Preparing for ICD-10-CM/PCS: One Payer's Experience with General Equivalence Mappings (GEMs)

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Abstract

The International Classification of Diseases, Tenth Edition, Clinical Modification/Procedure Coding System (ICD-10-CM/PCS) has been mandated as the new code set to be used for medical coding in the United States beginning on October 1, 2013, replacing the use of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM).

To assist in the transition from ICD-9-CM to ICD-10-CM/PCS, the National Center for Health Statistics developed bidirectional general equivalent mappings (GEMs) between the old and new code sets.

This article looks at how the GEMs have been leveraged by Health Care Service Corporation (HCSC) to achieve the goal of transition to ICD-10-CM/PCS. The analysis examines the questions asked and lessons learned in the practical application of the GEMs for the translation of business rules and processes in order to promote a deeper understanding of the data issues involved in the transition from ICD-9-CM to ICD-10-CM/PCS from a payer's perspective.

Key words: ICD-9-CM, ICD-10-CM/PCS, GEMs, codes, mapping

Introduction

The International Classification of Diseases, Tenth Edition, Clinical Modification/Procedure Coding System (ICD-10-CM/PCS) has been mandated as the new code set to be used for medical coding in the United States beginning on October 1, 2013, replacing the use of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). ICD-10-CM/PCS offers multiple challenges and opportunities from the payer's perspective. Health Care Service Corporation (HCSC) began initial planning and design for the transition to ICD-10-CM/PCS early in 2008. To help providers, vendors, clearinghouses, and payers more effectively implement the transition from ICD-9-CM to ICD-10-CM/PCS, the National Center for Health Statistics (NCHS) developed a bidirectional general equivalent mapping (GEM) system for sourcing and replacing codes and code lists. Both NCHS and the Centers for Medicare and Medicaid Services (CMS) have published the code translation files as a tool at no charge to the profession and the general public. The experience of HCSC in using the GEM tool in implementing ICD-10-CM/PCS and the evolution of the business rules developed and decisions made may offer significant insights for other payers and providers.

It is imperative that all key decision makers in the organization understand that the transition from ICD-9-CM to ICD-10-CM/PCS is not going to be a routine code-update process. Old, retired ICD-9-CM codes are not simply being end-dated and replaced by the new ICD-10-CM/PCS codes. There is no automated crosswalk chart or software program available in a ready-to-use format. Some payers may take the approach that this change is an information technology (IT) project, thereby missing the critical clinical, quality, and other business process implications.

The change from ICD-9-CM to ICD-10-CM/PCS requires a translation between code sets—a translation process that will be most successful when professionally trained clinical coders and clinicians are available to perform the task. The conversion is not a simple IT fix. Experienced personnel will have to be involved. In addition, CMS has left to the discretion of each individual payer the specific determinations of how to leverage the GEMs and how to choose a bidirectional mapping.

It took time and effort at HCSC to convince key corporate players that their preconceptions had to shift from a paradigm of routine crosswalking decisions and IT-heavy decisions, with which the corporation had a great deal of experience, to one of

exceptional complexity and translational accuracy involving all major divisions in the corporation. Communicating this unavoidable fact is an important first step.

Ultimately, the goal of this article is to discuss the lessons learned from the practical application of the GEMs and to promote a deeper understanding of the data issues involved in the transition from ICD-9-CM to ICD-10-CM/PCS from a payer's perspective. This article will look at how the GEMs have been leveraged by our corporation to achieve the goal of transition to ICD-10-CM/PCS. The discussion will not detail all of the possible decisions, only the options HCSC seriously considered.

Multiple Options to Consider for Optimal Benefit

How does an organization best decide which of the many available approaches to take? This article will elaborate on some of the available options that exist, and each option should be considered as part of an overall strategy discussion.

First, there are many questions that the executive leadership group in charge of the conversion should address. Should attempts be made to insulate existing ICD-9-CM systems from the change and then translate in a "live claim" environment from the ICD-10-CM/PCS claims received to ICD-9-CM claims for adjudication? Or is it better to move forward with identified business processes that require ICD-9-CM codes currently and update all of those systems to ICD-10-CM/PCS? Each option has merits based on the individual business processes and rules of each organization. There is no "right" answer or optimal approach for all organizations.

Another option would be to duplicate the present ICD-9-CM code environment with ICD-10-CM/PCS codes as precisely as possible to process claims with ICD-9-CM for service dates prior to October 1, 2013, and process claims with ICD-10-CM/PCS for service dates after October 1, 2013. Again, individual business processes and rules will help determine the best route to take. (ICD-10-CM/PCS has been mandated by the U.S. Department of Health and Human Services to become effective on October 1, 2013, for service dates on and after October 1, 2013.)

Another option would be to start from the beginning and build a new code environment using ICD-10-CM/PCS and retain none of the potential mistakes or gaps found in the older ICD-9-CM systems. This option is the most time-, money-, and labor-intensive option initially. This option also requires a method to access information from the ICD-9-CM world in a meaningful way in the new ICD-10-CM/PCS world. That is, this option will require translation of ICD-9-CM data to be able to compare "apples to apples." Translation from ICD-9-CM to ICD-10-CM/PCS is still required with this option, but only for archival ICD-9-CM data. For this option, utilizing the GEMs is the best starting point.

