vein by a percutaneous approach. In general, the substance introduced into a peripheral artery or vein has a systemic effect.

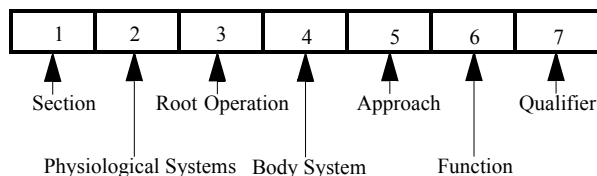
The central artery or vein is typically used when the site where the substance is introduced is distant from the point of entry into the artery or vein. For example, the introduction of a substance directly at the site of a clot within an artery or vein using a catheter is coded as an introduction of a thrombolytic substance into a central artery or vein by a percutaneous approach. In general, the substance introduced into a central artery or vein has a local effect.

The sixth character specifies the substance being introduced. Broad categories of substances are defined, such as anesthetic, contrast, dialysate, and blood products such as platelets.

The seventh character is a qualifier, and is used to indicate whether a substance transfused is autologous or nonautologous, or to further specify a substance introduced.

Measurement and Monitoring Section

The characters in the measuring and monitoring section have the following meaning:



Measurement and monitoring section codes represent procedures for determining the level of a physiological or physical function. Measurement and monitoring procedure codes have a first character value of “4”. The second character value for body system is either *physiological systems* or *physiological devices*. There are two root operations in the measurement and monitoring section, as defined below:

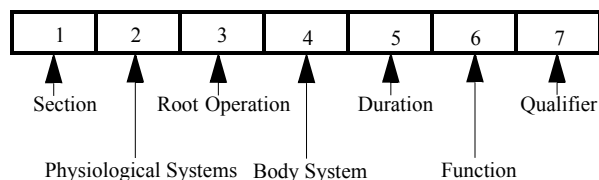
- Measurement: Determining the level of a physiological or physical function at a point in time
- Monitoring: Determining the level of a physiological or physical function repetitively over a period of time

The fourth character specifies the body system measured or monitored. The fifth character specifies approaches as defined in the medical and surgical section. Instead of specifying device, the sixth character specifies the physiological or physical function being measured or monitored. Examples of physiological or physical function values are *conductivity*, *metabolism*, *pulse*, *temperature*, and *volume*. If a device used to perform the measurement or monitoring is inserted and left in, then insertion of the device is coded as a separate medical and surgical section procedure. The seventh character qualifier contains specific values as needed to further specify the body part (e.g., central, portal, pulmonary) or a variation of the procedure performed (e.g., ambulatory,

stress). Examples of typical procedures coded in this section are EKG, EEG, and cardiac catheterization. An EKG is the measurement of cardiac electrical activity, while an EEG is the measurement of electrical activity of the central nervous system. A cardiac catheterization performed to measure the pressure in the heart is coded as the measurement of cardiac pressure by percutaneous approach.

Extracorporeal Assistance and Performance Section

The seven characters in the extracorporeal assistance and performance section have the following meaning.



In extracorporeal assistance and performance procedures, equipment outside the body is used to assist or perform a physiological function. Extracorporeal assistance and performance procedure codes have a first character value of “5”. The second character value for body system is *physiological systems*. There are three root operations in the extracorporeal assistance and performance section, as defined below.

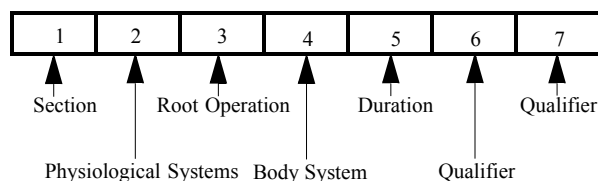
- Assistance: Taking over a portion of a physiological function by extracorporeal means
- Performance: Completely taking over a physiological function by extracorporeal means
- Restoration: Returning, or attempting to return, a physiological function to its natural state by extracorporeal means

The root operation *restoration* contains a single procedure code that identifies extracorporeal cardioversion. The fourth character specifies the body system (e.g., cardiac, respiratory) to which extracorporeal assistance or performance is applied.

The fifth character specifies the duration of the procedure, i.e., single, intermittent, continuous. For respiratory ventilation assistance or performance, the duration is specified in hours, i.e., <24 hours, 24-96 hours or >96 hours. The sixth character specifies the physiological function assisted or performed (e.g., oxygenation, ventilation) during the procedure. The seventh character qualifier specifies the type of equipment used, if any.

Extracorporeal Therapies Section

The seven characters in the extracorporeal therapies section have the following meaning:



In extracorporeal therapy, equipment outside the body is used for a therapeutic purpose that does not involve the assistance or performance of a physiological function. Extracorporeal therapy procedure codes have a first character value of "6". The second character value for body system is *physiological systems*. There are ten root operations in the extracorporeal therapy section, as defined below.

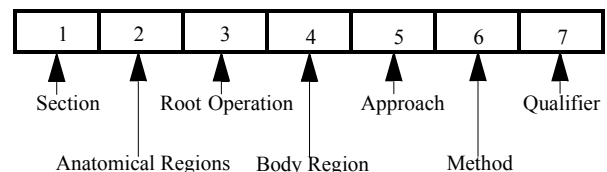
Atmospheric Control	Extracorporeal control of atmospheric pressure and composition
Decompression	Extracorporeal elimination of undissolved gas from body fluids
Electromagnetic Therapy	Extracorporeal treatment by electromagnetic rays
Hyperthermia	Extracorporeal raising of body temperature
Hypothermia	Extracorporeal lowering of body temperature

Pheresis	Extracorporeal separation of blood products
Phototherapy	Extracorporeal treatment by light rays
Ultrasound Therapy	Extracorporeal treatment by ultrasound
Ultraviolet light Therapy	Extracorporeal treatment by ultraviolet light
Shock Wave Therapy	Extracorporeal treatment by shock waves

The fourth character specifies the body system on which the extracorporeal therapy is performed (e.g., skin, circulatory). The fifth character specifies the duration of the procedure (e.g., single or intermittent). The sixth character is not specified for extracorporeal therapies, and always has the value *no qualifier*. The seventh character qualifier is used in the root operation pheresis to specify the blood component on which pheresis is performed.

