Putting the ICD-10-CM/PCS GEMs into Practice

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Mappings between ICD-9-CM and ICD-10-CM/PCS will play a critical role in the successful transition to ICD-10-CM/PCS. The Centers for Medicare and Medicaid Services (CMS) and the Centers for Disease Control and Prevention created the General Equivalence Mappings (GEMs) to ensure consistent national data when the US makes the transition.

The GEMs act as a translation dictionary to bridge the language gap between ICD-9-CM and ICD-10-CM/PCS. They help users understand, analyze, and manage the translation of one code set to the other. They also help users create their own applied mappings as needed.

This practice brief outlines how healthcare organizations can best use the GEMs to facilitate the transition to ICD-10-CM/PCS.

Understanding the GEMs

The GEMs are more complex than a simple one-to-one crosswalk. They reflect the relative complexity of the code sets clearly so that applications that use them can be managed effectively.

They are public domain, general purpose reference mappings designed to give all sectors of the healthcare industry that use coded data the tools to:

- Convert large databases and test system applications
- Link data in long-term clinical studies
- Develop application-specific mappings
- Analyze data collected before and after the transition to ICD-10-CM/PCS

The GEMs were developed to serve a specific, limited, short-term need-to allow the industry to migrate systems, applications, and data from ICD-9-CM to ICD-10-CM/PCS. They are intended to be used primarily for translations of code lists or code tables used by an application or other coded data when codes in one code set are the only source of information.

The GEMs are not intended to be a substitute for using ICD-9-CM and ICD-10-CM/PCS directly. The code sets should be used to look up the applicable codes if the health record or the clinical terms describing a diagnosis or procedure are available.

The GEMs organize the differences in the ICD-9-CM and ICD-10-CM/PCS code sets by linking a code to all valid alternatives in the other code set. Choices among the alternatives can be made depending on the particular conversion project for which the GEMs are being used.

All reasonable code translation alternatives for the complete meaning of the code being looked up (source system code) are provided in the GEMs (for a glossary of terms used in this brief, see appendix B). The "complete meaning" of a code is based on code set instructions, index entries, official coding guidelines, and, when ICD-9-CM is the source system, applicable *Coding Clinic for ICD-9-CM* advice.

For example, the "ICD-10-CM Official Guidelines for Coding and Reporting" indicate that the seventh character extension for subsequent encounter includes aftercare. Therefore, the GEM links the ICD-10-CM codes with the subsequent encounter extension to the ICD-9-CM diagnosis codes for aftercare.

An example from the ICD-10-CM to ICD-9-CM GEM is ICD-10-CM code S32.415D, Nondisplaced fracture of anterior wall of acetabulum, left side, subsequent encounter for fracture with routine healing, which links to ICD-9-CM code V54.13,

Aftercare for healing traumatic fracture of hip.

In a few instances, a code in the source system is not linked to any code in the target system. This occurs when the concept does not exist in the target system. For example, in ICD-9-CM, there is a diagnosis code for laparoscopic surgical procedure converted to open (ICD-9-CM code V64.41), but this concept does not exist in ICD-10-CM because this is really a surgical, rather than a diagnostic, concept. Underdosing and blood type are examples of concepts for which there are codes in ICD-10-CM, but not in ICD-9-CM.

In ICD-9-CM, there are adjunct procedure codes that do not identify a procedure, but convey additional information about the procedure (such as the number of vessels treated or the number of stents inserted) and must be paired with a code describing the procedure to be meaningful. Sometimes a combination of codes (referred to as a "cluster" in the GEM user guides) in the target system is needed to completely describe a code in the source system. For example, ICD-10-CM code I25.110, Atherosclerotic heart disease of native coronary artery with unstable angina pectoris, links to a combination of two ICD-9-CM codes:

- 414.01, Coronary atherosclerosis of native coronary artery
- 411.1, Intermediate coronary syndrome

Understanding these differences in the code sets is essential to determining the impact of the transition on reimbursement, eligibility, quality measurement, or other processes that rely on ICD-coded data.