Circumstances may lead an organization to take a hybrid approach, combining part of one approach with parts of others. Again, only a well-planned discussion and comprehensive analysis will reveal the best options for each organization.

Financial Considerations—Direct and Indirect

Decisions are much easier to make in a vacuum, apart from financial concerns. But organizations must budget real-world expenses against available funds. Human resources must factor into the overall expense as well. Determining leadership and team members will inevitably require many hours. Even more hours will be spent on developing the right approach for each corporation, institution, or practice, and more hours will be needed to ultimately implement the chosen approach. The cost of the conversion from ICD-9-CM to ICD-10-CM/PCS will be partially determined by when the process is initiated and what other resource constraints exist, in terms of both IT and business resources. Existing IT systems, system integration issues, and system aging may determine the available options. Ask the following questions: How much time remains before the organization must "go live" with ICD-10-CM/PCS? How much time remains to train or hire the coders who must do the GEM translations? Some organizations will have to hire subject-matter experts in coding or consider the cost of retraining available coders. Who are the other subject-matter experts and what is their availability? What design and development process is required to implement ICD-10-CM/PCS? What makes sense for individual clients and businesses may not be transferable to others.

Identifying Hidden Costs

Additional questions must be considered. Many years of data exist in ICD-9-CM. Perhaps your business has relied on that data for purposes such as reporting, making prognostications, pricing, tracking outcomes, monitoring performance indicators, tracking resource utilization, and tracking services delivered. Your organization may have to translate the ICD-9-CM data to ICD-10-CM/PCS data to continue delivering these services or reports. Perhaps it would make more business sense and enhance clinical expediency to translate the incoming ICD-10-CM/PCS data to ICD-9-CM data to serve the same functions and create a parallel database. Once again, there are multiple factors to consider before developing the unique approach that meets business needs, complies with the mandates, and simplifies clinical practice. Our organization is in the process of determining how to leverage the archived ICD-9-CM data in the ICD-10-CM/PCS world.

An organization may have older hardware and software systems incapable of being updated to receive data and operate within the more demanding ICD-10-CM/PCS code environment. (There is also a mandate effective January 1, 2012, to upgrade the current ANSI v4010A1 transaction set to ANSI v5010. This upgrade may also necessitate a hardware upgrade that would allow ICD-10-CM/PCS to be used. ANSI v5010 is a prerequisite for ICD-10-CM/PCS.) If so, there must be an assessment to determine if the system(s) should be completely replaced to accommodate the new ICD-10-CM/PCS code environment or if the new code system should be translated to accommodate the older software or hardware.

Four GEM Options

The multiple options already discussed can be merged into four separate approaches to consider, each of which has a different method for using the GEM tool. If the decision is to maintain core systems in the ICD-9-CM code set, then it must be determined how to translate between code sets in the “live” environment. The four options considered by HCSC for migrating to ICD-10-CM/PCS were as follows:

1. Insulate
2. Remediate
3. Dual
4. Pure Plus

See Table 1 for more details on each of these approaches.

Table 1
Some Options for Leveraging GEMs in the Transition to ICD-10-CM/PCS

Option	Description	Use of GEMs	Risks
Insulate	Receive ICD-10-CM/PCS claims and translate all claims to ICD-9-CM to process internally with ICD-9-CM only.	GEMs are used for live translation from ICD-10-CM/PCS to ICD-9-CM during the claim adjudication process.	Unable to model true ICD-10-CM/PCS claims. Only delays the transition to ICD-10-CM/PCS. May change the intent of the originally submitted claim.
Remediate	Receive ICD-10-CM/PCS claims and process in ICD-10-CM/PCS for core processes (e.g., claims) only. For all other processes, translate to ICD-9-CM.	Translate all business rules involved in claims processing from ICD-9-CM codes into ICD-10-CM/PCS using GEMs. May make a single mapping decision or limit possible mapping decisions. No live mapping required.	May change the intent of the originally submitted claim when it is used in reporting and other internal processes. Data mismatches may occur with this approach. Only delays the full transition to ICD-10-CM/PCS. Must validate decisions.
Dual	Receive ICD-10-CM/PCS claims and process as ICD-10-CM/PCS claims based on a predetermined translation of all business rules from ICD-9-CM codes to ICD-10-CM/PCS codes.	Translate all business rules in all affected lines of business into ICD-10-CM/PCS codes utilizing GEMs. No live mapping required.	Requires a great deal of initial business rule mining, discovering, and documenting the intent of all identified business rules, and clinical translational work. Must validate decisions.
Pure Plus	Leave the existing ICD-9-CM system intact. Build a parallel	Redo all systems in ICD-10-CM/PCS by natively coding the	Requires the most money, time, and personnel.