Osteopathic Section

The seven characters in the osteopathic section have the following meaning:



Osteopathic procedure codes have a first character value of "7". The body system character contains the value *anatomical regions*. There is only one root operation in the osteopathic section.

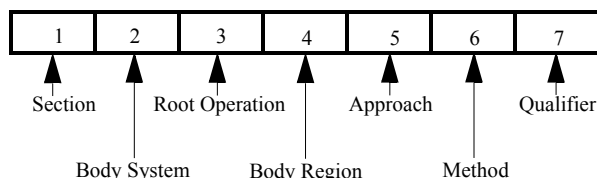
Treatment: Manual treatment to eliminate or alleviate somatic dysfunction and related disorders

The fourth character specifies the body region on which the osteopathic manipulation is performed. The approach for osteopathic manipulations is always external. The sixth character specifies the method by which the manipulation is accom-

plished. The seventh character is not specified in the osteopathic section and always has the value *no qualifier*.

Other Procedures Section

The seven characters in the other procedures section have the following meaning:



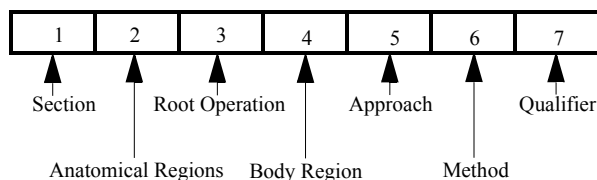
The other procedures section includes acupuncture, suture removal and in vitro fertilization. Other procedures section codes have a first character value of “8”. The second character value for body system is *physiological systems and anatomical regions*. The other procedures section has only one root operation, defined as follows:

Other Procedures: Methodologies which attempt to remediate or cure a disorder or disease.

The fourth character contains specified body region values, and also the body-region value *none* for extracorporeal procedures. Approaches included are percutaneous and external. The sixth character specifies the method (e.g., acupuncture, robotic assisted procedure). The seventh character is a qualifier, and contains specific values as needed.

Chiropractic Section

The seven characters in the chiropractic section have the following meaning:



Chiropractic section procedure codes

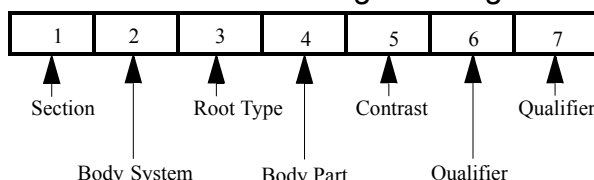
have a first character value of “9”. The second character value for body system is *anatomical regions*. There is only one root operation in the chiropractic section.

Treatment: Manual treatment of the musculoskeletal system to restore normal neurophysiological function

The fourth character specifies the body region on which the chiropractic manipulation is performed. The approach for chiropractic manipulation is always external. The sixth character is the method by which the manipulation is accomplished. The seventh character is not specified in the chiropractic section, and always has the value *no qualifier*.

Imaging Section

The seven characters in the imaging section have the following meaning:



Imaging procedure codes have a first character value of “B”. Imaging section codes represent procedures including plain radiography, fluoroscopy, CT, MRI, and ultrasound. Nuclear medicine procedure codes, including PET, uptakes, and scans, are in the nuclear medicine section. Therapeutic radiation procedure codes are in a separate radiation oncology section.

In the imaging section, the second character defines the body system and the fourth character defines the body part. The third character defines the root type of imaging procedure (e.g, MRI, ultrasound). Table 7 contains the list of all types in the imaging section, with a definition of each

type. The fifth character specifies whether the contrast material used in the imaging procedure is high or low osmolar, when applicable.

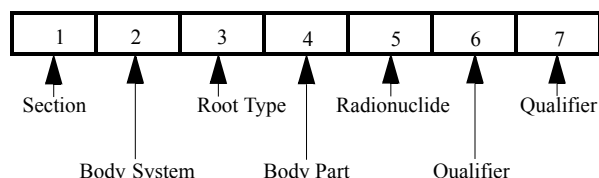
The sixth character qualifier provides further detail as needed, such as unenhanced followed by enhanced.

The seventh character is not specified in the imaging section, and always has the value *none*.

Nuclear Medicine Section

The seven characters in the nuclear

medicine section have the following meaning:



Nuclear medicine section codes represent procedures that introduce radioactive material into the body in order to create an image, to diagnose and treat pathologic conditions, or to assess metabolic functions. The nuclear medicine section does

Plain Radiography	Planar display of an image developed from the capture of external ionizing radiation on photographic or photoconductive plate.
Fluoroscopy	Single plane or bi-plane 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.

Table 7: Imaging Root Type Definitions

not include the introduction of encapsulated radioactive material for the treatment of cancer. These procedures are included in the radiation oncology section.

Nuclear medicine procedure codes have a first character value of "C". The second character specifies the body system on which the nuclear medicine procedure is performed. The third character root type indicates the type of nuclear medicine procedure (e.g., planar imaging or non-imaging uptake). Table 8 lists the root types of nuclear medicine procedures, with a definition of each type.

The fourth character indicates the body part or body region studied.

Regional (e.g., lower extremity veins) and combination (e.g., liver and spleen) body part values are used in this section.

The fifth character specifies the radionuclide, the radiation source. The option "Other Radionuclide" is provided in the nuclear medicine section for newly approved radionuclides until they can be added to the coding system.

The sixth and seventh characters are not specified in the nuclear medicine section, and always have the value *none*.

