Procedure Code Set General Equivalence Mappings

ICD-10-PCS to ICD-9-CM and ICD-9-CM to ICD-10-PCS
2007 Version
Documentation and User's Guide

Preface

Purpose and Audience

This document accompanies the 2007 update of the CMS public domain reference mappings of the ICD-10 Procedure Code System (ICD-10-PCS) and ICD-9-CM Volume 3. The purpose of this document is to give potential users the information they need to understand the structure and relationships contained in the mappings so they can use them correctly. The intended audience includes but is not limited to professionals working in health information, medical research and informatics. General interest readers may find section 1 useful. Those who may benefit from the material in both sections 1 and 2 include clinical and health information professionals who plan to directly use the mappings in their work. Software engineers and IT professionals interested in the details of the file format will find this information in Appendix A.

In This Document

For readability, ICD-9-CM is abbreviated "I-9," and ICD-10-PCS is abbreviated "PCS." The network of relationships between the two code sets described herein is called the General Equivalence Mappings (GEMs).

- **Section 1** is a general interest discussion of mapping as it pertains to the GEMs. It includes a discussion of the difficulties inherent in linking two coding systems of very different design and structure. The specific conventions and terms employed in the GEMs are discussed in more detail.

- **Section 2** contains detailed information on how to use the GEM files, for users who will be working hands-on with mapping applications now or in the future—as coding experts, researchers, claims processing personnel, software developers, etc.

- The **Glossary** provides a reference list of the terms and conventions used, some unique to this document, with their accompanying definitions.

- **Appendix A** contains tables describing the technical details of the file formats, one for each of the two GEM files:

    1) ICD-9-CM to ICD-10-PCS (I-9 to PCS)
    2) ICD-10-PCS to ICD-9-CM (PCS to I-9)

Section 1—Mapping and the GEMs

Mapping the ICD-9 and ICD-10 Procedure Code Sets

Mappings between ICD-9-CM and ICD-10-PCS attempt to find corresponding procedure codes between the two code sets, insofar as this is possible. Because the two systems are so different, translating between them the majority of the time can offer only a series of possible compromises rather than the mirror image of one code in the other code set.

A sentence translated from English to Chinese may not be able to capture the full meaning of the original because of fundamental differences in the structure of the language. Likewise, a mapping may not be able to seamlessly link the codes in one set to identical counterparts in the other code set, and this is especially true with I-9 and PCS. For these two procedure code sets, it is actually rare to find two corresponding descriptions that are identical in level of specificity and terminology used. This is understandable. Indeed, there would be little point in changing from the old system to the new system if the differences between the two, and the benefits available in the new system, were not significant.

There is no simple "crosswalk from I-9 to PCS" in the GEM files. A mapping that forces a simple correspondence—each I-9 code mapped only once—from the smaller, less detailed I-9 to the larger, more detailed PCS (a code set of entirely different design and scope) defeats the purpose of upgrading to PCS. It obscures the differences between the two code sets and eliminates any possibility of benefiting from the improvement in data quality that PCS offers. Instead of a simple crosswalk, the GEM files attempt to organize those differences in a meaningful way, by linking a code to all valid alternatives in the other code set. Generally speaking, the entries in both the I-9 and PCS GEMs cannot simply point the user from one code system to an identical counterpart in the other code system. This is because there is usually no identical counterpart. The two coding systems are dramatically different on several fronts that make it impossible to create a simple, all-purpose applied mapping.

It is important to understand the kinds of differences that need to be reconciled in linking coded data. The method used to reconcile those differences may vary, depending on whether the data is used for research, claims adjudication, or analyzing coding patterns between the two code sets; whether the desired outcome is to present an all-embracing look at the possibilities (one-to-many mapping) or to offer the one "best" compromise for the application (one-to-one mapping); whether the desired outcome is to translate existing coded data to their counterparts in the new code set ("forward mapping") or to track newly coded data back to what it may have been in the previous code set ("backward mapping"), or any number of other factors. The scope of the differences varies, is complex, and cannot be overlooked if quality mapping and useful coded data are the desired outcomes. Several common types of differences between the code sets will be examined here in detail to give the reader a sense of the scope.

Procedure Codes and Differences in Structure

ICD-10-PCS is designed to avoid regional variants of code descriptions and "running out" of code capacity. It contains a standardized vocabulary of surgical concepts, body part terms, operative approaches, and so on, from which codes are built. For these reasons, mapping between the two systems is often an "apples to oranges" enterprise.

The majority of the time, finding the "one correct" match in PCS coding concepts for a general I-9 concept is not possible. Because it is standardized, PCS contains code elements describing the precise objective of each coded procedure. Each of these concepts, called a "root operation," is defined in the system and can be used only when the procedure performed agrees with the root operation definition. Further, because a word used by I-9 like "repair" does not precisely identify a surgical method, the possible code alternatives in ICD-10-PCS must include all of the root operations that could have been performed. This means that any initial mapping between the systems must cast a wide net over possible equivalent options, options that can only be narrowed down when a specific clinical scenario, use case, or other application has been defined.

For example, an ICD-9-CM code description containing the words "repair of aneurysm" does not have a simple one-to-one correspondent in PCS. The I-9 description identifies the diagnosis of aneurysm, (information which should already be captured on the record in the diagnosis code) but does not actually give any indication of the specific method of repair. Depending on the documentation in the record, the correct PCS code could be one of several root operations: excision, replacement, or restriction, to name a few. All we know is that whatever is done to "repair" an aneurysm is included in the I-9 code description.

Procedure Codes and Levels of Specificity

	ICD-9-CM	ICD-10-PCS
# of Characters	**3-4 Numeric**	**7 Alphanumeric**
# of Codes	**~4,000**	**~90,000**

As shown in the table, PCS codes are longer, and there are many times more of them. Consequently, in an unabridged I-9 to PCS mapping, each I-9 code is typically linked to more than one PCS code, because each PCS code is more specific.

PCS is much more precise than I-9, and, just as important for purposes of mapping, the level of precision in a PCS code is standardized across the system. In I-9, on the other hand, the level of detail in a code varies greatly. For example, category 39, Other operations on vessels, contains the codes:

39.31 Suture of artery
39.55 Reimplantation of aberrant renal vessel

The first code contains a precise description of the surgical technique (suture) but is very general with respect to location (an artery somewhere). The second code does not specify the method of reimplantation, but on other subjects is much more specific, containing a precise description of

both the body part (renal vessel) and the diagnosis for which the procedure was performed (aberrant attachment to kidney, i.e., congenital anomaly).

