# Data Mapping Best Practices (2016 update) - Retired

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*This practice brief supersedes the November 2013 practice brief "[Data Mapping Best Practices](#)."*

The healthcare industry collects vast amounts of data from electronic sources. These data are captured in a wide variety of formats using various collection methods. Health data can be used and reused for multiple purposes that can maximize efficiency, minimize discrepancies and errors caused by multiple data entry processes, reduce costs of data acquisition and storage, and support health information exchange and interoperability. When data are collected in a specific format or coding system and the same or similar information is needed for a different purpose, data maps from one system to another facilitate the reuse of data.

In order for the data to be useful for all intended purposes, semantic interoperability is required to achieve meaningful exchange across settings, data sets, and standards. Maps are one approach organizations are considering to achieve this goal.

The phrase "data mapping" is generally used to describe a process that enables data captured in one format or system to be linked or associated with another. Data mapping always involves matching or linking between a source and a target. This process occurs in a variety of settings and is especially useful in electronic systems where captured data can be repurposed for a specific task or data sharing process. Mapping between terminologies and classifications is a common "use case" for health information management (HIM) projects.

The term "coding system" is used to depict encoded data, generically including clinical terminologies, administrative codes, vocabularies, classification systems, and any type of schema used to represent data in health information systems. Mapping projects are frequently staffed with HIM knowledge workers who have experience in data management, quality, and integrity assurance. Common terminology mapping projects include SNOMED CT, LOINC, RxNorm, and ICD-10-CM/PCS GEMS.

It is important to remember that data maps are not a substitute for the actual coding of the record in its native environment.

This practice brief defines key data mapping concepts and outlines best practices related to the development and use of data maps.

## Basic Mapping Concepts

Mapping features a number of terms such as source, target, forward, and reverse or backward maps (e.g., General Equivalence Mappings for ICD-10). In order to understand mapping, it is important to understand these terms.

The source is the origin of the map or the data set from which one is mapping. The target is the data set in which one is attempting to find equivalence or define the relationship.

Like other types of maps, there is a starting place and a final destination for each data item linked in the process. A map linking codes from ICD-9-CM to ICD-10-CM indicates that ICD-9-CM is the source and ICD-10-CM the target. This type of map is called a forward map because it maps an older version of a code set to a newer version. A reverse map links two systems in the opposite direction, going from the newer version of a code set to the older version.[1]

Each map produces unique results due to the disparity between the two versions of the systems. It is important to know the map's direction (forward or reverse) since the results depend on the direction.

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**Table 1. Mapping Equivalence Examples**

**Single Mapping between ICD and SNOMED CT with Equivalent Concepts in Both Systems**

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| ICD-9-CM Code | ICD-9-CM Name | Equivalence | SNOMED CT Code | SNOMED CT Name |
|---|---|---|---|---|
| 001.0 | Cholera due to vibrio cholerae | Equal | 63650001 | Cholera |

ICD-9-CM code 001.0 has a single relationship to a single SNOMED CT concept. The SNOMED CT concept "Cholera" (63650001) is clinically equivalent as it contains the attribute "causative agent" as Vibrio cholerae.

| ICD-10-CM Code | ICD-10-CM Name | Equivalence | SNOMED CT Code | SNOMED CT Name |
|---|---|---|---|---|
| A00.9 | Cholera, unspecified | Equal | 63650001 | Cholera |

ICD-10-CM code A00.9 also has a single relationship to a single SNOMED CT concept (6365001).

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**Single Mapping between ICD and SNOMED CT with Related Concepts in Both Systems**

| ICD-9-CM Code | ICD-9-CM Name | Equivalence | SNOMED CT Code | SNOMED CT Name |
|---|---|---|---|---|
| 282.7 | Other hemoglobin-pathies | Related | 80141007 | Hemoglobinopathy |
| **ICD-10-CM Code** | **ICD-10-CM Name** | **Equivalence** | **SNOMED CT Code** | **SNOMED CT Name** |
| D58.2 | Other hemoglobin-pathies | Related | 80141007 | Hemoglobinopathy |

The concepts in each system vary, creating an approximation. In this case the closest concept in SNOMED CT is hemoglobinopathy since the type is not identifiable in either the ICD-9-CM or ICD-10-CM classification.