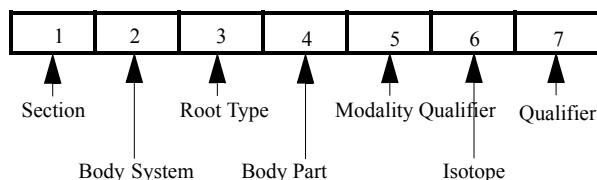
If more than one radiopharmaceutical is used to perform the procedure, then more than one code is used.

Planar Imaging	Introduction of radioactive materials into the body for single plane display of images developed from the capture of radioactive emissions.
Tomographic (Tomo) Imaging	Introduction of radioactive materials into the body for three dimensional display of images developed from the capture of radioactive emissions.
Positron Emission Tomographic (PET) Imaging	Introduction of radioactive materials into the body for three dimensional display of images developed from the simultaneous capture, 180 degrees apart, of radioactive emissions.
Nonimaging Uptake	Introduction of radioactive materials into the body for measurements of organ function, from the detection of radioactive emissions.
Nonimaging Probe	Introduction of radioactive materials into the body for the study of distribution and fate of certain substances by the detection of radioactive emissions; or, alternatively, measurement of absorption of radioactive emissions from an external source.
Nonimaging Assay	Introduction of radioactive materials into the body for the study of body fluids and blood elements, by the detection of radioactive emissions.
Systemic Therapy	Introduction of unsealed radioactive materials into the body for treatment.

Table 8: Nuclear Medicine Root Type Definitions

Radiation Oncology Section

The seven characters in the radiation oncology section have the following meaning:



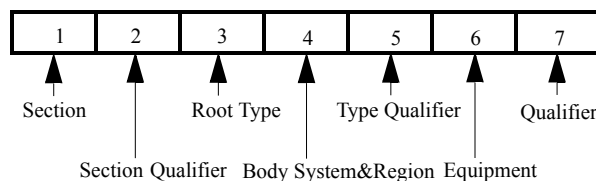
Radiation oncology procedure codes have a first character value of “D”. The second character specifies the body system (e.g., central nervous system, musculoskeletal) irradiated. The third character root type specifies the general modality used (e.g., beam radiation) and the fifth character further specifies the radiation modality used (e.g., photons, electrons). The fourth character specifies the body part that is the focus of the radiation therapy. The sixth character specifies the isotopes introduced into the body, if applicable, or whether the beam used is a gamma beam or other photon.

The seventh character is not specified

in the radiation oncology section, and always has the value *none*.

Physical Rehabilitation and Diagnostic Audiology Section

The seven characters in the physical rehabilitation and diagnostic audiology section have the following meaning:



Physical rehabilitation section codes represent procedures including physical therapy, occupational therapy and speech-language pathology. Osteopathic procedures and chiropractic procedures are in sections 7 and 9 respectively. Physical rehabilitation and diagnostic audiology procedure codes have a first character value of “F”. The section qualifier *rehabilitation* or *diagnostic audiology* is specified in the second character. The third character specifies the root type.

There are 14 different root type values, which can be classified into four basic categories of rehabilitation and diagnostic audiology procedures, defined as follows:

Treatment:	Use of specific activities or methods to develop, improve and/or restore the performance of necessary functions, compensate for dysfunction and/or minimize debilitation.
Assessment:	Includes a determination of the patient's diagnosis when appropriate, need for treatment, planning for treatment, periodic assessment and documentation related to these activities.
Fitting(s):	Design, fabrication, modification, selection and/or application of splint, orthosis, prosthesis, hearing aids and/or other rehabilitation device.
Caregiver Training:	Educating caregiver with the skills and knowledge used to interact with and assist the patient.

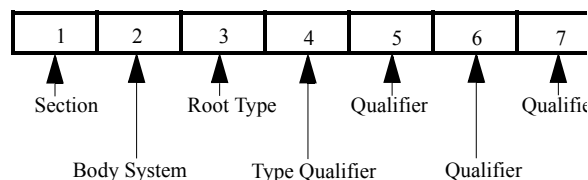
The root type *treatment* includes training as well as activities which restore function. The fourth character specifies the body region and/or system on which the procedure is performed. The fifth character is a type qualifier that further specifies the procedure performed. Examples include therapy to improve the range of motion and training for bathing techniques. The sixth character specifies the equipment used. Specific equipment is not defined in the equipment value. Instead, broad categories of equipment are specified (e.g., aerobic endurance and conditioning, assistive/adaptive/supportive, etc.)

The seventh character is not specified in the rehabilitation and diagnostic audiology section, and always has the value *none*.

Mental Health Section

The seven characters in the mental

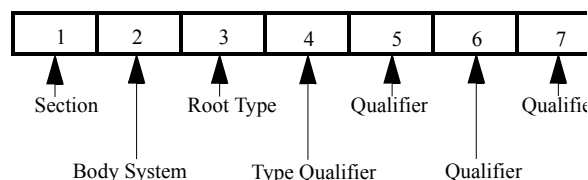
health section have the following meaning:



Mental Health procedure codes have a first character value of "G". The second character is used to identify the body system elsewhere in ICD-10-PCS. Since it does not apply in this section it always has the value *none*. The third character specifies the root type, such as crisis intervention or counseling. The fourth character is a type qualifier (e.g., to indicate that counseling was educational or vocational). The fifth, sixth and seventh characters are not specified and always have the value *none*.

Substance Abuse Treatment Section

The seven characters in the substance abuse treatment section have the following meaning:



Substance abuse treatment codes have a first character value of "H". The second character is used to identify the body system elsewhere in ICD-10-PCS. Since it does not apply in this section it always has the value *none*. The third character specifies the root type. Examples include detoxification services and individual counseling. The fourth character is a type qualifier that further specifies the procedure type. The individual counseling procedure further specified in the fourth character includes the values *cognitive*

behavioral, 12-step, and interpersonal.