I-9 descriptions or "includes" notes may contain several variations of a procedure. In practical terms this means that one general I-9 code actually represents a whole family of codes. Procedures that are identified by such "umbrella" codes lose their uniqueness as coded data. For example, an I-9 procedure code may include both the words "excision" and "destruction" of a body part in one description. This means that either an excision or a destruction procedure could have been performed. On a record, when only the coded I-9 data is available, it is impossible to tell which method was used.

In PCS, by contrast, each significant variation is a unique procedure code and is defined consistently throughout the system. Excision and destruction are distinct root operations in PCS, and so are identified as unique procedure codes.

One would not expect a PCS to I-9 mapping ever to contain one-to-many mappings, since PCS is so much larger and more specific. However, since I-9 can be inconsistent, there are inevitable cases where it contains more detail than PCS. Aspects of some individual I-9 code descriptions such as diagnosis information were intentionally not included in PCS. This means a single PCS code could be linked to more than one I-9 code option, depending on the purpose of the mapping and the specific documentation in the chart.

Below are two examples where a distinction made in I-9 is not made in PCS. The result is that the PCS code could be linked to more than one I-9 code, because a particular area of the I-9 code set (highlighted in yellow) is more detailed than the norm.

Varying Specificity in ICD-9-CM:
Body Part Subdivided

I-9 contains	I-9 also contains	PCS contains
83.64 Other suture of tendon	83.61 Suture of tendon sheath	0LQ70ZZ Repair Right Hand Tendon, Open Approach
85.23 Subtotal mastectomy	85.22 Resection of quadrant of breast	0HBT0ZZ Excision of Right Breast, Open Approach

Varying Specificity in ICD-9-CM:
Approaches Unique to Pituitary Gland

I-9 contains	I-9 also contains	PCS contains
07.69 Total excision of pituitary gland, unspecified approach	07.64 Total excision of pituitary gland, transfrontal approach	0GT00ZZ Resection of Pituitary Gland, Open Approach
	07.65 Total excision of pituitary gland, transsphenoidal approach	
	07.68 Total excision of pituitary gland, other specified approach	

Procedure Codes and Approach

Approach is another area that complicates translating between ICD-9-CM and ICD-10-PCS. In PCS, approach is defined as "the technique used to reach the site of the procedure." Further, all approaches used in PCS are defined, and these definitions aid in choosing the correct code. Two examples are "open" and "percutaneous."

- *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 any other body layers necessary to reach the site of the procedure

By contrast, what constitutes "approach" is not defined in I-9, nor are the specific approaches used in I-9 codes defined (e.g., open, closed). Consequently the notion of approach itself is handled inconsistently in the system, and specific approaches can be difficult to interpret for correct coding.

For example, correct coding of an exploratory laparotomy followed by needle biopsy of the liver requires two separate codes in I-9:

54.11 Exploratory laparotomy
50.11 Closed (percutaneous) [needle] biopsy of liver

Though both codes appear to identify an operative approach, here they are not being used for the same purpose. The laparotomy code specifies the technique used to expose the site of the procedure. But the closed biopsy code specifies the instrument employed to obtain the biopsy, not the technique used to expose the procedure site. In other clinical coding situations, the closed biopsy code is used differently—for a needle biopsy obtained through the skin without making an incision. Hence the ICD-9-CM code for "closed" biopsy of the liver can mean two very different things, depending on what other procedures were performed during the same operative episode.

In this example, correct coding in I-9 relies on a shifting notion of approach. By contrast, in PCS there is no ambiguity. If a biopsy of the liver is obtained by cutting through the skin and intervening tissue to expose the liver and then using a needle to take the sample, the approach selected for the PCS code is *open*. If a biopsy of the liver is obtained using a needle through the skin and intervening layers, the approach selected for the PCS code is *percutaneous*.

The comparative lack of precision between the two systems has ramifications for mapping. How one would map the procedure code for closed biopsy from I-9 to PCS depends on the wider clinical context of the operative episode. There is no simple "right" answer.

Procedure Codes in Combination: I-9 to PCS

The number of procedures included in one ICD-9-CM procedure code can vary greatly. Sometimes two procedures commonly performed together are identified in a single umbrella code, as in code 65.41, Laparoscopic unilateral salpingo-oophorectomy. I-9 also lists variations of combined procedures under a bigger umbrella code. This can be a general description, as in code 39.49, Other revision of vascular procedure, where varying combinations of multiple procedures could have been performed. Alternatively the procedure code may essentially say, "Here is the diagnosis, and this procedure code includes any of a number of things done to attempt to treat this condition." It identifies the diagnosis clearly, but does not shed much light on the procedure. Examples include code 35.81, Total repair of tetralogy of Fallot, and code 03.53, Repair of vertebral fracture.

Mapping in the above cases, where according to the PCS definition of a procedure multiple procedures may be performed, requires that the I-9 code be linked to multiple PCS codes or ranges of codes. Because a PCS code identifies a single standardized classification of a single procedure, multiple PCS codes must be coded to fully describe the procedures performed in an I-9 combination code. Each PCS code is a partial expression of the information contained in the I-9 code. Entries of this type are linked using a special mapping attribute that indicates the allowable A+B+C choices.

In the table below, the same codes used in the above example, for laparoscopic salpingo-oophorectomy, are depicted with their full descriptions. Note that because the I-9 code includes procedures on two distinct body parts, two codes are required in PCS.

I-9 to PCS mapping:
"Laparoscopic salpingo-oophorectomy, bilateral"

ICD-9-CM Source→	**≈**	**ICD-10-PCS Target**
65.63 Laparoscopic removal of both ovaries and tubes at same operative episode	≈	0UT24ZZ Resection of bilateral ovaries, percutaneous endoscopic approach **AND** 0UT74ZZ Resection of bilateral fallopian tubes, percutaneous endoscopic approach

Procedure Codes in Combination: PCS to I-9

An ICD-10-PCS code specifies a single procedure as defined within the PCS system. However, sometimes a PCS code must be linked to multiple I-9 codes because the I-9 code specifies less than a procedure. In I-9 these codes are referred to as "adjunct" procedure codes. In this document they are called "component" codes. They have been used increasingly in I-9, and function much like component codes in other systems: they convey additional information about the procedure performed, such as the number of devices placed or procedure sites treated. The

detail in both the primary I-9 procedure code and an I-9 component code can be found in a single PCS code. The result is that one PCS code must sometimes be linked to a combination of I-9 codes—the principal procedure code plus component code(s).

