

LexEVS 6.x GEM Mappings (No longer Supported)

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Source Data, General Comments

General Equivalence Mappings, or GEM, is the mappings between ICD-9 and ICD-10 concept codes. There are four types of mappings:

- 9 to 10 diagnosis codes
- 9 to 10 procedure codes
- 10 to 9 diagnosis codes
- 10 to 9 procedure codes

Each mapping is one text file with three white space separated columns. Column one is the source concept code, column two is the target concept code and column three is a five digit numeric character field that describes the relationship between the source and target codes. For detailed information on how to interpret the relationship details the reader is referred to either one of the following documents below.

Mapping guide for PCS data

- go to: http://www.cms.gov/ICD10/13_2010_ICD10PCS.asp,
- click on: "2010 Mapping - "ICD-10-PCS to ICD-9-CM" and "ICD-9-CM to ICD-10-PCS"; and User Guide, Reimbursement Guide - Procedures (ZIP, 0.98MB) - Updated 3/12/10"
- documentation referred to for mapping is: pcs_gemguide_2010.pdf and is in the ZIP file.

Mapping guide CM data

- go to: http://www.cms.gov/ICD10/14_2009_ICD_10_CM.asp
- click on: 2009 Diagnosis Code Set General Equivalence Mappings (ZIP 1.1MB)
- documentation referred to for mapping is: Dxgem_guide_2009.pdf and is in the ZIP file.

Decimal Point

The ICD-9 diagnosis codes, ICD-9 procedure codes and ICD-10 diagnosis codes concept codes in the mapping files do not contain decimal points. The loader will format the values with decimal points as needed.

Mappings

General Comments

Terms

The term 'map' or 'mappings' gets overloaded a bit in this document. In one context it may refer to the GEM data, which is a map (one concept maps to another concept or set of concepts). While in another context how the GEM data gets converted into LexGrid objects is a map.