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**Map Based on the Rules and Guidelines of the Source and Target Systems**

| ICD-9-CM Code | ICD-9-CM Name | Equivalence | SNOMED CT Code | SNOMED CT Name |
|---|---|---|---|---|
| 774.6 | Fetal/Neonatal jaundice (NNJ) | — | 387712008 | Neonatal jaundice |

| ICD-10-CM Code | ICD-10-CM Name | Equivalence | SNOMED CT Code | SNOMED CT Name |
|---|---|---|---|---|
| P59.9 | Neonatal jaundice, unspecified | — | 387712008 | Neonatal jaundice |

In both ICD-9-CM and ICD-10-CM, the code for fetal and neonatal jaundice (unspecified), does not include jaundice in preterm infants, which has a unique code, 774.2 (ICD-9-CM) and P59.0 (ICD-10-CM), Neonatal jaundice associated with preterm delivery. The SNOMED CT concept of "Neonatal jaundice associated with preterm delivery" (73749009) is therefore excluded as a potential mapping target.

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**One-to-Many Mappings between ICD-9-CM and SNOMED CT**

| ICD-9-CM Code | ICD-9-CM Name | Equivalence | SNOMED CT Code | SNOMED CT Name |
|---|---|---|---|---|
| 070.23 | Viral hepatitis B with hepatic coma, chronic, with hepatitis delta | Related | 235869004<br><br>26206000 | Chronic viral hepatitis B with hepatitis D<br><br>Viral hepatitis B with hepatic coma |

Code 070.23 requires two SNOMED CT codes for correct representation.

| ICD-10-CM Code | ICD-10-CM Name | Equivalence | SNOMED CT Code | SNOMED CT Name |
|---|---|---|---|---|
| K29.21 | Alcoholic gastritis with bleeding | Related | 2043009 | Alcoholic gastritis |

| | | | 61401005 | Gastric hemorrhage |
|---|---|---|---|---|

Code K29.21 requires two SNOMED CT codes to represent both the alcoholic gastritis and bleeding.

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**Two Single Mappings between ICD-9-CM and SNOMED CT**

| ICD-9-CM Code | ICD-9-CM Name | Equivalence | SNOMED CT Code | SNOMED CT Name |
|---|---|---|---|---|
| 008.3 | Proteus (Mirabilis/Morganii) enteritis | Related | 30493003 | Intestinal infection due to Proteus mirabilis |
| 008.3 | Proteus (Mirabilis/Morganii) enteritis | Related | 36529003 | Intestinal infection due to Morganella morganii |

Code 008.3 has relationships to two SNOMED CT concepts. Either of the SNOMED CT codes could be properly linked to the classification. In this case it is important to consider how the resulting map affects its use.

| ICD-10-CM Code | ICD-10-CM Name | Equivalence | SNOMED CT Code | SNOMED CT Name |
|---|---|---|---|---|
| B96.4 | Proteus (mirabilis) (morganii) as cause of disease classified elsewhere | Related | 73457008 | Proteus mirabilis |
| B96.4 | Proteus (mirabilis) (morganii) as cause of disease classified elsewhere | Related | 243301005 | Morganella morganii |

ICD-10-CM also combines Proteus mirabilis and morganii in one code but SNOMED CT has separate organism codes for each.