PCS to I-9 mapping:
"Percutaneous Transluminal Coronary Angioplasty (PTCA) of two coronary arteries, with insertion of two coronary stents"

ICD-10-PCS Source→	**≈**	**ICD-9-CM Target**
02713DZ Dilation of coronary artery, two sites using intraluminal device, percutaneous approach	≈	00.66 PTCA or coronary atherectomy **AND** 00.41 Procedure on two vessels **AND** 00.46 Insertion of two vascular stents **AND** 36.06 Insertion of non-drug-eluting coronary artery stents

Introduction to the GEMs

The PCS and I-9 General Equivalence Mappings (GEM)s are used to facilitate linking between the procedure codes in ICD-9-CM volume 3 and the new ICD-10-PCS code set. The GEMs are formatted as downloadable "flat" text files. The file contains a list of code pairs. Each code pair identifies a correspondence between a code in the source system and a code in the target system. First listed is a single code in the source system, followed by a single code in the target system, and finally the attributes that apply to that code pair in the GEM. The attributes can be used to analyze and reconcile the differences between the two coding systems. The GEMs are the raw material from which providers, health information vendors and payors can design and create specific mapping applications.

The I-9 to PCS GEM contains entries of interest if the procedure on the original record is coded or the test case is generated in ICD-9-CM. The user could, for example, use the GEM to see all possible options if the record had been coded in PCS, or to see if one I-9 test case will yield several alternative PCS test cases.

The PCS to I-9 GEM, on the other hand, contains entries of interest if the procedure coded or the test case generated is an ICD-10-PCS code. In this case, the GEM facilitates mapping back to the I-9 alternatives that could represent the procedure coded in PCS—for example, to determine how the procedure would be reimbursed had it been coded in I-9.

The word "crosswalk" is often used to refer to mappings between annual code updates of ICD-9-CM. It carries with it a comfortable image: clean white lines mark the boundary on either side; the way across the street is the same in either direction; a traffic signal, or perhaps even a crossing guard, aids you from one side to the other. Please be advised: GEMs are not crosswalks. They are reference mappings, to help the user navigate the complexity of translating meaning from one code set to the other. They are tools to help the user understand, analyze, and make distinctions that manage the complexity, and to derive their own applied mappings if that is the goal.

Because the PCS code is for the most part more specific than the I-9 code, one general I-9 entry in the I-9 to PCS GEM is typically linked to multiple PCS codes. The user must know, or must model, the level of detail contained in the original operative report to be able to settle on one of the PCS codes. The I-9 code itself cannot contain the answer; it cannot be made to describe detail it does not have. The same is occasionally true for the PCS to I-9 GEM as well. A PCS code may be linked to more than one I-9 code because of the variation in I-9 specificity and I-9's use of component codes, described in detail later.

An entry in the GEM identifies relationships between a code in the source system and possible equivalents in the target system. If a mapping is described as having a direction, the source is the code one is mapping from, and the target is the code being mapped to.

Source→		Target		a.k.a.
From	ICD-9-CM	**To**	ICD-10-PCS	"forward mapping"
From	ICD-10-PCS	**To**	ICD-9-CM	"backward mapping"

The correspondence between codes in the source and target systems is approximate in most cases. As with translating between languages, translating between coding systems does not necessarily yield an exact match. Context is everything, and the specific purpose of an applied mapping must be identified before the most appropriate option can be selected.

The GEMs together provide a general (many to many) reference mapping that can be refined to fit the requirements of an applied mapping. For a particular code entry, the GEM may contain several correspondences, each on a separate row. The code in the source system is listed on a new row as many times as there are alternatives in the target system. Each correspondence is formatted as a code pair. The user must choose from among the alternatives a single code in the target system if a one-to-one mapping is desired.

The word "entry," as used to describe the format of the GEM, refers to all rows in the GEM file having the same first listed code, the code in the source system. The word "row" refers to a single row in the file, containing a single code pair—one code from the source system and one code from the target system—along with its associated attributes. An entry typically encompasses multiple rows.

There are two basic types of entries in the GEM. They are "single entry" and "combination entry." In special cases, a code in the source system may be mapped using both types of entries.

- *Single entry*—an entry in the GEM for which a code in the source system linked to one code option in the target system is a valid entry

An entry of the single type is characterized by a single correspondence: code A in the source system corresponds to code A **or** code B **or** code C in the target system. Each row in the entry can be one of several valid correspondences, and each is an alternative for a "one to one" applied mapping. An entry can also consist of one row if there is a close correspondence between the two codes in the code pair.

This is not the same as a one-to-one mapping. A code in the source system may be used multiple times in the GEM, each time linked to a different code in the target system. This is because the GEM contains alternative equivalent relationships from which the appropriate applied mapping can be selected. Taken together, all are considered one entry of the single type.

Here is an entry of the single type, consisting of three rows. The rows can be thought of as rows A **or** B **or** C. Each row of the entry is considered a valid applied mapping option.

I-9 to PCS GEM:
Single type entry for ICD-9-CM code 02.11

ICD-9-CM Source→	≈	ICD-10-PCS Target
02.11 Simple suture of dura mater of brain	≈	00Q20ZZ Repair of dura mater, open approach
02.11 Simple suture of dura mater of brain	≈	00Q23ZZ Repair of dura mater, percutaneous approach
02.11 Simple suture of dura mater of brain	≈	00Q24ZZ Repair of dura mater, percutaneous endoscopic approach

- *Combination entry*—an entry in the GEM for which a code in the source system must be linked to more than one code option in the target system to be a valid entry

An entry of the combination type is characterized by a compound correspondence: code A in the source system must be linked simultaneously to code A **and** code B **and** code C in the target system to be a valid correspondence. Attributes in the GEM file clearly signal these special cases.

Stated another way, it takes more than one code in the target system to satisfy all of the meaning contained in one code in the source system. As discussed in this section, the situation occurs both when ICD-9-CM is the source system and when ICD-10-PCS is the source system.