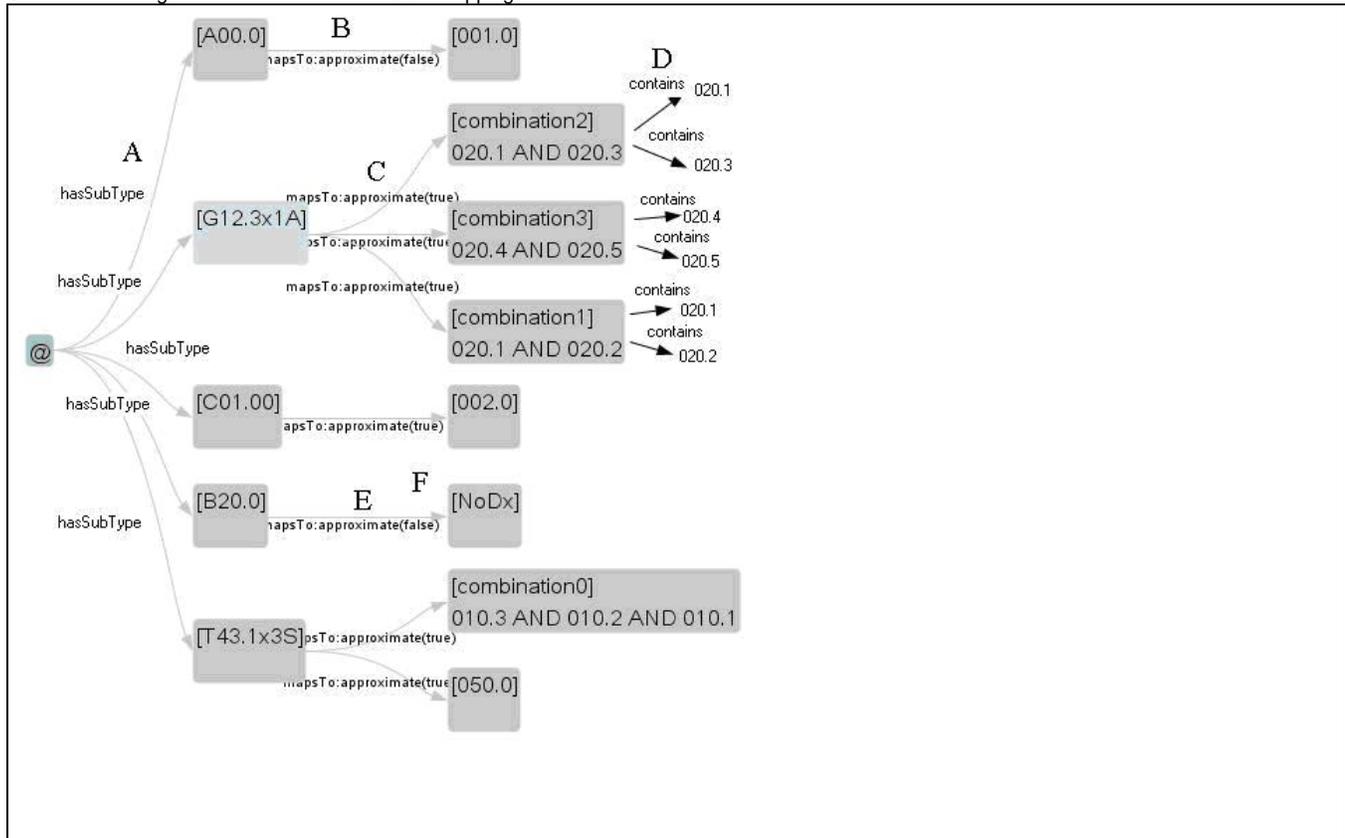
GEM to LexGrid Coding Scheme

For each GEM data set loaded, a LexGrid coding scheme will be created.

Overview

The GEM contains information that maps concepts to one another. This kind of data is represented in LexGrid as an association. So the coding scheme will consist of mostly associations. In some special cases, a concept will be created which will be detailed later in this document.

Consider the image below of a small set of GEM mapping data:



The loader creates a default root node @, and each unique occurrence of source concept code in the GEM file is associated with the root node via hasSubType association (A). The GEM data is mapped to instances of LexGrid associations that have a source concept code and target concept code. GEM can have a few types of situations the loader must handle. Case B, shows a single mapping. The type of association used is 'mapsTo'. For each mapsTo instance, a qualifier is set (approximate true or false) indicating if the two concepts are an exact mapping. In B's case it is set to false, meaning it is an exact map.

GEM data is not always a straight one-to-one mapping. Sometimes a combination of target concepts represent the desired map. Or there may also be a number of possible target maps. An example of this is shown in C. When a combination map is found in the data, the loader will create a 'concept' that represents combination map. Also, the individual concepts that make up the combination are recorded in LexGrid using another association type created by the loader named 'contains'. An instance of the contains association D, where the source is the combination concept and the targets are the individual concepts.

For details on how combination maps are derived please see the GEM guides referenced above in the Source Data, General Comments section.

GEM data may also contain occurrences of data where there is no map for a particular concept. This is shown in E, F where the association type is mapsTo and the target value is NoDx.

GEM metadata to LexGrid

What is meant by GEM meta data is data that would describe the GEM data, such as version, name etc... This kind of data is stored in LexGrid as coding scheme information and coding and supported attributes. However, none of this type of information is provided in the GEM data files. So the loader will populate this data with default values. When the loader is executed must be given a file location, version, and GEM type. The loader will fill in the default data based on the GEM type supplied to it.

Table: codingScheme

Field Name	Value
codingSchemeGuid	<generated value>
codingSchemeName	ICD-10-TO-9-DIAG-GEM
codingSchemeUri	urn:oid:11.11.0.71

representsVersion	<provided by user>
formalName	ICD-10-TO-9-DIAG-GEM
defaultLanguage	ENG
approxNumConcepts	Null
description	ICD-10 CM to ICD-Volume 1 and 2 CM Volume 1 and 2 General Equivalence Mapping
copyRight	Centers for Medicare & Medicaid Services (CMS)
isActive	Null
owner	Null
status	Null
effectiveDate	Null
expirationDate	Null
releaseGuid	Null
codingSchemeSource	U.S. Department of Health and Human Services, Centers for Medicare & Medicaid Services
entryStateGuid	Null

Also, the following attributes are supported by the coding scheme:

Table: supportedAttrib, tag: CodingScheme

Field Name	Value
csSuppAttribGuid	<generated>
codingSchemeGuid	<from codingScheme table>
supportedAttributeTag	CodingScheme
id	ICD-10-TO-9-DIAG-GEM
uri	urn:oid:11.11.0.71
idValue	<blank>
associationNames	Null
rootCode	Null
isForwardNavigable	Null
isImported	1
equivalentCodingScheme	Null
assemblyRule	Null
assnCodingScheme	Null
assnNamespace	Null
assnEntityCode	Null
propertyType	Null

In the tables that follow, all showing values from LexGrid table supportedAttrib (as above), only fields with non-null values and non-generated values will be displayed.