The fifth, sixth and seventh characters are not specified and always have the value *none*.

Modifications to ICD-10-PCS

During the development phase of ICD-10-PCS, extensive input from a wide range of organizations was obtained. A Technical Advisory Panel, which included representatives from the American Health Information Management Association, American Hospital Association and the American Medical Association, provided review and comment throughout.

The initial draft of ICD-10-PCS was widely disseminated. Both a paper and electronic version of the system were made available. Copies of ICD-10-PCS were distributed to all major physician specialty societies. CMS made ICD-10-PCS available for downloading from its web site.

As a result of feedback received, the system was modified from its initial version to reflect suggestions from reviewers. The most frequent request was to add entries to the Tables to represent procedures for which there was no corresponding PCS code. A common request was to add endoscopic or percutaneous approach values for a specific procedure, to reflect the increased use of less invasive approaches. Additional root operations were specified in the medical and surgical section (e.g., *fusion*).

The approaches were simplified. Originally, there were 17 different approaches. The approaches that specified the access location as the lining of an orifice itself were eliminated. These approaches did not constitute a critical distinction in describing the procedure performed, and were incorporated into the remaining

approaches by modifying the definitions.

Biopsy is not a separate root operation, and many reviewers suggested that it was important to distinguish biopsies from therapeutic procedures. Therefore, the qualifier *diagnostic* was added for use with the root operations *drainage*, *excision*, and *extraction*.

The issue of NOS codes was one of the most frequent issues raised. The concern was that sufficient documentation may not be present in the medical record to support the detail required by ICD-10-PCS. Originally, ICD-10-PCS did not provide NOS code options. As a result of these concerns, modifications were made to address this issue. Since ICD-10-PCS is a multiaxial system, the NOS issue was addressed separately for each character.

In the Medical and Surgical section, the NOS issue primarily concerns the root operation, body part, and approach characters. The root operation value *repair* is an operation of exclusion. If the objective of the procedure meets the definition of one of the other root operations, then *repair* is not coded. *Repair* is only coded when none of the other operations apply. The ICD-10-PCS coding guidelines were modified to indicate that if the root operation cannot be determined from the documentation and the necessary information cannot be obtained from the physician, then the root operation *repair* may be coded. *Repair* is the NOS option for the root operation character.

In order to address the issue of insufficient anatomic specificity in the medical record, the use of general body part values was expanded. General body part values were added to several body systems as needed, for use if the precise body part is not specified. For example, for procedures performed on the liver, originally the

precise part of the liver excised was required (i.e., right lobe, left lobe or caudate lobe). The general body part value *liver* was added. If the documentation in the medical record does not indicate the precise part of the liver, and the detail cannot be obtained from the physician, then the coder may assign the general body part value *liver*. This provides the user with a “liver NOS” option.

Three separate body systems were also added, containing fourth character body-region values for general anatomical regions, regions in the upper extremities and regions in the lower extremities. The coder may identify the broad anatomic region where the procedure was performed, when the full anatomic detail is not available in the medical record and the necessary information cannot be obtained from the physician.

There are four general approach categories: open, percutaneous, via natural or artificial opening, and external. The ICD-10-PCS coding guidelines were modified to indicate that if the full definition of the approach cannot be determined, then the general open, percutaneous or transorifice approach may be coded. The coder will still need to be able to specify whether the approach was open, percutaneous, transorifice or external. This distinction is so fundamental to the description of the procedure that any less specificity is not appropriate.

While the NOS issue primarily concerns the medical and surgical section, there were also NOS-related issues in other sections of ICD-10-PCS. The imaging, nuclear medicine and radiation oncology sections of ICD-10-PCS contain detail that may not be readily available in the medical record. Further, the level of detail provided by ICD-10-PCS in these sections, while important for research or internal manage-

ment, may not be required by payers. For characters in these sections where the full detail of ICD-10-PCS may not be required, an “Other” value is provided. The sections and characters for which an “Other” value is provided are summarized in table 9.

Section	Character
Imaging	Character 5 - Contrast
Nuclear Medicine	Character 5 - Radionuclide
Radiation Oncology	Character 5 - Isotope

Table 9: Sections and characters for which an “Other” option is provided

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 record documentation.

Number of Codes in ICD-10-PCS

Table 10 summarizes the number of ICD-10-PCS codes by section..

Section	Number of Codes
Medical and Surgical	62,909
Obstetrics	337
Placement	864
Administration	1,409
Measurement and Monitoring	310
Extracorporeal Assistance and Performance	41
Extracorporeal Therapies	42
Osteopathic	100
Other Procedures	56
Chiropractic	90
Imaging	2,589
Nuclear Medicine	463
Radiation Oncology	1,908
Rehabilitation and Diagnostic Audiology	1,382
Mental Health	30

Table 10: Number of ICD-10-PCS codes by section

Substance Abuse Treatment	59
Total	72,589

Table 10: Number of ICD-10-PCS codes by section

There are a total of 86,916 codes in ICD-10-PCS. This represents a substantial increase over the number of ICD-9-CM procedure codes. The table structure of ICD-10-PCS permits the specification of a large number of codes on a single page in the Tables. The combined Tables and Index of ICD-10-PCS are approximately half the physical size of the ICD-10 diagnosis coding manual from the World Health Organization.

Testing of ICD-10-PCS

As an informal test, in October 1996, seventy health information professionals were trained in the use of ICD-10-PCS. After the training, they coded a sample of records from their institutions using ICD-10-PCS and reported suggestions and problems to the ICD-10-PCS project staff.

CMS conducted a formal test of ICD-10-PCS in order to determine if it would be a practical replacement for the current ICD-9-CM procedures. CMS used two contractors to evaluate ICD-10-PCS: the two Clinical Data Abstraction Centers (CDACs): DynKePRO in York, PA, and FMAS in Columbia, MD.