Option	Description	Use of GEMs	Risks
	system with only ICD-10-CM/PCS codes.	business rules. GEMs can be used as a starting point. Results in total recoding of all affected systems and processes.	

The GEMs are the industry standard used as a basis for the conversion process. HCSC began by deciding whether to buy or to build a software tool that leveraged the GEMs and allowed the addition and deletion of codes, where appropriate, to create code groups specific to our business rules. After looking at many software tools, some of which were early in the development process, HCSC made the decision to build an internally developed tool to leverage the GEMs. Your organization may take a different approach, and a discussion or review of our decision-making process is beyond the scope of this article. HCSC started the process in the third quarter of 2009, and products are currently available with attributes that were not available at the time the decision was made.

Once HCSC built the tool, all of the business rules impacted by ICD-9-CM were imported into the tool. The business rules were translated using approximate matches, exact matches, combination codes, and scenarios. A decision was required for each business rule to look for the set of translations that would best adhere to the intent of the business rule being translated. Where ICD-10-CM/PCS codes mapped to multiple, approximate ICD-9-CM codes, a determination was made on which one code, or which group of multiple applicable codes, provided the best translation. The same held true for combinations and scenarios. Also, additional codes that may have been missed in the GEMs were pulled from the ICD-10-CM/PCS codebook to add to the ICD-10-CM/PCS code set used for the business rules. Next, the business impact, benefit impact, and financial impact that the decision would have on overall operations had to be determined. An assessment was made of how many processes based on that decision would require manual intervention on a day-to-day basis. How much would that manual process cost in dollars and personnel? All of these decisions related to business rules had to be factored into the final approach our corporation would take regarding GEMs.

In some organizations, the decision might be to upgrade some current systems and software to ICD-10-CM/PCS and to continue to use ICD-9-CM in others. So, for the applications continuing to use ICD-9-CM, translations would still need to be made using the GEMs in a “live” environment. Alternatively, for the ICD-10-CM/PCS applications, all of the ICD-9-CM diagnosis and procedure codes would have to be translated to ICD-10-CM/PCS using GEMs and coders, and then the validity of the translations for auditing purposes would have to be tested. Only your organization and subject-matter experts can decide which approach is best for your situation.

Methods

HCSC chose to duplicate the present ICD-9-CM environment with ICD-10-CM/PCS codes as precisely as possible in order to use ICD-9-CM codes to process claims with service dates prior to October 1, 2013, and to use ICD-10-CM/PCS to process claims with service dates on and after October 1, 2013. This approach is called dual processing.

HCSC considered the accruing benefits of processing ICD-10-CM/PCS claims in the same code set. Providers could continue to submit ICD-9-CM claims for services with dates prior to October 1, 2013, for up to one year after the date of service. Having to translate millions of claims a month in the “live” environment and facing the potential missteps that could occur was considered an unacceptable risk for customers, providers, and the corporation. Once the decision was made to perform dual processing, the remainder of the project structure, impact assessment, requirements, design and development, testing, and piloting plans and concepts followed logically. Table 2 is an example of a table used to help decide which approach to the transition to ICD-10-CM/PCS was best for our corporation. Of course, far more detailed analyses were performed during a more critical, in-depth look at all of these decisions.

Table 2
Developing Possible Approaches

Steps	Option 1	Option 2	Option 3	Option 4
Identify possible approaches	Describe	Describe	Describe	Describe

Steps	Option 1	Option 2	Option 3	Option 4
Impact on processing with ICD-9-CM codes				
Claims with date of service prior to October 1, 2013				
Claims with date of service on or after October 1, 2013				
Impact on processing with ICD-10-CM/PCS codes				
Claims with date of service prior to October 1, 2013				
Claims with date of service on or after October 1, 2013				
Overall assessment of approaches and issues by option				
What are the benefits of this option?				
What are the risks of this option?				

Identifying Clinical Resources

It is vital to have someone on the project team who completely understands the GEMs and clinical coding. The GEM expert, or experts, must understand what GEMs can and cannot do. When the GEMs were initially loaded into the tool we developed, it was found that translating accurately between the two code sets required the use of both the forward and backward GEMs. To actually translate from one code set to the other, our coders also had to access the coding books and retrieve the codes missing from the first pass at translation, using the GEMs, in order to achieve the most accurate translational result. Because many coders are not clinically trained and are not up to date on the latest clinical diseases or interventions, a secondary level of review had to be instituted. The ICD-10-CM/PCS code set will require additional training in anatomy, physiology, and medical terminology for many coders. Clinicians are valuable assets in the translation process because they presumably already have this expertise.

HCSC decided to hire experienced, professional coders trained in ICD-9-CM and have them trained in ICD-10-CM/PCS. ICD-10-CM/PCS coding is not something just any employee can perform. The process requires someone with training in coding, anatomy, and medical terminology as well as experience in coding production work. The qualifications are specific, exacting, and without shortcuts. Coders have told the project team that the changes in terminology for the root operations are the most difficult part of the transition for experienced ICD-9-CM coders. It will take coders a variable amount of time to adapt to the new terminology depending on how immersed they are in the ICD-10-PCS (procedure) code set versus the ICD-10-CM (diagnosis code) set. All coders will have to revisit their anatomy books and “cheat sheets” to use the GEMs and to natively code in ICD-10-CM/PCS.