Table: supportedAttrib (abbreviated), tag: Property

Field Name	Value
supportedAttributeTag	property
id	definition
idValue	definition

propertyType	PRESENTATION
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Table: supportedAttrib (abbreviated), tag: EntityType

Field Name	Value
supportedAttributeTag	EntityType
id	ASSOCIATION
idValue	ASSOCIATION

Table: supportedAttrib (abbreviated), tag: EntityType

Field Name	Value
supportedAttributeTag	EntityType
id	CONCEPT
idValue	CONCEPT

Table: supportedAttrib (abbreviated), tag: Association

Field Name	Value
supportedAttributeTag	Association
id	hasSubType
idValue	hasSubType

Table: supportedAttrib (abbreviated), tag: Association

Field Name	Value
supportedAttributeTag	Association
id	isA
idValue	isA

Table: supportedAttrib (abbreviated), tag: Association

Field Name	Value
supportedAttributeTag	Association
id	mapsTo
idValue	mapsTo

Table: supportedAttrib (abbreviated), tag: Association

Field Name	Value
supportedAttributeTag	Association
id	contains
idValue	contains

Table: supportedAttrib (abbreviated), tag: Association

Field Name	Value
supportedAttributeTag	Association
id	ENG
idValue	CONCEPT

Concepts

As mentioned in the Mappings: General Comments section, GEM mapping data, much of it anyway, is represented in LexGrid as associations. However some concepts are created by the loader in cases where GEM target data is a combination of concept codes.

When an concept is created the LexGrid tables entity, entityType and property are updated.

Table: entity

Field Name	Value
entityGuid	<generated >
codingSchemeGuid	< from codingScheme table>
entityCode	combination2
entityCodeNamespace	urn:oid:11.11.0.71
isDefined	Null
isAnonymous	Null
description	020.1 AND 020.3
isActive	1
owner	Null
status	Null
effectiveDate	Null
expirationDate	Null
entryStateGuid	< generated - used with revisions >
forwardName	Null
reverseName	Null
isNavigable	Null
isTransitive	Null

Table: entityType

Field Name	Value
entityGuid	< from entity table>
codingSchemeGuid	CONCEPT

Table: property

Field Name	Value
propertyGuid	<generated >
referenceGuid	< guid from entity table>
referenceType	entity
propertyId	definition
propertyType	presentation
propertyName	definition
language	ENG
format	Null
isPreferred	1
matchIfNoContext	0

degreeOfFidelity	<blank>
representationalForm	Null
propertyValue	020.1 AND 020.3
isActive	Null
owner	Null
status	Null
effectiveDate	Null
expirationDate	Null
entryStateGuid	< generated> used if revisions

Relations

A LexGrid relation container is defined to hold LexGrid association definitions (mapsTo, contains, etc). Instances of the defined associations are created to represent the GEM data. Note the isMapping flag is on to indicate the associations are mappings.

Table: relation

Field Name	Value
relationGuid	<generated >
codingSchemeGuid	<from codingSchme table>
containerName	icd10to9DiagnosisCmsRelations
isMapping	1
representsVersion	Null
sourceCodingScheme	Null
sourceCodingSchemeVersion	Null
targetCodingScheme	urn:oid:11.11.0.71
targetCodingSchemeVersion	< provided by user >
description	ICD-10 CM to ICD-9 diagnosis CMS relations container
isActive	Null
owner	Null
status	Null
effectiveDate	Null
expirationDate	Null
entryStateGuid	< generated>

Associations

LexGrid uses associations to represent GEM data. The loader creates a root concept, @, that is the root of the hierarchy. Source concept codes in the GEM are associated with @ via the hasSubType association. GEM source and target code relationships are represented by the association mapsTo. If there is a combination of concept codes that represent the target in a mapping, the combination concept is associated with the individual concept codes with a contains association.