Here is an entry of the combination type, consisting of two rows. The rows can be thought of as rows A **and** B. Both rows of the entry combined are considered a valid applied mapping option.

PCS to I-9 GEM:
Combination type entry for ICD-10-PCS code 02733ZZ

ICD-10-PCS Source→	≈	ICD-9-CM Target
02733ZZ Dilation of Coronary Artery, Four or More Sites, Percutaneous Approach	≈	00.66 PTCA or coronary atherectomy
02733ZZ Dilation of Coronary Artery, Four or More Sites, Percutaneous Approach	≈	**AND**
02733ZZ Dilation of Coronary Artery, Four or More Sites, Percutaneous Approach	≈	00.43 Procedure on four or more vessels

Linking a code in the source system to a combination of codes in the target system is accomplished by using conventions in the GEMs called *scenarios* and *choice lists*, discussed in more detail later.

- *Scenario*—in a combination entry, a collection of code lists from the target system containing the necessary codes that combined as directed will satisfy the equivalent meaning of a code in the source system

- *Choice list*—in a combination entry, a list of one or more codes in the target system from which a code must be included to satisfy the equivalent meaning of a code in the source system

Here is an entry in the GEM of the combination type.
The combination flag is highlighted in yellow.
The scenario number is in the next to last column of the file.
The choice list number is in the last column of the file.

```
6563 0UT24ZZ 1011 1
6563 0UT74ZZ 1011 2
```

It is important to make the distinction between a single row in a combination entry and an entry of the single type. An entry of the single type is one code in the source system (system being mapped from) linked to multiple one-code alternatives in the target system (system being mapped to). It presents the option of linking one I-9 code to code A **or** B **or** C in PCS. Each code correspondence is considered a viable option. Each row of the I-9 code entry linked with PCS code A or B or C would be a valid entry in an applied map.

An entry of the combination type is one code in the source system linked to one or more multiple-code alternatives in the target system. The user **must** include PCS codes A **and** B **and** C in order to cover all the procedures identified in the I-9 code. Further, if there is a range of PCS code alternatives for each partial expression of the I-9 code, then the number of solutions increases. Each instance of the I-9 combination code paired with one code of the allowed range A and one code of the allowed range B and one code of the allowed range C is considered a valid entry. The combination flag in the GEM will clearly signal an entry of the combination type.

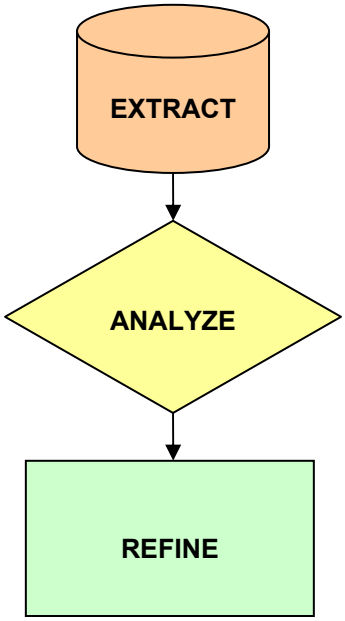
Section 2—How to Use GEM Files

For ease of use, we recommend loading the GEM files into a desktop database, along with the code descriptions for both code sets.

ICD-10-PCS long format code descriptions can be found at:
http://www.cms.hhs.gov/ICD9ProviderDiagnosticCodes/08_ICD10.asp

ICD-9-CM code descriptions can be found at:
http://www.cms.hhs.gov/ICD9ProviderDiagnosticCodes/06_codes.asp#TopOfPage

A general process for using the GEMs consists of three basic steps:

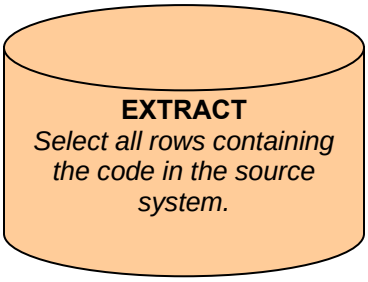


Step 1: EXTRACT
Select all rows containing the code in the source system.

Step 2: ANALYZE
Note any flags applied to the code and understand what they convey about the entry.

Step 3: REFINE
Select the row(s) of an entry that meet the requirements of an applied mapping.

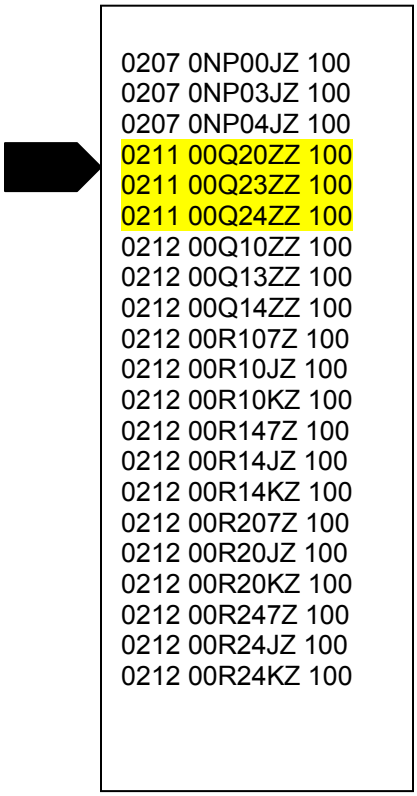
Step 1: EXTRACT



- *Have all rows that contain the same code from the source system been selected?*
- *Does the entry include multiple rows?*
- *Is the entry of the single type or combination type, or both?*

The code we will use for purposes of demonstration is ICD-9-CM code 02.11, Simple suture of dura mater of brain.

I-9 to PCS GEM:
02.11 Simple suture of dura mater of brain

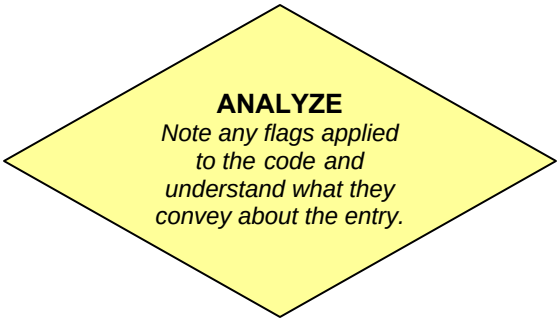


The illustrations at left and below display the ICD-9-CM procedure code 02.11 as it appears in the I-9 to PCS GEM. At left is the entry in text file format, and below is the same information as it would appear in a desktop database. Note that the I-9 codes do not contain decimals in the GEMs.