Understanding the GEMs: Basic Facts

The GEMs are the foundational data set. Use of the GEMs requires the creation or purchase of a tool in which to hold the translations and/or automate the pulling of data from the GEMs. Coders can use the tool to validate that the translation of each business rule correctly meets the intent of the business rule. Achieving an accurate translation may require adding and deleting codes from the code set returned from the GEMs.

Initially, a Microsoft Access database, containing the GEMs downloaded from the CMS Web site in the fall of 2009, was used to look up the possible translations in the GEMs. HCSC began by using a Microsoft Excel spreadsheet to record the ICD-9-CM to ICD-10-CM/PCS business-rule translations. High technology is not required if there is only a small volume of data to translate. However, if large amounts of data require translation (e.g., if the organization has hundreds of business rules that require thousands of code translations), a more sophisticated tool is a must.

To use the GEMs effectively, it must be understood how they actually work. Regardless of whether they are downloaded from the CMS Web site or supplied by a vendor, the GEMs offer four types of possible translational choices. When the GEMs are first downloaded into an Access database, they are formatted with the following structure: Appearing first is the source code set or the code set to translate from, with a description of the code. Second, across the code line, is the target code set or the

code set to translate to. Then there are five columns that have a value of either one or zero. One means the value is "on" or the answer is yes, and zero means the value is "off" or the answer is no.

HCSC used the GEMs to designate approximate matches, no matches, exact matches, combinations, scenarios, and choices, in that order. The definitions of those designations are as follows:

1. **Approximate match**. When the "Approximate" column has a value of 1, there is an approximate match for the source code in the target code set. This means that when starting at the ICD-9-CM code set and going to ICD-10-CM/PCS, the approximate matches are close and may serve some of the same clinical purposes, but they are not exact. There may be many, many approximate matches. (See Table 3.)
2. **No match**. When the "Approximate" value is 1 and the "No Map" value is 1, there is no match in the target code set. (See Table 4.)
3. **Exact match**. When the "Approximate" value is 0 and the "No Map" value is 0, there is an exact map for the source code in the target code set. (See Table 5.)
4. **Combination**. When the "Combination" value is 1, it means that a set combination of codes is required in the target code set to achieve the same clinical intent of the source code set. (See Table 6.)
5. **Scenarios and choices**. When the "Scenario" column has a value of 1, there are options of different combinations of codes that need to be chosen to achieve the same clinical intent of the source code set. To clarify, this offers the option to "choose one from row 1," "one from row 2," etc. (See Table 6.) For the example in Table 7, there are six possible scenarios. The values in the "Choice List" column demonstrate the potential choices that can be selected for each scenario. There may be multiple options: for example, choice 1 and choice 2 in the target code set may approximately match the source code. Or choice 1, choice 3, and choice 4 in the target code set may also approximately match the ICD-9-CM source code. There are multiple scenarios, and a decision must be made about which scenario works best.

Table 3
An Example of Approximate Matches Using the GEM Tool

ICD-9-CM Source Code	ICD-9-CM Description	ICD-10-CM/PCS Target Code	ICD-10-CM/PCS Description	Approx-imate	No Map	Combi-nation	Scenario	Choice
41000	Acute myocardial infarction of anterolateral wall, episode of care unspecified	I2109	St elevation (stemi) myocardial infarction involving other coronary artery of anterior wall	1	0	0	0	0
41001	Acute myocardial infarction of anterolateral wall, initial episode of care	I2109	St elevation (stemi) myocardial infarction involving other coronary artery of anterior wall	1	0	0	0	0
41002	Acute myocardial infarction of anterolateral wall, subsequent episode of care	I2109	St elevation (stemi) myocardial infarction involving other coronary artery of anterior wall	1	0	0	0	0
41010	Acute myocardial infarction of other anterior wall, episode of care unspecified	I2109	St elevation (stemi) myocardial infarction involving other coronary artery of anterior wall	1	0	0	0	0

Table 4
An Example of No Match Using the GEM Tool

ICD-9-CM Source Code	ICD-9-CM Description	ICD-10-CM/PCS Target Code	ICD-10-CM/PCS Description	Approx-imate	No Map	Combi-nation	Scenario	Choice
V6443	Arthroscopic surgical procedure converted to open procedure	NoDx	No diagnosis	1	1	0	0	0

Table 5
An Example of an Exact Match Using the GEM Tool

ICD-9-CMSource Code	ICD-9-CM Description	ICD-10-CM/PCS Target Code	ICD-10-CM/PCS Description	Approx-imate	No Map	Combi-nation	Scenario	Choice
V5867	Long-term (current) use of insulin	Z794	Long term (current) use of insulin	0	0	0	0	0