For each association an entry will be made in the following tables: associationPredicate, entity, entityType. Only mapsTo is shown in the examples below.

Table: associationPredicate

Field Name	Value
associationPredicateGuid	<generated >
associationPredicateGuid	<from relation table>

associationName	mapsTo
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Table: entity

Field Name	Value
entityGuid	<generated >
codingSchemeGuid	<from codingScheme table>
entityCode	mapsTo
entityCodeNamespace	urn:oid:11.11.0.71
isDefined	Null
isAnonymous	Null
description	the source object can be mapped to the target object
isActive	1
owner	Null
status	Null
effectiveDate	Null
expirationDate	Null
entryStateGuid	<generated >
forwardName	mapsTo
reverseName	<blank>
isNavigable	1
isTransitive	1

Table: entityType

Field Name	Value
entityGuid	<from entity table>
entityType	ASSOCIATION

OIDs

A note about the above entityCodeNamespace value. While official vocabularies and terminologies like ICD-9 and ICD-10-CM have registered unique Object Identifiers (OIDs) mappings don't seem to. So for the GEM mappings arbitrary values were chosen and used as default values in the GEM loader. For more information on OIDs: <http://www.oid-info.com/>

GEM data and LexGrid associations

In a general sense the GEM data consists of a source concept code and a target concept code and information describing the relationship. These relationships are described in LexGrid as an instance of a particular kind of association with source and target information. The key pieces of LexGrid data are the sourceEntityCode (from the first column of GEM data) , targetEntityCode (second column of GEM data) sourceEntityCodeNamespace (information that indicates the terminology the source code came from- usually a URI or URN value) and targetEntityCodeNamespace and finally the reference back to what type of association this is (mapsTo, hasSubType etc) via the associationPredicateGuid.

A couple examples may help. If we use the mapping illustrated in figure 1 above, an ICD-10-CM to ICD-9 diagnosis codes) we can see C01.00 maps to 002.0. And the mapsTo association has a qualifier that says this is an approximate is true. For this example we will only examine the mapsTo association. Note however the loader also creates a @ hasSubType C01.00 association.

Table: entityAssnsToEntity

Field Name	Value
entityAssnsGuid	<generated >
associationPredicateGuid	<mapsTo GUID from associationPredicate table >
sourceEntityCode	C01.00

sourceEntityCodeNamespace	urn:oid:2.16.840.1.113883.6.3
targetEntityCode	002.0
targetEntityCodeNamespace	urn:oid:2.16.840.1.113883.6.2
associationInstanceid	< generated >
isDefining	1
isInferred	Null
isActive	1
owner	Null
status	Null
effectiveDate	Null
expirationDate	Null
entryStateGuid	<generated - used with revisions>

Table: entityAssnsQuals

Field Name	Value
entityAssnsGuid	<generated >
referenceGuid	<from entityAssnsToEntity table>
qualifierName	approximate
qualifierValue	true
entryStateGuid	<generated - used with revisions>

The loader knows this is a GEM mapping of ICD-10 to ICD-9 diagnosis codes. The loader will only know this from the mapping-type parameter passed to it when it is executed. So sourceEntityCode is formatted with a decimal and the sourceEntityCodeNamespace is given the URN for ICD-10 CM. Likewise the targetEntityCode is formatted and the targetEntityCodeNamespace is given the ICD-9 URN. The link back to the defining association (mapsTo) is provided with associationPredicateGuid. Also note, this association had a qualifier so the entityAssnsQuals table was updated. The referenceGuid value is the link back to the association this qualifier belongs to.

Now for an example of a combination target code. Again, referring to figure 1 above, we can see the mapping:

G12.3x1A mapsTo combination2 and combination2 contains 020.1 and 020.3

In this example we will look at the mapsTo and contains associations. Reminder: the loader will also create a hasSubType association. The mapsTo association qualifier value is handled as described above.