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**ICD-9-CM and Local Code Mappings to a Single SNOMED CT Target**

| ICD-9-CM Code | ICD-9-CM Name | Equivalence | SNOMED CT Code | SNOMED CT Name |
|---|---|---|---|---|
| 002.9 | Paratyphoid fever | Equal | 85904008 | Paratyphoid fever |
| Local Code | Local Code Name | Equivalence | SNOMED CT Code | SNOMED CT Name |
| 002.9ZZ | Paratyphoid fever (severe) | Related | 85904008 | Paratyphoid fever |

In this case 002.9ZZ is a local code mapped to a related SNOMED CT code as SNOMED CT concepts do not capture the severity of the condition. 'Severe' as a modifier can be added as a qualifier value to further specify this condition.

# Mapping Relationships

A map should describe how the source and target are related. Degree of equivalency, match rating, and a rating scale using numbers with designated values are used to describe the relationship between the source and the target.

**Equivalence** describes the relationship between the source and target and informs users how close or distant the two systems are. A map's degree of equivalence affects its utility and reliability.

While one source code may map to one target code, the two codes may not have the exact same meaning. This is especially true when mapping a terminology to a classification. Map developers must identify the degree of equivalence for each map

and document how it was determined. When using maps for clinical care, the designation of equivalence is a critical element so all ambiguity of the closeness of the match is eliminated.

From a data integrity perspective it is equally important for the statement of equivalence to be easily understood and consistently applied by all map users. Because the map developer generates this documentation, the exact terms may vary; however, the general concept is the same. Common terms include:

- No match, no map, no code
- Approximate match, approximate map, related match
- Exact match, exact map, equivalent match, equivalent map, equal

A variety of methods are used for determining semantic equivalence or partial equivalence between the source and target. For example, "no match or map" means a concept exists in one of the coding systems without a similar concept in the other system. In mapping projects using a numeric rating scale, "1" represents equivalent meaning, while "5" indicates that no map is possible between the source and target. Values in between 1 and 5 convey a degree of equivalence for consideration.

Other designations associated with mapping identify how many concepts in each system are necessary to achieve the closest approximation as possible. This may be referred to as "cardinality of the map." Frequently used terms to describe the elements of the map set include:

- One to one: one concept is mapped for both the source and target system
- One to many: one concept in the source is mapped to multiple concepts in the target
- Many to one: multiple concepts in the source are mapped to one in the target
- Many to many: multiple concepts are mapped in both the source and target system

For instance, one to one expresses the degree of equivalency between two systems, indicating a single concept in the target system has a relationship to one concept in the source system.

Table 1, "Mapping Equivalence Examples," provides equivalence examples for data maps. The first example illustrates a map from ICD-9-CM and ICD-10-CM (classification systems) to SNOMED CT (a clinical terminology) to support the conversion of information captured in ICD to populate an electronic health record system using SNOMED CT. It indicates the degree of equivalency as "equal" clearly between the source and target system. The subsequent examples illustrate other types of equivalency.

Identifying the degree of equivalency within a map facilitates proper use of data map types for the intended result. Data maps can be generated by humans and executed by computer systems. Table 2 demonstrates the linkages of CPT with LOINC and Table 3 discusses the mapping process for transforming RXNorm to a specified format.

## Table 2. Data Map Used by Healthcare Providers Offering Laboratory Services

A map for healthcare providers that offer laboratory services is typically a proprietary map linking local data (service codes) with national standards (CPT and LOINC codes).

| Service Code | Description | CPT Code | LOINC Code | Charge |
|---|---|---|---|---|
| 123456789 | Hemoglobin Glycosylated (A1c) | 83036 | 41995-2 | $15 |

## Table 3: Data Map Used by Healthcare Providers Leveraging Drug Terminologies

| RXNorm | Automated Mapping for Electronic Systems |
|---|---|

RxNorm, a standardized nomenclature, is basically two things: a normalized naming system for generic and branded drugs; and a tool for supporting semantic interoperation between drug terminologies and pharmacy knowledge base systems. The National Library of Medicine (NLM) produces RxNorm.