All ICD-9-CM and ICD-10-CM/PCS codes are included in the collective GEMs. However, the GEMs have different content in each direction. The backward (ICD-10-CM/PCS to ICD-9-CM) and forward (ICD-9-CM to ICD-10-CM/PCS) mappings are not mirror images of each other, since all translation alternatives are based on the meaning and level of specificity of the code in the source system.

No Mirror Image

The backward mapping (ICD-10-CM/PCS to ICD-9-CM) and forward mapping (ICD-9-CM to ICD-10-CM/PCS) are not mirror images of each other, since all translation alternatives are based on the meaning and level of specificity of the code in the source system. All codes in a code set are included when that code set is the source system, but not when it is the target system.

ICD-9-CM			**ICD-10-CM**	
820.8	Fracture of unspecified part of neck of femur, closed	links to –––> (forward)	S72.009A	Fracture of unspecified part of neck of right femur, initial encounter for closed fracture
ICD-9-CM			**ICD-10-CM**	
820.8	Fracture of unspecified part of neck of femur, closed	links from <––– (backward)	S72.001A or S72.002A or	Fracture of unspecified part of neck of right femur, initial encounter for closed fracture Fracture of unspecified part of neck of left femur, initial encounter for closed fracture

			S72.009A	Fracture of unspecified part of neck of femur, initial encounter for closed fracture

Not all ICD-9-CM codes are used in the ICD-10-CM/PCS to ICD-9-CM GEMs, and not all ICD-10-CM/PCS codes are used in the ICD-9-CM to ICD-10-CM/PCS GEMs. In other words, all codes in a code set are included when that code set is the source system, but not when it is the target system, as the examples in the table above show.

In the table's forward GEM example (ICD-9-CM to ICD-10-CM), ICD-9-CM code 820.8 does not map to ICD-10-CM codes S72.001A or S72.002A because the ICD-9-CM code does not include information about which side of the body the fracture occurred, and this information is needed in order to link to these ICD-10-CM codes.

However, in the backward GEM (ICD-10-CM to ICD-9-CM), ICD-10-CM codes S72.001A and S72.002A map back to ICD-9-CM code 820.8 because laterality is not specified in ICD-9-CM, and therefore both the left and right sides are included in this ICD-9-CM code.

Because the GEMs were developed for implementation in electronic applications, they are far more flexible than any printed translation dictionary. For example, coding professionals can perform a "reverse lookup." This is akin to taking the Spanish word *hombre* and looking in the English-to-Spanish half of the dictionary to see how many English words translate to *hombre*.

Users of a printed translation dictionary can look up only a Spanish word in the Spanish-to-English dictionary and an English word in the English-to-Spanish dictionary. Reverse lookup is an important feature with many benefits such as the development of applied mappings.

Applying GEMs for Different Purposes

The GEMs make it possible to accurately and effectively translate coded data for a number of purposes including:

- Comparing data across the transition period for various purposes, such as long-term clinical studies, epidemiological and other research, and calculating costs and other institutional financial measurements
- Calculating equivalent reimbursement
- Facilitating the conversion or refinement of ICD-9-CM–based applications, such as payment and coverage edits and policies, utilization/case management software, clinical risk grouping applications, quality measures, and groupers used for reimbursement and pricing

The GEMs are intended to be used by anyone who needs to convert coded data or convert software applications that produce or process coded data from ICD-9-CM to ICD-10-CM/PCS. They can also be used to translate incoming ICD-10-CM/PCS data back to ICD-9-CM after the implementation date.