The code in the source system is listed first, followed by the code in the target system. Here the source system is the four-digit I-9 code and the target system is the 7-character PCS code. The final group of digits is used to indicate additional attributes for entries in the map. These three digits are called flags. This version of the GEM file contains a flag characterizing the degree of correspondence between codes in one row ("approximate" flag), a flag for codes with no correspondence in the target system ("no map" flag) and a flag indicating the row is part of a combination entry ("combination" flag). If the digit is 1, the flag applies (is "turned on") to that entry in the GEM. If the digit is 0, the flag does not apply (is "turned off") to that entry in the GEM. In other words, 1 means "yes," the flag applies to the entry in the GEM and 0 means, "no," the flag does not apply. There are three rows in I-9-CM to PCS GEM for code 02.11. The entry is of the single type, meaning that each row—code 02.11 linked to one of three PCS code alternatives—is considered a valid entry.

I-9 Code	I-9 Description	PCS Code	PCS Description	Approximate [FLAG]	No Map [FLAG]	Combination [FLAG]
02.11	Simple suture of dura mater of brain	00Q20ZZ	Repair of dura mater, open approach	1	0	0
02.11	Simple suture of dura mater of brain	00Q23ZZ	Repair of dura mater, percutaneous approach	1	0	0
02.11	Simple suture of dura mater of brain	00Q24ZZ	Repair of dura mater, percutaneous endoscopic approach	1	0	0

Step 2: ANALYZE



Is the "approximate" flag turned on?
- If yes, the correspondence is not a precise equivalent.

Is the "no map" flag turned on?
- If yes, there is no corresponding code in the target system.

Is the "combination" flag turned on?
- If yes, more than one code is the target system is required to satisfy the meaning of the code in the source system.

In the I-9 to PCS GEM, there are three flags:

Approximate *indicates that the entry is not considered equivalent*

No Map *indicates that a code in the source system is not linked to any code in the target system*

Combination *indicates that more than one code in the target system is required to satisfy the full equivalent meaning of a code in the source system*

In the PCS to I-9 GEM, the "approximate" and "combination" flags are used. The "no map" flag is not used. All PCS codes are linked to one or more I-9 alternatives.

The Approximate Flag

I-9 Code	I-9 Description	PCS Code	PCS Description	Approximate [FLAG]	No Map [FLAG]	Combination [FLAG]
02.11	Simple suture of dura mater of brain	00Q20ZZ	Repair of dura mater, open approach	1	0	0
02.11	Simple suture of dura mater of brain	00Q23ZZ	Repair of dura mater, percutaneous approach	1	0	0
02.11	Simple suture of dura mater of brain	00Q24ZZ	Repair of dura mater, percutaneous endoscopic approach	1	0	0

The approximate flag is turned on when no one code in the target system or linked combination of codes in the target system expresses the same essential meaning as the code in the source

system. Because the I-9 and PCS structure and organization are so different, this flag is turned on for the great majority of entries in the GEMs. The difference between the two systems is typically in level of detail between the codes, and in nearly all cases the PCS code is more detailed than the I-9 code.

The approximate flag is turned on for ICD-9-CM code 02.11. The level of detail differs between the two codes—the approach (shown highlighted in yellow) is specified in PCS and not in I-9.

The No Map Flag

I-9 Code	I-9 Description	PCS Code	PCS Description	Approximate [FLAG]	No Map [FLAG]	Combination [FLAG]
00.40	Procedure on single vessel	*Blank*	*Blank*	0	1	0
00.41	Procedure on two vessels	*Blank*	*Blank*	0	1	0
00.42	Procedure on three vessels	*Blank*	*Blank*	0	1	0
00.43	Procedure on four or more vessels	*Blank*	*Blank*	0	1	0
00.44	Procedure on vessel bifurcation	*Blank*	*Blank*	0	1	0

In the I-9 to PCS GEM, the “no map” flag is on for a subset of I-9 codes. The 2007 version of ICD-9-CM contains component codes that do not identify a procedure, but instead further specify an aspect of a procedure, such as the number of stents used in an angioplasty. They must be paired with an I-9 “primary” procedure code to be meaningful. Since they cannot be coded alone in I-9, they cannot be linked singly to an equivalent code in PCS, because every PCS code is complete in itself as a procedure code. To put it another way, there are no PCS component codes; every PCS code is a primary procedure code. In the I-9 to PCS GEM they are listed without a corresponding PCS entry, and with the “no map” flag on.

The component ICD-9-CM codes are listed in the table below. In the I-9 to PCS GEM, the “no map” flag is on and they are not linked to any PCS code. In the PCS to I-9 GEM, they are linked as portions of an I-9 combination entry.

I-9 Code	Component ICD-9-CM codes I-9 Description
00.40	Procedure on single vessel
00.41	Procedure on two vessels
00.42	Procedure on three vessels
00.43	Procedure on four or more vessels
00.44	Procedure on vessel bifurcation
00.45	Insertion of one vascular stent
00.46	Insertion of two vascular stents
00.47	Insertion of three vascular stents
00.48	Insertion of four or more vascular stents
00.55	Insertion of drug-eluting peripheral vessel stent(s)
00.63	Percutaneous insertion of carotid artery stent(s)
00.64	Percutaneous insertion of other precerebral (extracranial) artery stent(s)
00.65	Percutaneous insertion of intracranial vascular stent(s)
00.74	Hip replacement bearing surface, metal on polyethylene
00.75	Hip replacement bearing surface, metal-on-metal
00.76	Hip replacement bearing surface, ceramic-on-ceramic
00.77	Hip replacement bearing surface, ceramic-on- polyethylene
00.91	Transplant from live related donor
00.92	Transplant from live non-related donor
00.93	Transplant from cadaver
36.06	Insertion of non-drug-eluting coronary artery stent(s)
36.07	Insertion of drug-eluting coronary artery stent(s)
39.90	Insertion of non-drug-eluting peripheral vessel stent(s)
72.4	Forceps rotation of fetal head
81.62	Fusion or refusion of 2-3 vertebrae
81.63	Fusion or refusion of 4-8 vertebrae
81.64	Fusion or refusion of 9 or more vertebrae
84.51	Insertion of interbody spinal fusion device