Hospitals, pharmacies, and other organizations use computer systems to record and process drug information. Because these systems use many different sets of drug names, it can be difficult for one system to communicate with another. To address this challenge, RxNorm provides normalized names and unique identifiers for medicines and drugs. The goal of RxNorm is to allow computer systems to communicate drug-related information efficiently and unambiguously.

Example RxNorm forms before the data transformation:

Bupropion 300 MG 24 hour Extended Release Tablet [Wellbutrin]
Clonidine 0.00833 MG/HR Weekly Transdermal Patch

And after the data transformation:

24 HR Bupropion 300 MG Extended Release Tablet [Wellbutrin]
168 HR Clonidine 0.00833 MG/HR Transdermal Patch

# Map Types

There are three general types of maps:

- Standards development organization maps. These maps are either created or adopted by a standards development organization or in cooperation between organizations. An example of this type of cooperative project is the current harmonization agreement between the International Health Terminology Standards Development Organisation (IHTSDO) and the World Health Organization (WHO). These organizations are working together to ensure maps between SNOMED CT and ICD-10 are properly developed and SNOMED CT and the classification codes in the 10th revision of ICD-10 are linked where possible.
- Government-recognized maps. These maps may be developed by a standards development organization or other authorized source; however, with government recognition these maps move from a voluntary standard to a government standard. Examples of this type of map are the ICD-9-CM to ICD-10-CM/PCS General Equivalence Mappings (GEMs), which were added to the HIPAA code set standards.
- Proprietary or customized maps. These maps are usually developed within an organization or by consultants working for them to meet their needs. In some instances they are developed as a product for purchase to meet specific needs. A proprietary map could consist of any data mapping important to achieve specific objectives. An example is local (organization-specific) terms or vocabularies mapped to standard terminologies or classifications.

Healthcare organizations use many types of maps. Some include clinical content, while others address links between administrative data elements and standard code sets. The tables provide examples of general types of maps familiar to most HIM professionals.

If an organization uses local, homegrown, or proprietary coded data elements, it is recommended those data elements map to a known standard data element (see Table 2, Data Map Used by Healthcare Providers Offering Laboratory Services, and Table 3, Data Map Used by Healthcare Providers Leveraging Drug Terminologies). This will enable data sharing and interoperability. A full migration to standard data elements should be considered to discontinue the use of local codes.

Multiple maps may exist between vocabularies, classification systems, data dictionaries, and EHR content standards. Multiple maps require careful management to keep track of versions and the purpose of each map. Failure to use the right map or apply updates when the source or target system changes can create data integrity problems.

## Table 4. Maps Related to Patient Demographics

These examples show maps that support administrative functions using current Health Level Seven (HL7) standards. The following table shows the current HL7 standard for designated patient race in collecting demographic data.

| Permissible Value | Domain Meaning Name |
|---|---|
| 1002-5 | American Indian or Alaska Native |
| 2028-9 | Asian |
| 2054-5 | Black or African American |
| 2076-8 | Native Hawaiian or Other Pacific Islander |
| 2106-3 | White |
| 2131-1 | Other Race |

Source: United States Health Information Knowledgebase: Health Level Seven

## A Data Map to Support Administrative Functions including Patient Attributes or Identification

Using the current HL7 standard referenced above, a map is created to the alternative data set.

| Permissible Value | Domain Meaning Name |
|---|---|
| R1 | American Indian/Alaska Native |
| R2 | Asian |
| R3 | Black/African American |
| R4 | Native Hawaiian or Other Pacific Islander |
| R5 | White |
| R9 | Other Race |
| UNKNOW | Unknown/Not Specified |

Source: United States Health Information Knowledgebase: Division of Healthcare Finance and Policy

## A Data Map to Support Administrative Functions That Use the Current HL7 Standards

This map demonstrates how local data concepts may be mapped to a standard. This is another form of a proprietary map.

| Local Data value | Local Meaning Name | Mapped Result Closest to the Standard |
|---|---|---|
| NATAM | Native American | American Indian or Alaska Native |
| eski | Eskimo | American Indian or Alaska Native |
| negro | Negro (Black) | Black or African American |
| poly | Polynesian | Native Hawaiian or Other Pacific Islander |
| cauc | Caucasian | White |
| MULTI | Mixed Race | No Map |

This example illustrates the necessity of guidelines or rules for maps. Guidelines or rules are needed to build a useful map to the standard. In this instance the guidance is provided by the United States Office of Management and Budget.