Types of users include:

- Payers
- Providers
- HIM professionals
- Researchers
- Informatics professionals
- Utilization managers
- Quality managers
- Developers of quality measures
- Software vendors

How GEMs Should Not Be Used

The GEMs cannot be used:

- As simple crosswalks. They are reference mappings to assist users in navigating the complexity of translating meaning from the contents of one code set to the other code set according to the definitions and rules of the applicable code set.
- By a system or application in unaltered form to get from one code in the source code set to one code in the target code set. It is up to end users, including payers, vendors, and providers, to use the GEMs as a basis for converting systems or as a basis to create applied mappings that meet their specific needs (development of applied mappings is discussed in greater detail later).

The GEMs should not be used as a substitute for learning how to use the ICD-10-CM/PCS code sets. Coding professionals should not use the GEMs as a means to code health records for external reporting or other administrative purposes, such as reimbursement or state data reporting. When coding health records, codes should be assigned using an ICD-10-CM/PCS code book or coding software and should be based on health record documentation.

Mapping simply links concepts in the two code sets, without consideration of context or specific patient encounter information, whereas coding involves assigning the most appropriate code based on health record documentation and applicable coding guidelines.

Selecting the GEM to Use

It is important to understand the differences that need to be reconciled in linking coded data. The method used to reconcile those differences may vary depending on factors such as:

- Whether the data are 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 they may have been in the previous code set (backward) mapping
- User or application constraints

Individual GEM files for a code set can be used in one direction at a time or both directions to find all possible translation alternatives. If it is necessary for all codes in a particular code set to be explicitly represented in the mapping application, the GEM in which that code set is the source system should be used. For example, since the ICD-10-CM to ICD-9-CM GEM does not contain every ICD-9-CM code (because ICD-9-CM is the target system in this GEM), this GEM file would not be the best option for a project requiring every ICD-9-CM code.

The ICD-10-CM/PCS to ICD-9-CM GEM could be used to convert applications containing lists of codes via reverse lookup. Since it contains all ICD-10-CM/PCS codes, it could also be used for applications that depend on all ICD-10-CM/PCS codes being present (e.g., claims submitted for encounters on or after October 1, 2013, will contain ICD-10-CM/PCS codes). The ICD-9-CM to ICD-10-CM/PCS GEM could be used to translate historical data, such as quality measures. Combined GEMs could be used for small conversion projects with access to original health records or additional clinical information, forecasting, strategic planning, or general education.

The GEMs can assist in making the transition to ICD-10-CM/PCS using one of two basic methods: converting an application or data set so that it uses ICD-10-CM/PCS codes directly or developing an applied mapping that operates between coded data in one code set and an application in the other code set and determining a single, fixed mapping choice for each incoming code to be processed by the application.

User or application constraints may govern whether the GEMs are used to convert data and applications directly to ICD-10-CM/PCS or to develop an applied mapping as an ongoing translator between the two code sets. For example, for an application that is to be replaced by a completely redesigned application in 2014, the decision might be made not to convert the current application, but to develop an applied mapping instead.

Distinguishing between Direct Conversion and Applied Mapping

Direct conversion is like translating the user manual for a microwave oven from English into Spanish. There will be two copies of the user manual, one in Spanish and one in English. Spanish-speaking owners of the microwave will use the Spanish copy, and English-speaking owners of the microwave will use the English copy.

There is no direct, ongoing link between the two manuals. They are used independently, like an ICD-9-CM version of an application and an ICD-10-CM/PCS–based version of the same application.

An applied mapping, on the other hand, is like a handheld translator from English to Spanish. When a user keys in an English word, the translator returns a Spanish word. The translator is an applied mapping in that it creates a direct, ongoing link between individual words in the two languages.