The Combination Flag

The combination flag is turned on when a code in the source system must be linked to more than one code in the target system to be a valid entry. When the combination flag is on, the *scenario* and *choice list* fields in the GEM contain a number. They appear last in the GEM text file, after the flags. These numbers allow the user to collate the combination entries in the GEM.

```
688  0DTN0ZZ 101 2 7
688  0DTP0ZZ 101 2 8
688  0TTB0ZZ 101 1 5
688  0TTB0ZZ 101 2 5
688  0TTD0ZZ 101 1 6
688  0TTD0ZZ 101 2 6
688  0UT20ZZ 101 1 2
688  0UT20ZZ 101 2 2
688  0UT70ZZ 101 1 3
688  0UT70ZZ 101 2 3
688  0UT90ZZ 101 1 1
688  0UT90ZZ 101 2 1
688  0UTG0ZZ 101 1 4
688  0UTG0ZZ 101 2 4
```

I-9 to PCS GEM:
68.8 Pelvic Evisceration
Removal of ovaries, tubes, uterus, vagina, bladder and urethra (with removal of sigmoid colon and rectum)

The illustrations at left and below display the entry for I-9 procedure code 68.8, Pelvic evisceration, as it appears in the I-9 to PCS GEM. At left is the entry in text file format, and below is the same information as it would appear in a desktop database. The I-9 procedure code 68.8 describes more than one procedure in PCS, so it requires a combination entry in the GEM. A combination is subdivided hierarchically on two levels: 1) By *scenario*, the clinical variation of the procedures included in the I-9 code, and 2) By *choice list*, the possible PCS codes that combined are a valid expression of the I-9 scenario. Each body part listed in the "includes" notes of the I-9 code is a unique PCS code, so more than one PCS code is required to satisfy the equivalent meaning. Therefore, each PCS code for a different body part is assigned a *choice list* number in the GEM.

In addition, two distinct clinical variations of the procedure are specified in I-9 code 68.8: one includes removal of the sigmoid colon and rectum, and the other does not. The linking between I-9 code 68.8 and PCS that includes removal of the sigmoid colon and rectum must be distinguished from the linking that does not. Each clinically distinct variation of a procedure requires its own corresponding list of codes in PCS, so each version of the procedure is assigned a separate *scenario* number in the GEM.

A scenario identifies one variation of the procedure. In other words, it is one version of the procedure as it could be performed in an operative episode. In this example, scenario 1 contains all the PCS codes needed to satisfy the equivalent meaning of "pelvic evisceration without removal of the sigmoid colon and rectum." Scenario 2 contains all the PCS codes needed for "pelvic evisceration with removal of the sigmoid colon and rectum."

A scenario is subdivided into two or more choice lists of codes in the target system. These are the codes that must be linked together in an applied mapping to satisfy the equivalent meaning of the code in the source system. A choice list contains one or more codes in the target system that express a portion of the meaning of the code in the source system. A code must be included from each choice list in a scenario to satisfy the equivalent meaning of the code in the source system.

I-9 Code	I-9 Description	PCS Code	PCS Description	Approximate [FLAG]	No Map [FLAG]	Combination [FLAG]	Scenario# (w/wo colon/rectum)	Choice list# (organs removed)
68.8	Pelvic Evisceration	0TTB0ZZ	Resection of bladder, open approach	0	0	1	1	1
68.8	Pelvic Evisceration	0TTD0ZZ	Resection of urethra, open approach	0	0	1	1	2
68.8	Pelvic Evisceration	0UT20ZZ	Resection of bilateral ovaries, open approach	0	0	1	1	3
68.8	Pelvic Evisceration	0UT70ZZ	Resection of bilateral fallopian tubes, open approach	0	0	1	1	4
68.8	Pelvic Evisceration	0UT90ZZ	Resection of uterus, open approach	0	0	1	1	5
68.8	Pelvic Evisceration	0UTG0ZZ	Resection of vagina, open approach	0	0	1	1	6
68.8	Pelvic Evisceration	0TTB0ZZ	Resection of bladder, open approach	0	0	1	2	1
68.8	Pelvic Evisceration	0TTD0ZZ	Resection of urethra, open approach	0	0	1	2	2
68.8	Pelvic Evisceration	0UT20ZZ	Resection of bilateral ovaries, open approach	0	0	1	2	3
68.8	Pelvic Evisceration	0UT70ZZ	Resection of bilateral fallopian tubes, open approach	0	0	1	2	4
68.8	Pelvic Evisceration	0UT90ZZ	Resection of uterus, open approach	0	0	1	2	5
68.8	Pelvic Evisceration	0UTG0ZZ	Resection of vagina, open approach	0	0	1	2	6
68.8	Pelvic Evisceration	0DTN0ZZ	Resection of sigmoid colon, open approach	0	0	1	2	7
68.8	Pelvic Evisceration	0DTP0ZZ	Resection of rectum, open approach	0	0	1	2	8

In this example there are six PCS choice lists in scenario 1 and eight PCS choice lists in scenario 2, and each choice list contains only one PCS code. In scenario 1, the row containing PCS code 0TTD0ZZ is the only member of choice list 2. The number 2 simply means that it is the 2nd of a total of 6 PCS "organ resection" codes necessary to satisfy the equivalent meaning specified in I-9 code 58.8 Pelvic evisceration.