As part of a contract awarded in 1994, the primary task of the CDACs was to collect clinical data from approximately 1.5 million medical records over a period of five years. The primary end product of the CDAC contracts was the development of accurate and reliable clinical data in quantities sufficient to support the analytical efforts of the PROs as they carry out the Health Care Quality Improvement Program. Since the CDACs had a ready sup-

ply of current medical records and extensive experience in reviewing, abstracting, and coding medical records, they were selected to test ICD-10-PCS.

Using the ICD-10-PCS training manual, the CDACs were trained for two days on the medical/surgical part of the system, and a separate one-day session was held for the remaining sections (nuclear medicine, radiation oncology osteopathic, etc.) The CDACs then spent several weeks coding with ICD-10-PCS to gain experience. Conference calls were held to answer questions prior to the start of the formal testing.

In the first phase of the test, a sample of 5000 medical records (2500 per CDAC) was selected, including cases with a wide distribution of ICD-9-CM procedure codes. The CDACs coded the cases using ICD-10-PCS, and noted any questions or concerns. Questions and concerns were forwarded to project staff, which then responded on an ongoing basis. As a result of this interaction, a list of proposed revisions to the final draft was made. This included terms that needed clarification, and omissions identified in the Tables or Index. In addition, areas where the training manual could be improved were identified.

In the second phase of the test, a subset of 100 medical records was coded blindly using both ICD-9-CM and ICD-10-PCS. The reviewers coded the initial 50 records first with ICD-9-CM, then with ICD-10-PCS. For the last 50 records the process was reversed, and ICD-10-PCS was coded first followed by ICD-9-CM. The systems were compared on issues such as ease of use, time needed to identify codes, number of codes required, problems identifying codes, strengths and weaknesses of each system, and any other issues identified by the coding personnel.

After an initial learning curve, the CDAC coders were able to use ICD-10-PCS easily, with a few challenges. Because of the added detail in ICD-10-PCS, it was occasionally necessary for the coders to consult a medical dictionary or an anatomy textbook. The coders required a greater understanding of anatomy and surgical terms to use ICD-10-PCS than is required for ICD-9-CM. As a result, more training time will be necessary for ICD-10-PCS than is currently required for ICD-9-CM. Although the initial ICD-10-PCS training manual was very useful, the CDACs felt that it needed to be enhanced with additional examples before any national training takes place. It was also suggested by the CDACs that the addition of diagrams of the body systems would be useful in the training manual.

Once the CDAC coders became proficient in ICD-10-PCS, they were able to suggest a number of improvements, such as additional index entries and modifications of body part and approach values. These suggestions have been incorporated in ongoing drafts of ICD-10-PCS. Testing demonstrated the ease with which ICD-10-PCS can be updated and expanded when issues are identified.

Another area of concern was the issue of correct code assignment in several situations: when records did not provide enough documentation to code the precise body part or procedure, or when the coders did not have enough knowledge of anatomy to select a precise code. These concerns resulted in the NOS modifications of ICD-10-PCS and the coding guidelines previously mentioned.

A side-by-side comparison of ICD-10-PCS and ICD-9-CM was performed once test coders became proficient in the new system. One CDAC reported that the staff did not detect a significant time difference

using ICD-10-PCS as compared to ICD-9-CM. The other CDAC found that ICD-10-PCS coding took somewhat longer. ICD-10-PCS sometimes required more codes than ICD-9-CM. This was due in part to the fact that ICD-9-CM contains combination procedure codes, and their equivalents are coded separately in ICD-10-PCS. However, it was felt that the precision of ICD-10-PCS resulted in greater detail about the nature of the procedure and was therefore worth the possible increase in coding time. It was suggested that once coders became familiar with the greater detail and precision of ICD-10-PCS, the result would be improved accuracy and efficiency of coding.

Both CDACs pointed out that once the coders were familiar with ICD-10-PCS, they rarely used the index. The ICD-10-PCS tables were found to be so well organized and so well structured that coders could quickly find the correct section of the tables. The index was used more often when the coder was just learning the definitions of the root operations and other terms used in ICD-10-PCS. However, once coders understood ICD-10-PCS, they found it easy to code straight from the Tables.

Both CDACs found ICD-10-PCS an improvement over ICD-9-CM, because it provided greater specificity for use in research, statistical analysis, and administrative areas. A major strength of the system was its detailed structure, which allowed users to more precisely report the procedures performed.

Comparison of ICD-10-PCS and ICD-9-CM

In 1993, the National Committee on Vital and Health Statistics (NCVHS) issued a report specifying recommendations for a

new procedure classification system. NCVHS identified the essential characteristics that a procedure classification system should possess. The characteristics listed in table 11 are taken directly from the NCVHS report. Included in table 11 is a comparison of ICD-9-CM and ICD-10-PCS for each of the NCVHS characteristics. As the comparisons in table 11 indicate, ICD-10-PCS meets virtually all NCVHS characteristics, while ICD-9-CM fails to meet many NCVHS characteristics.

In addition to the NCVHS characteristics, there are several other attributes of a procedure coding system that should be taken into consideration when comparing systems.

Training Effort

As the independent evaluation of ICD-10-PCS demonstrates, there is a learning curve associated with ICD-10-PCS. Since the CDAC staff consisted of trained ICD-9-CM coders, the independent evaluation could not include a formal comparison of initial training time for ICD-10-PCS and ICD-9-CM. Because of the additional specificity in ICD-10-PCS, it is likely that the training time needed to achieve a minimum level of coding proficiency is greater for ICD-10-PCS than for ICD-9-CM. However, while it may take longer to reach a minimum level of proficiency with ICD-10-PCS, it should take less time to become highly proficient with ICD-10-PCS than with ICD-9-CM. Because ICD-9-CM lacks clear definitions, and because many substantially different procedures are coded with the same code, the identification of the correct code requires extensive knowledge of the contents of *Coding Clinic* and other coding guidelines. Becoming completely familiar with all the conventions associated with ICD-9-CM requires extensive effort, and as a result, the process of becoming highly proficient in ICD-9-CM

can require a long learning curve.