Number of Translation Alternatives in Each GEM

Backward GEMs
ICD-10-CM codes with only one ICD-9-CM translation alternative: 64,961
ICD-10-CM codes with more than one ICD-9-CM translation alternative: 4,140 (5%)
ICD-10-CM codes with no translation in ICD-9-CM: 593

ICD-10-PCS codes with only one ICD-9-CM translation alternative: 67,126
ICD-10-PCS codes with more than one ICD-9-CM translation alternative: 4,831 (6%)
ICD-10-PCS codes with no translation in ICD-9-CM: 0

Forward GEMs
ICD-9-CM diagnosis codes with only one ICD-10-CM translation alternative: 11,344
ICD-9-CM diagnosis codes with more than one ICD-10-CM translation alternative: 2,971 (20%)
ICD-9-CM codes with no translation in ICD-10-CM: 416

ICD-9-CM procedure codes with only one ICD-10-PCS translation alternative: 352
ICD-9-CM procedure codes with more than one ICD-10-PCS translation alternative: 3,486 (90%)
ICD-9-CM procedure codes with no translation in ICD-10-PCS: 209

Direct Conversion of Applications

Any size and type of conversion project can benefit from GEM use including a large conversion project such as the conversion of a reimbursement system, a medium project like the conversion of a lengthy, complex document containing multiple references to ICD-9-CM codes, or a small project involving the conversion of the ICD-9-CM codes used in a single research study.

To date, the federal government has used the GEMs to:

- Convert the Medicare MS-DRGs version 26.0 to an ICD-10-CM/PCS–based application
- Facilitate the creation of the “Official Guidelines for Coding and Reporting” for ICD-10-CM/PCS
- Convert the Medicare Code Editor to an ICD-10-CM/PCS–based application

For more information on the MS-DRGs conversion project, see the CMS report “Converting MS-DRG 26.0 to ICD-10-CM and ICD-10-PCS” at www.cms.hhs.gov/ICD10/09_ICD10_MS_DRG_Conversion_Project.asp.

Conversion projects using the GEMs can be used for both replication and optimization of an existing application. The goal of replication is to produce an ICD-10-CM/PCS–based “copy” of the application that yields essentially the same results as the current ICD-9-CM–based application. The initial test conversion of the MS-DRGs version 26.0 is an example of replication.

The goal of optimization is to produce an ICD-10-CM/PCS–based application that produces optimized results based on the increased detail in ICD-10-CM/PCS. Optimization is a more complex conversion project than replication.

For example, ICD-10-CM contains codes for "underdosing," whereas ICD-9-CM does not. The ICD-10-CM codes for underdosing could be used as exclusionary criteria for a quality measure of outcomes in diabetes patients. The combination of the underdosing code and a code for patient noncompliance would provide information relevant to patient outcomes that is not available today because the concept of underdosing does not exist in ICD-9-CM.

Every conversion project will not require the use of the GEMs. For small-scale projects, such as updating a policy document containing a specific narrative description of diagnoses or procedures or converting a small number of codes, it would be quicker, easier, and more accurate to look up the codes directly using a code book or encoder.

Developing Applied Mappings

In addition to direct conversion of applications, the GEMs may also be used to develop applied mappings. Developing applied mappings for specific purposes is an alternative to converting systems or applications to ICD-10-CM/PCS when system conversion is not possible.

The term "applied mapping" is used universally in the GEM user guides to characterize the decision-making process of choosing between translation alternatives in the GEMs. Often, but not always, the goal of an applied mapping will be to produce the best one-to-one translation for a specific purpose; that is, either one source system code to one target system code or one source system code to one target system cluster.

In some cases, the goal of the applied mapping will be to reduce the number of translation alternatives for a specific conversion project, with the selection of the appropriate translation alternatives being dependent on user-defined rules or criteria.

A single one-to-one mapping cannot serve all the uses of coded data and will not produce valid results for all applications that contain, store, or process ICD-9-CM codes. Maps for different applications or processes, such as payment methodologies, utilization management, clinical care management, and decision support, may vary. A backward mapping developed for one reimbursement system may require technical modifications to work for another reimbursement system. These maps may very well contain different entries and require different rules than a map for quality measurement or research.

Developing a one-to-one backward mapping may be indicated when:

- The current application cannot be converted to process ICD-10-CM/PCS codes directly because of application or platform limitations.
- The current application is being replaced by a new application on or shortly after ICD-10-CM/PCS implementation.
- The current application does not apply the same program logic to a group or range of codes stored as code categories or lists of codes but treats each code uniquely and individually (i.e., individual ICD-9-CM codes are inextricably hard-coded into the system).