Because each choice list contains only one code, this is a comparatively simple example of a combination entry. Although many PCS codes are required here to satisfy the complete equivalent meaning of the I-9 code, the user does not need to choose among alternatives in the

choice list. This situation rarely occurs in combination entries in a GEM. Usually a choice list contains multiple codes. The result is that for this I-9 combination entry, there are only two applied mapping alternatives:

Scenario 1

ICD-9-CM Source→	≈	ICD-10-PCS Target
68.8 Pelvic Evisceration	≈	0TTB0ZZ Resection of bladder, open approach **AND** 0TTD0ZZ Resection of urethra, open approach **AND** 0UT20ZZ Resection of bilateral ovaries, open approach **AND** 0UT70ZZ Resection of bilateral fallopian tubes, open approach **AND** 0UT90ZZ Resection of uterus, open approach **AND** 0UTG0ZZ Resection of vagina, open approach

OR

Scenario 2

ICD-9-CM Source→	≈	ICD-10-PCS Target
68.8 Pelvic Evisceration	≈	0TTB0ZZ Resection of bladder, open approach **AND** 0TTD0ZZ Resection of urethra, open approach **AND** 0UT20ZZ Resection of bilateral ovaries, open approach **AND** 0UT70ZZ Resection of bilateral fallopian tubes, open approach **AND** 0UT90ZZ Resection of uterus, open approach **AND** 0UTG0ZZ Resection of vagina, open approach **AND** 0DTN0ZZ Resection of sigmoid colon, open approach **AND** 0DTP0ZZ Resection of rectum, open approach

Step 3: REFINE

REFINE
Select the row(s) of an entry that meet the requirements of an applied mapping.

- *What is the purpose of the applied mapping?*
- *Does the applied mapping require that the code in the source system be mapped to only one "best" alternative in the target system?*
- *Will the correct applied mapping vary depending on the documentation in the record?*

Once the user has analyzed all rows for an entry in the GEM, it is possible to select the row or rows most appropriate to a specific mapping application. We will use two different sample entries of the combination type, one from the I-9 to PCS GEM and one from the PCS to I-9 GEM, in order to discuss the process of refining an entry and deriving an applied mapping.

Sample Entry 1—I-9 to PCS GEM
00.53 Implantation or replacement of CRT pacemaker generator

I-9 Code	I-9 Description	PCS Code	PCS Description	Approximate [FLAG]	No Map [FLAG]	Combination [FLAG]	Scenario#	Choice list#
00.53	Implantation **or** replacement of CRT pacemaker generator	0JH60P3	Insertion of Cardiac Resynchronization Pacemaker Pulse Generator, Open Approach	1	0			
00.53	Implantation **or** replacement of CRT pacemaker generator	0JH63P3	Insertion of Cardiac Resynchronization Pacemaker Pulse Generator, Percutaneous Approach	1	0			
00.53	Implantation **or** replacement of CRT pacemaker generator	0JPT0PZ	Removal of Pacemaker/Defibrillator, Open Approach	1	0	1	1	1
00.53	Implantation **or** replacement of CRT pacemaker generator	0JPT3PZ	Removal of Pacemaker/Defibrillator, Percutaneous Approach	1	0	1	1	1
00.53	Implantation **or** replacement of CRT pacemaker generator	0JH60P3	Insertion of Cardiac Resynchronization Pacemaker Pulse Generator, Open Approach	1	0	1	1	2
00.53	Implantation **or** replacement of CRT pacemaker generator	0JH63P3	Insertion of Cardiac Resynchronization Pacemaker Pulse Generator, Percutaneous Approach	1	0	1	1	2

In this instance an I-9 entry in the GEM is of both the single and the combination type. Because the I-9 code includes either implantation of the CRT pacemaker generator alone or removal of the old generator and insertion of a new one in the same operative episode, the GEM must translate both possibilities into their PCS equivalents. One version requires one PCS code ("implantation" in the I-9 code) to satisfy the equivalent meaning, and the other version requires two PCS codes ("replacement" in the I-9 code).

Note that entries of the single type are not assigned a scenario number. Only combination entries with the combination flag turned on use the scenario and choice list fields in the file.

After classifying the entry into its single and combination entry constituents and collating the combination entries into their respective choice lists (there is only one combination scenario), the available possibilities are:

Single entry

ICD-9-CM Source→	≈	ICD-10-PCS Target
00.53 Implantation **or** replacement of CRT pacemaker generator	≈	0JH60P3 Insertion of Cardiac Resynchronization Pacemaker Pulse Generator, Open Approach **OR** 0JH63P3 Insertion of Cardiac Resynchronization Pacemaker Pulse Generator, Percutaneous Approach

OR

Combination entry

ICD-9-CM Source→	≈	ICD-10-PCS Target
00.53 Implantation **or** replacement of CRT pacemaker generator	≈	0JPT0PZ Removal of Pacemaker/Defibrillator, Open Approach **OR** 0JPT3PZ Removal of Pacemaker/Defibrillator, Percutaneous Approach **AND** 0JH60P3 Insertion of Cardiac Resynchronization Pacemaker Pulse Generator, Open Approach **OR** 0JH63P3 Insertion of Cardiac Resynchronization Pacemaker Pulse Generator, Percutaneous Approach

Note that either member of choice list 1 can be combined with either member of choice list 2. Although PCS codes having the same approach value (5th character identifies operative approach for all Medical and Surgical and related codes) are more likely to be used together, the GEM must accommodate all possible variations of an operative episode and allow for combinations

with differing approach values. In this case a variation could be that the old generator was removed percutaneously and the new one inserted using an open approach.

To refine this entry, first the user must decide whether or not the applied mapping is going to encompass both the single and combination correspondence. This decision of course depends on the mapping application.

A health information professional or researcher who is converting individual patient records from old I-9 data forward to PCS, and has access to the medical record, can simply refer to the record to see which procedure was performed and choose accordingly. On the other hand, a reimbursement specialist looking to translate a PCS coded record back to I-9 codes to produce equivalent payment from a legacy payment system does not need to retain the fine distinctions in PCS, since they are not present in the old system and will not affect payment. This user can ignore the recommended combinations and choose one row of the entry to link to the I-9 code that will represent all the PCS possibilities. In this case finding the one closest equivalent is not the goal.

However, a reimbursement specialist looking to upgrade a legacy payment system to make it more accurate and fair will want to use the increased specificity available in the PCS system. This user may be assigning new payment adjudication logic to the system (payment for insertion of the pacemaker could be reimbursed at a lower rate than removal of the old pacemaker and insertion of a new one). In this case, the I9 to PCS GEM would be used simply as a reference, to see the PCS possibilities and assign them accordingly in a new reimbursement system, where records would be coded in PCS and paid using PCS codes.