# Determining Appropriate Maps

There is no one-size-fits-all map for healthcare data. Such a map would be like a single interstate that attempts to link all the towns and cities across the United States.

Just as drivers must select the proper road map for a trip, healthcare professionals must select the correct data maps to manage health information. When evaluating maps, users must consider the following principles to ensure the maps they select provide results they expect:

- Every map must have a defined purpose. Mapping for clinical decision support will necessarily be different than mapping for reimbursement, which would be different than mapping for public health surveillance. Users should choose the map that matches their needs.
- Authoritative maps save development costs. Maps supported by standards development organizations or mandated by government agencies usually have been validated and tested to ensure they work for the purposes for which they were developed. This saves the cost of creating and testing locally developed maps. It is important to keep in mind the purpose for which these maps were developed before considering using them for other purposes.
- Maps that are not standards-based or mandated must be validated before being adopted. Maps that are proprietary or locally developed may not have been validated by objective third parties.
- Every map must include guidelines or rules (heuristics) that govern its creation and use. These rules and guidelines should be consistent with the stated purpose of the map and include guidance developed by authoritative sources of the systems.
- An identified organization, department, or individual should be in charge of implementing, maintaining, and updating the map. Usually a team of qualified personnel is responsible for maintenance. This unit should be given the resources to acquire the necessary skills and knowledge, which helps ensure consistent content and use of the map.
- Maps must be updated when the source and targets are updated. This may require updating maps multiple times per year. Each update must be clearly identified as a different version, and documentation should detail the revisions for both the source and target versions.
- The map update process, including timing, must be clearly defined and documented. A reimbursement mapping for ambulatory care settings lagging 30 days behind the source or target update could negatively affect the financial state of an organization

Additional items may need to be evaluated depending upon the uses of the map.

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## Table 5. The Importance of Map Maintenance

The graphics below demonstrate the importance of updating maps.

Prior to October 2005, ICD-9-CM code 799.0 was mapped to SNOMED concept 70067009.

In October 2005 the valid ICD-9-CM code was expanded to five digits, 799.01. An existing rule of the map required that all valid billable codes must have a map to SNOMED CT, and therefore new ICD-9-CM code 799.01 was mapped to 70067009.

In November 2010, SNOMED CT retired the target concept (70067009), and ICD-9-CM code 799.01 was re-mapped to 66466001.

With services provided on or after October 1, 2015, health systems across the country transitioned to the International Classification of Diseases, 10th Revision- ICD-10.

| Mapping Update | | | |
|---|---|---|---|
| Prior to October 2005 | Asphyxia (799.0) | ICD-9 to SNOMED mapping | Asphyxia (70067009) |
| October 2005 | Asphyxia (799.0) Asphyxia and hypoxemia (799.0) | ~~ICD-9 to SNOMED mapping~~ | Asphyxia (70067009) |

| | Asphyxia (799.01) | ICD-9 to SNOMED mapping | |
| November 2010 | Asphyxia (799.01) | ~~ICD-9 to SNOMED mapping~~  ICD-9 to SNOMED mapping | ~~Asphyxia (70067009)~~  Asphyxiation (66466001) |
| October 2015 | Asphyxia (R09.01) | ICD-10 to SNOMED mapping | 66466001 asphyxiation (event) |

A number of organizations have created maps from ICD-9-CM to ICD-10-CM for various applications. In this example all the site specific codes in ICD-10-CM for pseudoexfoliation of lens are mapped to the single ICD-9-CM code. In the 2013 version of ICD-10-CM an additional 7th character to identify stage of the disease was added.