Table 6
An Example of Combination Maps Using the GEM Tool

ICD-10-CM/PCS Source Code	ICD-10-CM/PCS Description	ICD-9-CM Target Code	ICD-9-CM Description	Approx-imate	No Map	Combi-nation	Scenario	Choice
T4391XA	Poisoning by unspecified psychotropic drug, accidental (unintentional) initial encounter	9699	Poisoning by unspecified psychotropic agent	1	0	1	1	1
T4391XA	Poisoning by unspecified psychotropic drug, accidental (unintentional) initial encounter	E8548	Accidental poisoning by other psychotropic agents	1	0	1	1	2

Table 7
An Example of Scenario Maps in GEMs

ICD-9-CM Source Code	ICD-9-CM Description	ICD-10-CM/PCS Target Code	ICD-10-CM/PCS Description	Approx-imate	No Map	Combi-nation	Scenario	Choice
8065	Open fracture of lumbar spine with spinal cord injury	S34109A	Unspecified injury to unspecified level of lumbar spinal cord, initial encounter	1	0	1	1	1
8065	Open fracture of lumbar spine with spinal cord injury	S32009B	Unspecified fracture of unspecified lumbar vertebra, initial encounter for open fracture	1	0	1	1	2
8065	Open fracture of lumbar spine with spinal cord injury	S34129A	Incomplete lesion of unspecified level of lumbar	1	0	1	1	1

ICD-9-CM Source Code	ICD-9-CM Description	ICD-10-CM/PCS Target Code	ICD-10-CM/PCS Description	Approx-imate	No Map	Combi-nation	Scenario	Choice
			spinal cord, initial encounter					
8065	Open fracture of lumbar spine with spinal cord injury	S34119A	Complete lesion of unspecified level of lumbar spinal cord, initial encounter	1	0	1	1	1
8065	Open fracture of lumbar spine with spinal cord injury	S32019B	Unspecified fracture of first lumbar vertebra, initial encounter for open fracture	1	0	1	2	2
8065	Open fracture of lumbar spine with spinal cord injury	S34101B	Unspecified injury to L1 level of lumbar spinal cord, initial encounter	1	0	1	2	1
8065	Open fracture of lumbar spine with spinal cord injury	S34111A	Complete lesion of L1 level of lumbar spinal cord, initial encounter	1	0	1	2	1
8065	Open fracture of lumbar spine with spinal cord injury	S34121A	Incomplete lesion of L1 level of lumbar spinal cord, initial encounter	1	0	1	2	1
8065	Open fracture of lumbar spine with spinal cord injury	S34102A	Unspecified injury to L2 level of lumbar spinal cord, initial encounter	1	0	1	3	1
8065	Open fracture of lumbar spine with spinal cord injury	S32029B	Unspecified fracture of second lumbar vertebra, initial encounter for open fracture	1	0	1	3	2
8065	Open fracture of lumbar spine with spinal cord injury	S34112A	Complete lesion of L2 level of lumbar spinal cord, initial encounter	1	0	1	3	1
8065	Open fracture of lumbar spine with spinal cord injury	S34122A	Incomplete lesion of L2 level of lumbar spinal cord, initial encounter	1	0	1	3	1
8065	Open fracture of lumbar spine with spinal cord injury	S32039B	Unspecified fracture of third lumbar vertebra, initial encounter for open fracture	1	0	1	4	2
8065	Open fracture of lumbar spine with spinal cord injury	S34103A	Unspecified injury to L3 level of lumbar spinal cord, initial encounter	1	0	1	4	1
8065	Open fracture of lumbar spine with spinal cord injury	S34123A	Incomplete lesion of L3 level of lumbar spinal cord, initial encounter	1	0	1	4	1
8065	Open fracture of lumbar spine with spinal cord injury	S34113A	Complete lesion of L3 level of lumbar spinal cord, initial encounter	1	0	1	4	1

ICD-9-CM Source Code	ICD-9-CM Description	ICD-10-CM/PCS Target Code	ICD-10-CM/PCS Description	Approx-imate	No Map	Combi-nation	Scenario	Choice
8065	Open fracture of lumbar spine with spinal cord injury	S34124A	Incomplete lesion of L4 level of lumbar spinal cord, initial encounter	1	0	1	5	1
8065	Open fracture of lumbar spine with spinal cord injury	S32049B	Unspecified fracture of fourth lumbar vertebra, initial encounter for open fracture	1	0	1	5	2
8065	Open fracture of lumbar spine with spinal cord injury	S34114A	Complete lesion of L4 level of lumbar spinal cord, initial encounter	1	0	1	5	1
8065	Open fracture of lumbar spine with spinal cord injury	S34104A	Unspecified injury to L4 level of lumbar spinal cord, initial encounter	1	0	1	5	1
8065	Open fracture of lumbar spine with spinal cord injury	S34115A	Complete lesion of L5 level of lumbar spinal cord, initial encounter	1	0	1	6	1
8065	Open fracture of lumbar spine with spinal cord injury	S34105A	Unspecified injury to L5 level of lumbar spinal cord, initial encounter	1	0	1	6	1
8065	Open fracture of lumbar spine with spinal cord injury	S32059B	Unspecified fracture of fifth lumbar vertebra, initial encounter for open fracture	1	0	1	6	2
8065	Open fracture of lumbar spine with spinal cord injury	S34125A	Incomplete lesion of L5 level of lumbar spinal cord, initial encounter	1	0	1	6	1

Analyzing the GEMs

The types of results from the GEMs were categorized according to the forward and backward mappings. The figures below are the *approximate* figures used when the process was begun.