Because the GEMs were designed to be all-inclusive and accurate as a translation reference between the code sets, they function as a common standard for all ICD-9-CM users and a common starting point for the development of all applied mappings. Applied mappings should never represent as valid choices codes that are not included as one of the translation options in the GEMs.

The applied mapping should contain supporting documentation that identifies which of the translation options provided in the GEMs will be used for a specific map and the basis for those choices (e.g., clinical or financial data sources, frequency information, or other parameters that circumscribe the use of the map, such as service area, age, or gender).

When using the backward GEMs to derive a one-to-one applied mapping, the percentage of codes that require the user to choose among translation alternatives is relatively low, as indicated by the sidebar "Number of Translation Alternatives in Each GEM".

Given how vague or broad many ICD-9-CM codes are, it is not surprising that the percentage of codes in the source system with more than one translation alternative in the target system is higher in the forward GEMs.

It is important to keep in mind that just because there is only one listed mapping alternative does not necessarily mean the linked codes have identical meanings. There may be differences in the code titles or definitions.

Whenever a code in the source system is linked to multiple code alternatives in the target system, each of the alternatives is a viable translation. When developing the applied mapping, one must choose the most appropriate translation alternative(s) for a particular application based on user-defined reference data from among all of the translation alternatives listed in the GEMs.

The initial planning and design of an applied mapping should take into account:

- The purpose of the applied mapping
- What additional information is available, such as context (e.g., type of patient encounter, other abstracted patient data) or any of the reference data sources mentioned earlier that could be used to determine either the single most appropriate translation alternative (single code or code cluster) or eliminate the inappropriate translation alternatives

When developing an applied mapping, users should create mapping rules as needed to promote consistency. For example, users could decide to partially automate the development of an applied mapping for their reimbursement system by using their own ICD-9-CM raw frequency data.

A rule might be written to automatically choose the most frequently coded ICD-9-CM translation alternative when it is coded more than twice as frequently as any of the other ICD-9-CM translation alternatives in the GEMs and leave the remaining mapping choices for human review. The applied mapping can then be developed consistently according to the applicable rule.

Rules specific to the applied mapping promote consistency and are a way of documenting the mapping decisions made.

Finding the Correct Choice

The correct choice or the closest match may differ depending on the purpose of the map. For example, ICD-10-CM combines the concepts of intraoperative hemorrhage and hematoma into a single code, whereas ICD-9-CM splits hemorrhage and hematoma complicating a procedure into two distinct codes. Based on only the meanings of the codes, there is no way to choose between hematoma and hemorrhage. Both are equally correct. Therefore, other reference data or parameters relevant to the applied mapping must be used in making the correct choice.

In developing a mapping for a medical necessity application, it would not matter which ICD-9-CM code alternative is selected if both hematoma and hemorrhage met the same medical necessity criteria. Either translation would produce the same result in the mapping. The ICD-10-CM code, mapped to either the ICD-9-CM hemorrhage or hematoma code, would end up in the same list in the ICD-9-CM–based medical necessity application, so either code would be correct.

However, in developing an applied mapping for a study that tracks treatment outcomes for surgical evacuation versus medical treatment of hematoma, the ICD-9-CM hematoma code is the only correct choice.

Note that in the first hypothetical mapping, both ICD-9-CM options were deemed the correct choice because either choice produces valid results for the application. This may often be the case where fine distinctions are not made in an application between individual ICD-9-CM codes, but instead entire categories of ICD-9-CM codes are treated the same in an application (i.e., assigned to the same policy, payment category, or other list).