# Decision to Map

After evaluating existing maps, an organization may decide to create its own customized map. If it does, it must first clearly define the business use case of the map.

The use case is a scenario describing how intended users will interact with the map, and it should include "the 'actors,' priorities, pre- and post-conditions (including input and output), flow of events, user interface issues, and more."[2] Examples of different use cases include a map for clinical decision support or a map to support billing and reimbursement.

The use case may address issues such as:

- What problem is the map trying to solve
- How the organization will create, use, and maintain the map
- What cost center pays for the map

Organizations that choose to create their own data maps must also carefully consider the resources necessary for maintenance and updating once the initial mapping has been completed. Various systems update on asynchronous cycles, and the effort required to maintain maps is often underestimated. For example, ICD-10-CM and ICD-10-PCS have the potential to update twice a year, in April and October; CPT may update twice a year, also. However, terminologies such as LOINC, RxNorm, and SNOMED CT have their own update schedules.

Table 5 demonstrates the importance of maintaining maps. It illustrates how routine updates to ICD-9-CM/ICD-10-CM and SNOMED CT over the years required changes within the map. Keep in mind that if maps between ICD-9-CM and ICD-10-CM/PCS have been developed and implemented, these require review of the ICD-10-CM/PCS addenda annually to make revisions for new, deleted or revised codes.

Keeping a map current can prove to be unwieldy and expensive in times of lean business practices. An organization may choose not to create or use maps due to time, resource, or financial constraints.

However, when an organization decides to develop or implement a map, there are fundamental steps that must be taken to ensure reliable, expected results.

# General Mapping Steps

Organizations that decide to map should take the following basic steps. Additional process steps may be deemed necessary in order to attain useful, reproducible, and understandable maps.

**Develop a business case first.** Questions to ask include:

- What is the reason for the project?
- What is the expected business benefit?

- What are the expected costs of the project?
- What are the expected risks?

**Define a use case for how the content will be used within applications.** Questions to ask include:

- Who will use the maps?
- Is the mapping between standard terminologies or between proprietary (local) terminologies?
- Are there delivery constraints or licensing issues?
- What systems will rely on the map as a data source?

**Develop rules (heuristics) to be implemented within the project.** Questions to ask when developing the rules include:

- What is the version of source and target schema to be used?
- What is included or excluded?
- How will the relationship between source and target be defined (e.g., are maps equivalent, related, etc.)?
- What mapping methodologies will be utilized?
- What procedures will be used for ensuring intercoder/inter-rater reliability (reproducibility) in the map development phase?
- What parameters will be used to ensure usefulness? (For example, a map from the SNOMED CT concept "procedure on head" could be mapped to hundreds of CPT codes, making the map virtually useless.)
- What tools will be used to develop and maintain the map?

**Plan a pilot phase to test the rules.** Maps must be tested and deemed "fit for purpose," meaning they are performing as desired. This may be done using random samples of statistically significant size. Additional pilot phases may be needed until variance from the expected result are resolved. Reproducibility is a fundamental best practice when mapping.

**Develop full content with periodic testing throughout the process.** Organizations should perform a final quality assurance test for the maps and review those data items unable to be mapped to complete the mapping phase. Any modifications from the review process should be retested to assure accuracy.

Organizations should release the map results to software configuration management where software and content are integrated. They should then perform quality assurance testing on the content within the software application (done in a development environment). They can then deploy the content to the production environment, or go-live.

**Communicate with source and target system owners** when issues are identified with the systems that require attention or additional documentation for clarity.

Whether an organization decides to create a map or chooses to use a map created outside of the organization, maps should be validated by an objective, qualified third party.