1. Forward mapping ICD-9-CM to ICD-10-CM
   a. 77 percent of the codes had approximate matches
   b. 20 percent of the approximate matches had choices or scenarios
   c. 3 percent of the codes had no matches
   d. 30.4 percent of the codes had exact matches
2. Backward mapping ICD-10-CM to ICD-9-CM

   a. 93 percent of the codes had approximate matches
   b. 5 percent of the approximate matches had choices or scenarios
   c. 2 percent of the codes had no matches
   d. 5 percent of the codes had exact matches

3. Forward mapping ICD-9-CM Volume 3 (procedure codes) to ICD-10-PCS

a. 8 percent of the codes had approximate matches
b. 86 percent of the approximate matches had choices or scenarios
c. 5 percent of the codes had no matches
d. 6 percent of the codes had exact matches

4. Backward mapping ICD-10-PCS to ICD-9-CM Volume 3 (procedure codes)

a. 93 percent of the codes had approximate matches
b. 7 percent of the approximate matches had choices or scenarios
c. 0 percent of the codes had no matches
d. 0.06 percent of the codes had exact matches

The GEMs' chapters and subchapters were also used to categorize our claim volumes by dollar amounts and claim counts. We were able to further determine what chapters caused the greatest risk based on numbers of combination codes, scenarios, or codes that had no matches. This allowed the team to target an approach based on claim volume, dollars reimbursed, and risk.

Next, HCSC was able to determine that not all codes appeared in the GEMs, whether mapping from ICD-9-CM to ICD-10-CM/PCS or from ICD-10-CM/PCS to ICD-9-CM. This information did result in a slight revision of the approach. The "forward" mapping of diagnosis codes (from ICD-9-CM to ICD-10-CM) was missing three ICD-9-CM codes in the source code set and more than 50,000 ICD-10-CM codes in the target code set. Fortunately, the number of missing codes decreased to approximately 13,000 when the chapter on external causes of injury was eliminated from the mapping. The "backward" mapping—from ICD-10-CM (source) to ICD-9-CM (target)—had all of the ICD-10-CM codes but was missing 2,979 ICD-9-CM codes.

The "forward" mapping for procedure codes—from ICD-9-CM Volume 3 (source) to ICD-10-PCS (target)—was not missing any ICD-9-CM codes but was missing 1,092 ICD-10-PCS codes. The "backward" mapping for procedure codes—from ICD-10-PCS (source) to ICD-9-CM Volume 3 (target)—was not missing any ICD-10-PCS codes but was missing 1,032 ICD-9-CM Volume 3 codes. All of these numbers may have changed since that initial review took place in the fall of 2009.

It is important to note how many codes translated to approximate matches and then look at those approximate matches to determine if they capture the desired concept in the translation of business rules or processes. Also, combination codes and scenarios, especially in the procedure code sets, may require a change to the way codes are stored, retrieved, and tracked. Translating business rules may require looking at all of the codes in the combination and scenario sets to determine if the intent of the business rule has been met. It also must be decided how the combination codes and scenarios will be used in all the existing software systems that require translation from ICD-9-CM to ICD-10-CM/PCS.

Finally, for the codes that have no match in the target code set, you must include them in your decision process and determine how you will accommodate them.

The results of this analysis emphasize that codes must be forward mapped and backward mapped to achieve the best outcome. The results also show that both the ICD-9-CM and ICD-10-CM/PCS codebooks must be consulted and decisions must be made based on business needs and clinical concepts. For example, it must be decided which additional codes must be included or deleted to serve the intent of established business rules.

Finally, the analysis helps to make decisions about how to approach the translation process initially and what complications need to be anticipated.

Leveraging GEMs

How did HCSC apply the GEMs? First, the GEMs were used as a training tool. Because no coders in the United States currently have to code in the "live" environment in the ICD-10-CM/PCS code set (except those who code morbidity and mortality data), the challenge was to determine how to get newly hired coders comfortable with the soon-to-be-implemented ICD-10-CM/PCS code sets.

The new HCSC coders were enrolled in a three-day ICD-10-CM/PCS train-the-trainer session offered by AHIMA. The coders were given time to study, and as a result, they all passed the exam. They then used their training to validate the GEMs to find errors to submit to CMS. This allowed them to practice while our internal software staff was designing and developing a tool for them to use for the business-rule translation process.

The coders worked on the diagnosis codes and procedure codes in the GEMs on a chapter-by-chapter basis. Chapters were chosen based on the frequency with which the ICD-9-CM codes appeared in the HCSC claims-data warehouse over a period of one year. ICD-9-CM codes were ranked by chapter and linked to the corresponding ICD-10-CM/PCS chapter.