Applied mappings might be useful in areas that include:

- Revenue cycle impact analysis
- Quality measurement
- Claims adjudication
- Utilization review policy assessments

The Public Domain Reimbursement Mappings

CMS's public domain ICD-10-CM/PCS Reimbursement Mappings are an example of an applied mapping. They were developed in response to requests from the commercial payer community for a "standard one-to-one reimbursement crosswalk." They are intended to be used as a temporary mechanism to process ICD-10-CM/PCS–based claims received on or after October 1, 2013, with a legacy ICD-9-CM–based system, until systems and processes are developed to process ICD-10-CM/PCS–based claims directly.

It is important to note that CMS is not using the reimbursement mappings for any purpose, because they are converting their systems and applications to be able to accept ICD-10-CM/PCS codes directly by October 1, 2013.

In order to develop the reimbursement mappings, CMS used the ICD-10-CM to ICD-9-CM and ICD-10-PCS to ICD-9-CM GEMs as a starting point. In those instances when an ICD-10-CM or ICD-10-PCS code translated to more than one ICD-9-CM alternative, a single ICD-9-CM translation alternative was chosen based on hospital inpatient frequency data.

For example, ICD-10-CM code J45.22, Mild intermittent asthma with status asthmaticus, links to two ICD-9-CM translation alternatives: 493.01, Extrinsic asthma with status asthmaticus, or 493.11, Intrinsic asthma with status asthmaticus.

Frequency data showed that the ICD-9-CM code for extrinsic asthma with status asthmaticus is more prevalent, so that was the single translation selected for the reimbursement mapping.

In those instances when frequency data did not point to a clear choice among ICD-9-CM alternatives, clinical relevance was used to make the final choice. For example, ICD-10-CM code P07.31, Other preterm newborn, 28–31 completed weeks, links to three ICD-9-CM translation alternatives:

- 765.24, 27–28 completed weeks of gestation
- 765.25, 29–30 completed weeks of gestation
- 765.26, 31–32 completed weeks of gestation

Although frequency data favored code 765.26, after clinical review, it was decided to use code 765.25, 29–30 completed weeks of gestation, for the reimbursement mapping, since it was the only code where all the weeks specified in the ICD-9-CM code title were included in the ICD-10-CM code.

Unlike the GEMs, which include all plausible translation alternatives for each code in the source system, the resulting reimbursement mappings offer a single recommended mapping of each ICD-10-CM/PCS code to a single ICD-9-CM alternative.

Note that the mapping is not necessarily to a single ICD-9-CM code. As discussed earlier, in some instances a combination of ICD-9-CM codes is needed for a complete translation of an ICD-10-CM/PCS code (i.e., a "cluster"). In these instances, in the reimbursement mappings, there is only one ICD-9-CM translation alternative, but it is a cluster of codes instead of a single code.

In some cases, a payer wishing to use the reimbursement mappings may need to further refine them for use in certain conversion projects. Since the reimbursement mappings involve the selection of the single best ICD-9-CM alternative when there are multiple translation alternatives, the other ICD-9-CM alternatives are not included.

Organizations wishing to use the reimbursement mappings should review the ICD-9-CM codes used in the reimbursement mappings and determine if any codes essential to their application are missing. If that is the case, they should use the GEMs to develop an applied mapping to address these situations or refine the affected mapping entries in the reimbursement mapping.

Principles for Developing Applied Maps

Developing an applied mapping that can withstand scrutiny and can be readily maintained during its lifespan requires using the GEMs and standardized processes.

A standardized process will yield the correct answer for the specific application. In addition, having the documentation of the development method and the mapping files available to business associates and other stakeholders will address questions or concerns over the outcome. Making the rationale available will provide transparent and consistent results that can be easily

understood and explained. This will go a long way toward assuaging industry fears of hidden changes to an application that may give different, unexplained results.

For example, a payer's applied mappings should be made available to providers with whom they have contracts, so that all affected entities understand the mapping process that was used to convert a payment policy or reimbursement category from ICD-9-CM to ICD-10-CM/PCS.

Taking the applied mapping method as an example, two basic principles can guide the building of the map.