Completeness and Accuracy of Codes

The CDACs concluded that procedures coded in ICD-10-PCS provided a much more complete and accurate description of the procedure performed. The specification of the procedures performed not only affects payment, but is integral to internal management systems, external performance comparisons, and the assessment of quality of care. The detail and completeness of ICD-10-PCS is essential in today's healthcare environment.

Communications with Physicians

ICD-9-CM procedure codes often provide a poor description of the precise procedure performed. Physicians reviewing or analyzing data coded in ICD-9-CM may have difficulty developing clinical pathways, evaluating the coding for possible fraud and abuse, or conducting research. The ICD-10-PCS codes provide more clinically relevant procedure descriptions that can be more readily understood and used by physicians.

Conclusion

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

NCVHS Characteristics	ICD-9-CM	ICD-10-PCS
Hierarchical structure		
Ability to aggregate data from individual codes into larger categories	The ability to aggregate by body system is provided but there is no ability to aggregate by other components of a procedure	The ability to aggregate across all essential components of a procedure is provided
Each code has a unique definition forever - not reused	Some codes do not have a unique definition because the codes have been reused	All codes have a unique definition
Expandability		
Flexibility to new procedures and technologies ("empty" code numbers)	Minimal flexibility New procedures and technologies are difficult to incorporate. Virtually no empty code numbers	Extensive flexibility New procedures and technologies are easily incorporated. Unlimited empty code values available
Mechanism for periodic updating	Updated annually through Coordination and Maintenance Committee	Update process needs to be established. If ICD-10-PCS replaces ICD-9-CM, Coordination and Maintenance Committee would be responsible for update process
Code expansion must not disrupt systematic code structure	Code expansions are difficult to incorporate without disrupting systematic code structure	Code expansions do not disrupt systematic structure
Comprehensive		
Provides NOS and NEC categories so that all possible procedures can be classified somewhere	Extensive use of NOS and NEC categories. All procedures can be categorized somewhere. Broad NOS and NEC categories result in procedure codes which are ambiguously defined	Limited use of NOS and NEC categories. NEC and NOS categories are specific to each axis of code. All procedures can be categorized somewhere. Procedure codes are precisely defined even when NOS and NEC options are used
Includes all types of procedures	All types of procedures are included although there is minimal detail for many types of procedure	All types of procedures are included except evaluation and management procedures. Complete detail is provided for all types of procedures
Applicability to all setting and types of providers	All settings and types of providers are covered although there is minimal detail for many settings and types of providers	All settings and types of providers are covered except physician office services for evaluation and management. Complete detail is provided for all settings and types of providers
Non-Overlapping		
Each procedure (or component of a procedure) is assigned to only one code	The same procedure when performed for different diagnoses is sometimes assigned to multiple codes	Each procedure is assigned to only one code
Ease of Use		

Table 11: Comparison of ICD-9-CM and ICD-10-PCS Using the NCVHS Characteristics

NCVHS Characteristics	ICD-9-CM	ICD-10-PCS
Standardization of definitions and terminology	No standard definitions provided. Terminology is inconsistent across codes	All terminology is precisely defined. All terminology is used constantly across all codes
Adequate indexing and annotation for all users	Full index but specificity of index varies across codes	Full index. Index is computer generated so specificity of index is consistent across codes
Setting and Provider Neutrality		
Same code regardless of who or where procedure is performed	Codes are independent of who or where procedure is performed	Codes are independent of who or where procedure is performed
Multiaxial		
Body system(s) affected	Body system affected can be determined from code number	A specific character in the code specifies the body system affected
Technology used	Limited and inconsistent specification of technology used	Technology used is specified in the approach character of the code
Techniques/approaches used	Limited and inconsistent specification of techniques/approaches used	The techniques/approaches used are specified in the approach character of the code
Physiological effect or pharmacological properties	Limited and inconsistent specification of physiological effect and pharmacological properties	Physiological effect and pharmacological properties are specified when relevant to the procedure
Characteristics/composition of implant	Limited and inconsistent specification of characteristics/composition of implant	The characteristics/composition of implants are specified in the device character of the code
Limited to Classification of Procedures		
Should not include diagnostic information	Diagnostic information is included for some codes	No diagnostic information is included in the code
Other data elements (such as age) should be elsewhere in the record	No other data elements included in code	No other data elements included in code

Table 11: Comparison of ICD-9-CM and ICD-10-PCS Using the NCVHS Characteristics (Continued)

APPENDIX A

Medical and Surgical Root Operation Definitions

Alteration	Definition:	Modifying the anatomic structure of a body part without affecting the function of the body part
	Explanation:	Principal purpose is to improve appearance
	Examples:	Face lift, breast augmentation
Bypass	Definition:	Altering the route of passage of the contents of a tubular body part
	Explanation:	Rerouting contents around an area of a body part to another distal (downstream) area in the normal route; rerouting the contents to another different but similar route and body part; or to an abnormal route and another dissimilar body part. It includes one or more concurrent anastomoses with or without the use of a device such as autografts, tissue substitutes and synthetic substitutes.
	Examples:	Coronary artery bypass, colostomy formation
Change	Definition:	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
	Explanation:	All Change procedures are coded using the approach External
	Example:	Urinary catheter change, gastrostomy tube change
Control	Definition:	Stopping, or attempting to stop, postprocedural bleeding
	Explanation:	The site of the bleeding is coded as an anatomical region and not to a specific body part.
	Examples:	Control of post-prostatectomy hemorrhage, control of post-tonsillectomy hemorrhage
Creation	Definition:	Making a new genital structure that does not physically take the place of a body part
	Explanation:	Used only for sex change operations
	Examples:	Creation of vagina in a male, creation of penis in a female
Destruction	Definition:	Physical eradication of all or a portion of a body part by the direct use of energy, force or a destructive agent
	Explanation:	None of the body part is physically taken out
	Examples:	Fulguration of rectal polyp, cautery of skin lesion
Detachment	Definition:	Cutting off all or a portion of the upper or lower extremities
	Explanation:	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
	Examples:	Below knee amputation, disarticulation of shoulder
Dilation	Definition:	Expanding an orifice or the lumen of a tubular body part
	Explanation:	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
	Examples:	Percutaneous transluminal angioplasty, pyloromyotomy
Division	Definition:	Cutting into a body part without draining fluids and/or gases from the body part in order to separate or transect a body part
	Explanation:	All or a portion of the body part is separated into two or more portions.
	Examples:	Spinal cordotomy, osteotomy