As the validation process continued, HCSC concurrently reviewed and reevaluated all software tools and business processes to find every instance in which an ICD-9-CM code impacted a business rule.

Second, HCSC leveraged the GEMs to determine our approach to the transition, as discussed earlier.

Third, HCSC leveraged the GEMs to translate business rules from the current ICD-9-CM code set to the ICD-10-CM/PCS code set. The major challenge for those choosing this process will be to discover every place an ICD-9-CM diagnosis or procedure code resides. Some of the business rules used in your software will be highly visible and easy to find and access. Other business rules may be far more challenging to locate, but it is critical to how business is conducted in your organization to find all uses of these codes in your business rules. It is strongly recommended to institute a process for continuously updating your rules and tracking any changes you have made to your rules as well as the rationale for any changes.

Using GEMs to Translate Business Rules

Some of the business rules in software tools or systems are hard coded, while other processes or business rules require us to query external databases for single codes or code ranges. Regardless of how and where you use codes in business rules, you must determine how to translate and update them.

An example of a single-code translation is 042 (Human immunodeficiency virus) in ICD-9-CM, which translates to B20 (Human immunodeficiency virus) in ICD-10-CM. An example of the translation of a code range is 41.xx in ICD-9-CM (the range for operations on bone marrow and spleen), which translates to 83 approximate matches in ICD-10-PCS. A coder with clinical knowledge must look at all of the codes in that range to ascertain if the codes meet the stated intent of the business rule in question, and IT experts must determine how and where those decisions are stored and accessed.

Once these instances of ICD-9-CM codes are found, then the purpose or intent of the rule, or the actions they execute, are used to define the business rule. Understanding the purpose of each business rule is critical. The intent of the business rule dictates how the ICD-9-CM codes are translated to ICD-10-CM/PCS codes in the most accurate fashion, and vice versa. HCSC began the translation process by finding all of the business rules and backward mapping from ICD-10-CM/PCS to the ICD-9-CM codes embedded in the business rules. This direction was chosen first because the backward mapping from ICD-10-CM/PCS (as the source) to ICD-9-CM (as the target) does not miss any ICD-10-CM/PCS codes. When forward mapped, the missing 2,979 ICD-9-CM codes discussed above were revealed. In addition, any codes that might not have been included in the directional mapping tool were taken as alternative translations.

For example, the utilization management department of the organization may have a business rule that states: “All of the following codes are automatically approved for air ambulance transportation and do not require precertification.” The rule will have a list of ICD-9-CM diagnoses that are critical illnesses or injuries or that require rapid travel for specific services not routinely delivered at community hospitals. To achieve the goal of the business rule, it is vital to translate only to the codes that result in the same clinical and business outcome. If the intent is not clearly understood, the coder could mistakenly look at all of the ICD-9-CM orthopedic codes on the list and pull all the corresponding ICD-10-CM/PCS codes from the GEMs, including the combination and scenario codes, without understanding that the intent of the rule was to make decisions regarding unstable, life-threatening orthopedic injuries.

To further underscore the need for coder input in translating business rules, Table 8 provides an example of the explosion of codes from ICD-9-CM Volume 3 to ICD-10-PCS for a frequently seen catherizationcode set. Four ICD-9-CM codes translate to 1,842 ICD-10-CM/PCS codes. All of these ICD-10-CM/PCS codes have to be reviewed to translate the business rules. As an example of how the new codes further impact cardiac care, note that an integral part of the ICD-9-CM code set is the

"episode of care" information. This information may be important to track provider follow-up on the initial myocardial infarction and to differentiate it from subsequent events in the same anatomical distribution. To get to the same information, it is essential to use code I22.x to describe the subsequent visits in the ICD-10-CM code set. Performing a straight query of the GEMs, however, does not return those values. The coder must add that value from the ICD-10-CM code set while also understanding what the intent of the rule is and what information is necessary to get to the best translation of the business rule. Table 9 shows additional examples of GEM translations that the coders did not feel were correct and for which the codes returned by the GEMs had to be deleted and different codes added to achieve the best translations.

Utilizing the steps detailed above, the coders translated 660 business rules. The total number of codes mapped (both manually and via the GEM tool) was 316,183 ICD-9-CM codes and 422,837 ICD-10-CM/PCS codes. To achieve that goal, it required seven coders working for 21 weeks at 30 hours per week, for a total of 4,410 coder hours.