# Map Validation

Organizations should follow the understandable, reproducible, and useable principle to develop appropriate data maps. This principle stipulates that:

- The links between data elements should be understood by the user without benefit of a user guide or lengthy manual.
- The process to develop the data links must be straightforward enough to be reproduced so that the same results occur no matter who (human) or what (machine or software program) is creating the links.
- The map is not valuable if it is not useable for the use case it was designed to support.
- The validation of maps must be conducted by an entity that has not been involved with the map development or has a financial or political interest in its use.

Just as there are steps to create a map, there are best practice steps for validation. Organizations should begin the validation by asking these characteristics questions of the map:

- Is the map easy to understand?
- Can the results be reproduced?
- Is the use case support evident in the map results?

Organizations should then examine and compare the use case or the purpose of the map for consistency. A map designed for a specific purpose may not be suitable for a different purpose, so a comparison with the stated use case using a proper sample of map records is necessary.

Organizations should also complete additional general validation reviews, including:

- Using authoritative sources from the standards development organization to link the codes when the map is between two official standards (e.g., SNOMED CT to ICD or LOINC to CPT)
- Drawing a statistically valid sample from the map record population to review the validity of the map results
- Reviewing map heuristics
- Enlisting a qualified person without access to the previous work to perform the mapping independently (blind comparison)
- Comparing results and explaining any discordance in detail in a full report

Organizations should perform an "in use" review and validation checks, including:

- Comparing map performance in translating the source to the target for its intended purpose (e.g., does it produce the same results every time the map record is used?)
- Assessing the concordance between software programs using the map and noting any discordance
- Presenting a full report of findings with a qualified panel from the organization using the maps

# Data Stewardship and Mapping Role

The National Committee on Vital and Health Statistics defines data stewardship as "a responsibility guided by principles and practices, to ensure the knowledgeable and appropriate use of data derived from individuals' personal health information."[3] Depending on the size of an organization and the number of systems being mapped to each other, the organization may create a dedicated resource for this task. Smaller organizations may incorporate the concepts of data stewardship into current roles and responsibilities. When mapping data, the resources responsible for data stewardship should be involved to verify that data stewardship principles are put into practice. A data steward can serve in this role to oversee and be accountable for the accuracy and appropriate use of health data.

# Data Integrity

It is important to verify the data mapping has been completed accurately. Data mapping not only transfers data from one system to another, but often transforms the data. It is critical to make sure data mapped from each system has the same definition and meaning historically and going forward. Modifying data definitions after mapping has been completed and data is collected must be avoided for accurate mapping and data comparison. New data elements must be created and new mapping done instead of modifying existing elements to assure data integrity. Users and creators of data maps must understand the construct of the data elements (i.e. code sets, terminology, fields, etc.) being mapped in order to assure the map results are complete, correct and appropriate for the intended use case.

Data mapping and migration can identify quality issues within data elements. Organizations must decide to correct the data inaccuracies or keep the discrepancies knowing the data does not map accurately.

# Vendor-Developed Maps

It is now common for terminology developers and distributors to develop their own mappings or to extend standards development organization or government maps in what the vendor terms a "value add." EHR vendors may also develop and incorporate maps into their products. Before an organization uses a vendor-developed map, it must evaluate the map according to the mapping principles outlined above, just as it would any non-authoritative map.

In addition, an organization's due diligence should include requesting references from organizations currently using the map, as well as knowing who and how many other organizations use the map. Vendor-developed maps can help enormously with map implementation and use if the organization understands the product and assesses it with the framework of their needs and requirements.

# Summary

There are no standards for health data maps, nor is there a certification program for health information or health data maps, as there is for many other technology standards. Data mapping is complex, requiring careful design consideration and subsequent thorough testing to assure that the map is appropriate for its purpose and meets the specified need. Data mapping is not an alternative to coding and documentation reviews but can help facilitate these reviews. HIM professionals can play an important role in data mapping processes to ensure data integrity is preserved.

# Notes

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