Sample Entry 2—PCS to I-9 GEM:
02733ZZ Dilation of Coronary Artery, Four or More Sites, Percutaneous Approach

PCS Code	PCS Description	I-9 Code	I-9 Description	Approximate [FLAG]	Combination [FLAG]	Scenario#	Choice list#
02733ZZ	Dilation of Coronary Artery, Four or More Sites, Percutaneous Approach	00.66	PTCA or coronary atherectomy	1	1	1	1
02733ZZ	Dilation of Coronary Artery, Four or More Sites, Percutaneous Approach	00.40	Procedure-one vessel	1	1	1	2
02733ZZ	Dilation of Coronary Artery, Four or More Sites, Percutaneous Approach	00.41	Procedure-two vessels	1	1	1	2
02733ZZ	Dilation of Coronary Artery, Four or More Sites, Percutaneous Approach	00.42	Procedure-three vessels	1	1	1	2
02733ZZ	Dilation of Coronary Artery, Four or More Sites, Percutaneous Approach	00.43	Procedure-four+ vessels	1	1	1	2
02733ZZ	Dilation of Coronary Artery, Four or More Sites, Percutaneous Approach	00.44	Proc-vessel bifurcation	1	1	1	2

The approximate flag is on, indicating that the relationship between the code in the source system and the code in the target system is classified as an approximate equivalent only. In this case the difference lies in the classification of the body part. I-9 classifies the body part by number of **vessels** treated, and PCS classifies by the number of **sites** treated regardless of the number of vessels. For example, a PTCA could treat two separate lesions along the same vessel. In PCS this is considered two sites for coding purposes, whereas in I-9 it is considered one vessel. The ramification for mapping is that the PCS code indicating that four sites were treated must be linked to all I-9 code alternatives indicating the number of vessels treated, since all four sites could conceivably be on the same vessel.

The combination flag is on, and the number in the scenario column indicates there is only one variation of the procedure identified in the source system. After collating the rows of this entry into their respective choice lists, then, the available possibilities are:

ICD-10-PCS Source→	≈	ICD-9-CM Target
02733ZZ Dilation of Coronary Artery, Four or More Sites, Percutaneous Approach	≈	00.66 PTCA or coronary atherectomy **AND** 00.40 Procedure-one vessel **OR** 00.41 Procedure-two vessels **OR** 00.42 Procedure-three vessels **OR** 00.43 Procedure-four+ vessels **OR** 00.44 Proc-vessel bifurcation

There is only one way to refine this entry: to decide among the alternatives in choice list 2, the user must have access to the detail in the original record. If the patient record is not available, or the mapping application is intended to establish general rules for translation rather than deciding on a case-by-case basis, then a consistent method must be derived and documented for resolving the disparity in body part classification between the two systems. Depending on the mapping application, the user may want to equate vessels with sites or ignore the I-9 component codes altogether in the applied mapping. These decisions require considering the ramifications of lost detail for accurate reimbursement—for coding patient records in one system when the bill will be submitted in another system—and for transposing research data gathered in one system and converted to another.

Glossary

Approach—a character of the seven-character ICD-10-PCS code that "defines the technique used to reach the site of the procedure"

Approximate flag—attribute in a GEM that when turned on indicates that the entry is not considered equivalent

Applied mapping—distillation of a reference mapping to conform to the needs of a particular application (i.e., reimbursement)

Backward mapping—mapping that proceeds from a newer data set to an older data set

Choice list—in a combination entry, a list of one or more codes in the target system from which a code must be included to satisfy the equivalent meaning of a code in the source system

Combination flag—attribute in a GEM that when turned on indicates that more than one code in the target system is required to satisfy the full equivalent meaning of a code in the source system

Combination entry—an entry in the GEM for which a code in the source system must be linked to more than one code option in the target system to be a valid entry

Forward mapping—mapping that proceeds from an older data set to a newer data set

General Equivalence Map (GEM)—reference mapping that attempts to include all valid relationships between the codes in the ICD-9-CM procedure classification and the ICD-10 Procedure Code System (ICD-10-PCS)

ICD-9-CM—International Classification of Diseases 9th Revision Clinical Modification (I-9)

ICD-10-PCS—International Classification of Diseases 10th Revision Procedure Code System (PCS)

No map flag—attribute in a GEM that when turned on indicates that a code in the source system is not linked to any code in the target system

Reference mapping—mapping that includes all possible valid relationships between a source system and a target system

Root operation—a character of the seven-character ICD-10-PCS code that "defines the objective of the procedure"

Scenario—in a combination entry, a collection of code lists from the target system containing the necessary codes that when combined as directed will satisfy the equivalent meaning of a code in the source system

Single entry—an entry in the GEM for which a code in the source system linked to one code option in the target system is a valid entry

Source system—code set of origin in the mapping; the set being mapped ‘from’

Target system—destination code set in the mapping; the set being mapped ‘to’

Procedure Code Set General Equivalence Mappings
2007 Version Documentation

Appendix A—File and Format Detail

ICD-9-CM to ICD-10-PCS
General Equivalence Map (GEM)
FILE AND FORMAT

FILE NAME: Map_i9pcs.txt

FILE FORMAT:

FIELD	POSITION	LENGTH	VALUE
ICD-9-CM Code [source]	1 – 4	4	Left justified, blank filled No decimal
Filler	5	1	*Blank*
ICD-10-PCS Code [target]	6 – 12	7	All seven characters used
Filler	13	1	*Blank*
Approximate [FLAG]	14	1	1 = Yes/On 0 = No/Off
No Map [FLAG]	15	1	1 = Yes/On 0 = No/Off
Combination [FLAG]	16	1	1 = Yes/On 0 = No/Off
Filler	17	1	*Blank*
Scenario#	18	2	0 – 99
Filler	20	1	*Blank*
Choice list#	21	1	0 – 9

ICD-10-PCS to ICD-9-CM
General Equivalence Map (GEM)
FILE AND FORMAT

FILE NAME: Map_pcsi9.txt

FILE FORMAT:

FIELD	POSITION	LENGTH	VALUE
ICD-10-PCS Code [source]	1 – 7	7	Left justified, blank filled No decimal
Filler	8	1	*Blank*
ICD-9-CM Code [target]	9 – 12	4	All seven characters used
Filler	13	1	*Blank*
Approximate [FLAG]	14	1	1 = Yes/On 0 = No/Off
Combination [FLAG]	15	1	1 = Yes/On 0 = No/Off
Filler	16	1	*Blank*
Scenario#	17	2	0 – 99
Filler	19	1	*Blank*
Choice list#	20	1	0 – 9