Table 8
Using the GEMs to Map from ICD-9-CM Catheterization Codes to ICD-10-PCS Codes

ICD-9-CM Procedure Code	Number of Corresponding ICD-10-PCS Codes
0061	62
0062	8
0066	64
3950	1,708
Total	**1,842**

Table 9
Examples of GEM Mappings with Issues

ICD-10-CM Code	Description	ICD-9-CM Code	Description	Direction
E0836	Diabetes mellitus due to underlying condition with diabetic cataract	2518	Other specified disorders of pancreatic internal secretion	Backward
E0836	Diabetes mellitus due to underlying condition with diabetic cataract	24950	Secondary diabetes mellitus with ophthalmic manifestations, not stated as uncontrolled, or unspecified	Back ward
E0836	Diabetes mellitus due to underlying condition with diabetic cataract	36641	Diabetic cataract	Back ward
E0836	Diabetes mellitus due to underlying condition with diabetic cataract	24950	Secondary diabetes mellitus with ophthalmic manifestations, not stated as uncontrolled, or unspecified	Backward
E0836	Diabetes mellitus due to underlying condition with diabetic cataract	36644	Cataract associated with other syndromes	Backward

This process resulted in ICD-10-CM/PCS business rules being put into place and HSCS still being able to do business in ICD-9-CM for claims with dates of service prior to October 1, 2013. HCSC now has the best "first draft" of all the ICD-10-CM/PCS code translations in order to duplicate the existing ICD-9-CM rules in the ICD-10-CM/PCS code set. This duplication will allow HCSC to potentially reduce the impact on providers and members during the transition to the ICD-10-CM/PCS code set.

Conclusion

In summary, to approach the transition to ICD-10-CM/PCS, many things must occur. Every impacted entity, whether a payer, institutional provider, professional provider, vendor, or clearinghouse, is on a tight schedule to review how business is currently being done. All instances in which ICD-9-CM codes are used in the current state of the business must be retrieved and isolated. It is critical to understand the intent of each business rule or process that leverages the ICD-9-CM diagnosis or procedure codes. Key decisions then have to be made about how to arrive at the future state of an ICD-10-CM/PCS-enabled organization. Some of the key steps to reach that new state are listed below.

- Select a strong program team.
- Ensure that effective project management techniques are used.
- Adopt a lifecycle view and formulate a strategy prior to undertaking any action.
- Determine all of the areas of your business that will be affected by the transition to ICD-10-CM/PCS.
- Determine what approach will be taken after soliciting the input of your business and IT subject matter experts.
- Focus first on the key business areas within the organization and identify how and where the new code sets affect these areas.
- Look for all of the business rules and processes that currently use ICD-9-CM codes and perform due diligence in an attempt to discover the intent of the business rule and the purpose of the code in that business rule.
- Work together with the subject-matter experts from the business units to interpret the intent of each business rule, review the translations to determine if the intent has been maintained, and finally assess the impact of the translations.
- Decide how to determine if the business rules that use ICD-9-CM have errors before translating those errors into the ICD-10-CM/PCS environment. Does the present business rule use end-dated codes, invalid codes, truncated codes, or codes that make no sense based on the intent of the rule?
- Use the GEMs as a foundation, but use intelligence and research to decide which of the approximate matches, combination code options, and scenarios serve the intent of the organization’s business rules.
- Decide who will do the work. To achieve the best quality outcome in the most efficient time frame, the work must be done by someone who has both technical (IT) and clinical knowledge.
- Decide when to hire coders to start the translation process.
- Decide how to train the coders to use the new ICD-10-CM/PCS code sets.
- Determine how to educate the new coders about the business processes so they can ask the correct questions at the correct time and call for help when they need it. Who will be their resource for questions if they are unable to resolve outstanding issues?
- Ask the coders to check for codes that must be added or deleted to serve the intent of the business rule.
- Have clinical oversight of all changes that are made.
- Establish a mechanism to make sure your update of GEMs continues and that your organization continues to update all of the already-translated business rules.
- Implement a process to audit the quality of the translations done using GEMs and verify that the right mappings occurred.
- Define the key risks of your chosen approach.
- Always consult your business subject-matter experts.
- Develop a contingency plan.

The business of healthcare is about the delivery, and the payment for the delivery of, healthcare services or supplies to achieve the best quality outcomes for our respective populations. To achieve this goal, the healthcare industry must be effective and efficient in the use of the healthcare dollar. Medical coding is the language used to transmit healthcare documentation, and the healthcare industry is about to switch languages for the first time in more than 30 years. The transition to the ICD-10-CM/PCS code set offers multiple challenges and opportunities from the payers’ and the providers’ perspectives, both institutional and professional. There is no automated crosswalk. Moving from ICD-9-CM to ICD-10-CM/PCS requires a translation tool that will prove most successful when trained clinical coders and clinicians assist in doing the work. Adopting the new code set will not be a simple IT fix. It will require a great investment of time, money, and human resources in the preparation, design, conceptualization, simulation and modeling, testing, piloting, and finally adoption of the new system. Although organizations facing the transition should have already begun the process, it is hoped that the experience of HCSC in using GEMs to implement ICD-10-CM/PCS and the decisions made in the process of updating the organization’s business rules will offer significant insights for other payers and providers facing the upcoming implementation of ICD-10-CM/PCS.

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Notes

[1] Centers for Medicare and Medicaid Services. *Diagnosis Code Set General Equivalence Mappings: ICD-10-CM to ICD-9-CM and ICD-9-CM to ICD-10-CM 2009 Version: Documentation and User's Guide*. Available at https://www.cms.gov/ICD10/11b1_2011_ICD10CM_and_GEMs.asp.

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