Medical and Surgical Root Operation Definitions

Drainage	Definition:	Taking or letting out fluids and/or gases from a body part
	Explanation:	The qualifier Diagnostic is used to identify drainage procedures that are biopsies.
	Examples:	Thoracentesis, incision and drainage
Excision	Definition:	Cutting out or off, without replacement, a portion of a body part
	Explanation:	The qualifier Diagnostic is used to identify excision procedures that are biopsies
	Examples:	Partial nephrectomy, liver biopsy
Extirpation	Definition:	Taking or cutting out solid matter from a body part
	Explanation:	The solid matter may be an abnormal byproduct of a biological function or a foreign body. The solid matter is imbedded in a body part, or is in the lumen of a tubular body part. The solid matter may or may not have been previously broken into pieces. No appreciable amount of the body part is taken out
	Examples:	Thrombectomy, choledocholithotomy
Extraction	Definition:	Pulling or stripping out or off all or a portion of a body part by the use of force
	Explanation:	The qualifier Diagnostic is used to identify extractions that are biopsies
	Examples:	Dilation and curettage, vein stripping
Fragmentation	Definition:	Breaking solid matter in a body part into pieces
	Explanation:	The solid matter may be an abnormal byproduct of a biological function or a foreign body. Physical force (e.g., manual, ultrasonic) applied directly or indirectly through intervening body parts is used to break the solid matter into pieces. The pieces of solid matter are not taken out, but are eliminated or absorbed through normal biological functions
	Examples:	Extracorporeal shockwave lithotripsy, transurethral lithotripsy
Fusion	Definition:	Joining together portions of an articular body part rendering the articular body part immobile
	Explanation:	The body part is joined together by fixation device, bone graft, or other means
	Examples:	Spinal fusion, ankle arthrodesis
Insertion	Definition:	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
	Explanation:	N/A
	Examples:	Insertion of radioactive implant, insertion of central venous catheter
Inspection	Definition:	Visually and/or manually exploring a body part
	Explanation:	Visual exploration may be performed with or without optical instrumentation. Manual exploration may be performed directly or through intervening body layers
	Examples:	Diagnostic arthroscopy, exploratory laparotomy
Map	Definition:	Locating the route of passage of electrical impulses and/or locating functional areas in a body part
	Explanation:	Applicable only to the cardiac conduction mechanism and the central nervous system
	Examples:	Cardiac mapping, cortical mapping

Medical and Surgical Root Operation Definitions

Occlusion	Definition:	Completely closing an orifice or lumen of a tubular body part
	Explanation:	The orifice can be a natural orifice or an artificially created orifice
	Examples:	Fallopian tube ligation, ligation of inferior vena cava
Reattachment	Definition:	Putting back in or on all or a portion of a separated body part to its normal location or other suitable location
	Explanation:	Vascular circulation and nervous pathways may or may not be reestablished
	Examples:	Reattachment of hand, reattachment of avulsed kidney
Release	Definition:	Freeing a body part from an abnormal physical constraint by cutting or by use of force
	Explanation:	Some of the restraining tissue may be taken out but none of the body part is taken out
	Examples:	Adhesiolysis, carpal tunnel release
Removal	Definition:	Taking out or off a device from a body part
	Explanation:	If the device is taken out and a similar device is 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 the device is coded to the root operation REMOVAL and the procedure for putting in the new device is coded to the root operation performed
	Examples:	Drainage tube removal, cardiac pacemaker removal
Repair	Definition:	Restoring, to the extent possible, a body part to its normal anatomic structure and function
	Explanation:	Used only when the method to accomplish the repair is not one of the other root operations
	Examples:	Herniorrhaphy, suture of laceration
Replacement	Definition:	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
	Explanation:	The biological material is non-living, or the biological material is living and from the same individual. The body part may have been previously taken out, previously replaced, or may be taken out concomitantly with the Replacement procedure. If the body part has been previously replaced, a separate Removal procedure is coded for taking out the device used in the previous replacement
	Examples:	Total hip replacement, bone graft, free skin graft
Reposition	Definition:	Moving to its normal location or other suitable location all or a portion of a body part
	Explanation:	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
	Examples:	Reposition of undescended testicle, fracture reduction
Resection	Definition:	Cutting out or off, without replacement, all of a body part
	Explanation:	N/A
	Examples:	Total nephrectomy, total lobectomy of lung
Restriction	Definition:	Partially closing the orifice or lumen of a tubular body part
	Explanation:	The orifice can be a natural orifice or an artificially created orifice
	Examples:	Esophagogastric fundoplication, cervical cerclage

Medical and Surgical Root Operation Definitions

Revision	Definition:	Correcting, to the extent possible, a malfunctioning or displaced device
	Explanation:	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
	Examples:	Adjustment of pacemaker lead, adjustment of hip prosthesis
Supplement	Definition:	Putting in or on biologic or synthetic material that physically reinforces and/or augments the function of a portion of a body part
	Explanation:	The biological material is non-living, or the biological material is living and from the same individual. The body part may have been previously replaced. If the body part has been previously replaced, the Supplement procedure is performed to physically reinforce and/or augment the function of the replaced body part
	Examples:	Herniorrhaphy using mesh, free nerve graft, mitral valve ring annuloplasty, put a new acetabular liner in a previous hip replacement
Transfer	Definition:	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
	Explanation:	The body part transferred remains connected to its vascular and nervous supply
	Examples:	Tendon transfer, skin pedicle flap transfer
Transplantation	Definition:	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
	Explanation:	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
	Examples:	Kidney transplant, heart transplant