Transparency

Base the ICD-9-CM map choices for a given applied map on one of the following decision types:

- Highest frequency in Medicare Provider Analysis and Review (MedPAR) data file
- Highest frequency in other publically available data set (e.g., state data set)
- Highest frequency in internal data set
- Closest clinical match based on defined use (e.g., outpatient versus inpatient), context, or other additional information (e.g., when mapping a procedure code, information about the patient's diagnosis could be used to select the most appropriate procedure code translation)
- Blind choice based on defined rule (e.g., first code in list of alternatives)

Consistency

Make all necessary choices for a given applied map based on a single decision type, not a mixture of decision types, in order to:

- Make it easier to document the process for internal and external communication
- Reassure users/customers that the results are not biased
- Facilitate refinement of the map and new application design, once ICD-10-CM/PCS data are collected after implementation

Key Points to Remember

A single one-size-fits-all map might seem like a reasonable solution; however, such a map would mean the code sets were so similar that there would be no point in transitioning to ICD-10-CM/PCS. The correlation of specificity and meaning between the two code sets is not that simple. There are many, many more examples-more than 8,000 ICD-10-CM/PCS codes translate to multiple, equally plausible ICD-9-CM choices. Examples offered in appendix A of the online version of this brief illustrate why a one-size-fits-all map is not possible (see the AHIMA Body of Knowledge at www.ahima.org).

Applied mappings should not be created when systems and applications can be converted directly (using the GEMs) or when coding directly from the ICD-10-CM/PCS code sets would be more efficient and accurate for the intended purpose. As discussed in the CMS MS-DRG conversion report, direct conversion of an application using GEMs is the preferred option. Producing an ICD-10-CM/PCS–based copy of an application that currently contains ICD-9-CM codes provides the most solid link to the ICD-9-CM historical data and the most solid foundation for an ICD-10-CM/PCS–based future.

CMS sees conversion of applications as the least disruptive and most effective way to leverage the information built into existing applications and to prepare for the development of ICD-10-CM/PCS–based systems that reap the full benefits from the increased specificity of ICD-10-CM/PCS. However, the GEMs can also be used to develop applied maps for specific purposes where necessary. Applied mappings narrow the possible choices in the target code set by implementing a set of user-defined criteria.

Due to the differences in the ICD-9-CM and ICD-10-CM/PCS code sets and the multiple types of applications where coded data are used, applied maps based on the GEMs are the closest to an industry-wide consistent mapping standard that is likely to be reasonable and achievable. Although the differences in the code sets inherently present challenges to data comparability

across the transition period, the development of applied mappings does not in and of itself add to these challenges as long as applied mappings are developed appropriately and according to the principles outlined above.

Since there is no single correct translation alternative for all purposes (for which data are being converted) when multiple alternatives exist in the GEMs, the accuracy of the translated data increases when there is flexibility to allow selection of the best alternative for a given situation or when additional information outside of the GEM is available that can improve the accuracy of the chosen alternative.

Note: For more information about the GEMs and how to use them, see the documentation and user's guides posted on the CMS and CDC Web sites. For more information about conversion of applications directly to ICD-10-CM/PCS, see the MS-DRG conversion report on the CMS Web site. The links to these resources can be found under "References" below.

Online Appendixes

Two appendixes are included in this online version of this practice brief.

Appendix A: Examples of Complexity in Applied Mappings

Appendix B: Glossary of Terms

Applied mapping: distillation of a reference mapping to conform to the needs of a particular application (e.g., data quality, reimbursement, research).

Backward mapping: mapping from a newer code set to an older code set.

Cluster: a combination of codes in the target system that represent a single translation alternative.

Entry: the relationship between a code in the source system and possible equivalents in the target system.

Forward mapping: mapping from an older code set to a newer code set.

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

Reverse lookup: the process of looking up a target system code in a GEM to see all the source system codes that translate to it.

Source system: the code set of origin in the mapping; the set being mapped from.

Target system: the destination code set in the mapping; the set being mapped to.

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