APPENDIX B

Comparison of Medical and Surgical Root Operations

Operation	Action	Target	Clarification	Example
Procedures that take out or eliminate all or a portion of a body part:				
Excision	Cutting out or off	Portion of a body part	Without replacing body part	Sigmoid polypectomy
Resection	Cutting out or off	All of a body part	Without replacing body part	Total nephrectomy
Extraction	Pulling out or off by physical force	All or a portion of a body part	Without replacing body part	Toenail extraction
Destruction	Eradicating	All or a portion of a body part	Without taking out or replacing body part	Rectal polyp fulguration
Detachment	Cutting off	All or a portion of an extremity	Without replacing extremity	Below knee amputation
Procedures that involve putting in or on, putting back, or moving living body parts:				
Transplantation	Putting in or on	All or a portion of a living body part from other individual or animal	Physically takes the place and/or function of all or a portion of a body part	Heart transplant
Reattachment	Putting back in or on	All or a portion of a separated body part	Put in its normal or other suitable location.	Finger reattachment
Reposition	Moving	All or a portion of a body part	Put in its normal or other suitable location. Body part may or may not be cut out or off	Reposition undescended testicle
Transfer	Moving	All or a portion of a body part	Without taking out body part; assumes function of similar body part and remains connected to its vascular and nervous supply	Tendon transfer
Procedures that take out or eliminate solid matter, fluids, or gases from a body part:				
Drainage	Taking or letting out	Fluids and/or gases from a body part	Without taking out any of the body part	Incision and drainage
Extirpation	Taking or cutting out	Solid matter in a body part	Without taking out any of the body part	Thrombectomy
Fragmentation	Breaking down	Solid matter in a body part	Without taking out any of the body part or any solid matter	Lithotripsy of gallstones
Procedures that only involve examination of body parts and regions:				
Inspection	Visual and/or manual exploration	A body part	Performed with or without optical instrumentation, directly or through body layers	Diagnostic arthroscopy
Map	Locating	Route of passage of electrical impulses or functional areas in a body part	Applicable only to cardiac conduction mechanism and central nervous system	Cardiac mapping

Comparison of Medical and Surgical Root Operations

Operation	Action	Target	Clarification	Example
Procedures that can be performed only on tubular body parts:				
Bypass	Altering the route of passage	Contents of tubular body part	May include use of living tissue, non-living biological material or synthetic material which does not take the place of the body part	Gastrojejunal bypass
Dilation	Expanding	Orifice or lumen of tubular body part	By application of intraluminal pressure or by cutting the wall or orifice	Anal sphincter dilation
Occlusion	Completely closing	Orifice or lumen of tubular body part	N/A	Fallopian tube ligation
Restriction	Partially closing	Orifice or lumen of tubular body part	N/A	Cervical cerclage
Procedures that always involve devices:				
Insertion	Putting in	Device in or on a body part	Does not physically take the place of a body part	Pacemaker insertion
Replacement	Putting in or on	Biological or synthetic material; living tissue taken from same individual	Physically takes the place of all or a portion of a body part	Total hip replacement
Supplement	Putting in or on	Biological or synthetic material; living tissue taken from same individual	Physically reinforces or augments a portion of a body part	Herniorrhaphy using mesh
Removal	Taking out or off	Device from a body part	N/A	Cardiac pacemaker removal
Change	Taking out or off and putting back	Identical or similar device in or on a body part	Without cutting or puncturing skin or mucous membrane	Drainage tube change
Revision	Correcting	Malfunctioning or displaced device in or on a body part	To the extent possible	Hip prosthesis adjustment
Procedures involving cutting or separation only:				
Division	Separating	A body part	Without taking out any of the body part	Osteotomy
Release	Freeing	A body part	Eliminating abnormal constraint without taking out any of the body part	Peritoneal adhesiolysis
Procedures involving other repairs:				
Control	Stopping or attempting to stop	Postprocedural bleeding	Limited to anatomic regions and extremities	Control of postprostatectomy bleeding
Repair	Restoring	A body part to its normal structure	To the extent possible	Hernia repair
Procedures with other objectives:				
Alteration	Modifying	Anatomic structure of a body part	Without affecting function of body part, performed for cosmetic purposes	Face lift

Comparison of Medical and Surgical Root Operations

Operation	Action	Target	Clarification	Example
Creation	Making	New genital structure	Does not physically take the place of a body part, used for sex change operations	Artificial vagina creation
Fusion	Joining together	An articular body part	Rendering body part immobile	Spinal fusion

APPENDIX C

Components of the Medical and Surgical Approach Definitions

Access Location	Method	Type of Instrumentation	Approach	Example
Skin or Mucous Membrane	Open	N/A	Open	Abdominal hysterectomy
Skin or Mucous Membrane	Instrumental	Without Visualization	Percutaneous	Needle biopsy of liver
Skin or Mucous Membrane	Instrumental	With Visualization	Percutaneous Endoscopic	Arthroscopy
Orifice	Instrumental	Without Visualization	Via Natural or Artificial Opening	Endotracheal tube insertion
Orifice	Instrumental	With Visualization	Via Natural or Artificial Opening Endoscopic	Sigmoidoscopy
Skin or Mucous Membrane	Open	With Visualization	Open with Percutaneous Endoscopic Assistance	Laparoscopic-assisted vaginal hysterectomy
Skin or Mucous Membrane	N/A	N/A	External	Closed fracture reduction

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