Table: entityAssnsToEntity

Field Name	Value
entityAssnsGuid	<generated >
associationPredicateGuid	<mapsTo GUID from associationPredicate table >
sourceEntityCode	G12.3x1A
sourceEntityCodeNamespace	urn:oid:2.16.840.1.113883.6.3
targetEntityCode	combination2
targetEntityCodeNamespace	urn:oid:11.11.0.71
associationInstanceid	<generated >
isDefining	1
isInferred	Null
isActive	1
owner	Null
status	Null

effectiveDate	Null
expirationDate	Null
entryStateGuid	< generated - used with revisions >

In this case, the loader created a concept called combination2 to represent the combination of target codes that the source concept code maps to. Note, this is a concept created local to this mapping coding scheme so sourceEntityCode combination2 has a sourceEntityCodeNamespace of urn:oid:11.11.0.71 which is the namespace of this LexGrid coding scheme. For a bit more detail on the GEM coding scheme namespaces see the OIDs section under the Association section above.

Table: entityAssnsToEntity

Field Name	Value
entityAssnsGuid	<generated >
associationPredicateGuid	<contains GUID from associationPredicate table >
sourceEntityCode	combination2
sourceEntityCodeNamespace	urn:oid:11.11.0.71
targetEntityCode	020.3
targetEntityCodeNamespace	urn:oid:2.16.840.1.113883.6.2
associationInstanceCld	<generated >
isDefining	1
isInferred	Null
isActive	1
owner	Null
status	Null
effectiveDate	Null
expirationDate	Null
entryStateGuid	< generated - used with revisions >

The associationPredicateGuid refers back to the contains association and the target information, code format and namespace value are set appropriately for the ICD-9 target vocabulary.

Default Data

The example above showed default data for a ICD-10-CM to ICD-9 diagnosis codes GEM. The default data used by the loader for the other GEM data sets is shown in this section.

ICD9 to ICD10 diagnosis codes

Table: codingScheme (abbreviated)

Field Name	Value
codingSchemeName	ICD-9-TO-10-DIAG-GEM
codingSchemeUri	urn:oid:11.11.0.70
representsVersion	<provided by user>
formalName	ICD-9-TO-10-DIAG-GEM
defaultLanguage	ENG
description	ICD-9 CM Volume 1 and 2 to ICD-10 CM General Equivalence Mapping
copyRight	Centers for Medicare & Medicaid Services (CMS)
codingSchemeSource	http://www.cms.hhs.gov

Table: relation (abbreviated)

Field Name	Value
containerName	icd9to10DiagnosisCmsRelations
isMapping	1
sourceCodingScheme	Null
sourceCodingSchemeVersion	Null
targetCodingScheme	urn:oid:11.11.0.70
targetCodingSchemeVersion	<provided by user>
description	ICD-9 CM to ICD-10 diagnosis CMS relations container.

ICD9 to ICD10 procedure codes

Table: codingScheme (abbreviated)

Field Name	Value
codingSchemeName	ICD-9-TO-10-PROC-GEM
codingSchemeUri	urn:oid:11.11.0.72
representsVersion	<provided by user>
formalName	ICD-9-TO-10-PROC-GEM
defaultLanguage	ENG
description	ICD-9 CM Volume 3 to ICD-10 PCS General Equivalence Mapping
copyRight	Centers for Medicare & Medicaid Services (CMS)
codingSchemeSource	http://www.cms.hhs.gov

Table: relation (abbreviated)

Field Name	Value
containerName	icd9to10ProcedureCmsRelations
isMapping	1
sourceCodingScheme	Null
sourceCodingSchemeVersion	Null
targetCodingScheme	urn:oid:11.11.0.72
targetCodingSchemeVersion	<provided by user>
description	ICD-9 CM to ICD-10 procedure CMS relations container.

ICD10 to ICD9 procedure codes

Table: codingScheme (abbreviated)

Field Name	Value
codingSchemeName	ICD-10-TO-9-PROC-GEM
codingSchemeUri	urn:oid:11.11.0.73
representsVersion	<provided by user>
formalName	ICD-10-TO-9-PROC-GEM
defaultLanguage	ENG
description	ICD-10 PCS to ICD-9 CM Volume 3 General Equivalence Mapping
copyRight	Centers for Medicare & Medicaid Services (CMS)

codingSchemeSource	http://www.cms.hhs.gov
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Table: relation (abbreviated)

Field Name	Value
containerName	Icd10to9ProcedureCmsRelations
isMapping	1
sourceCodingScheme	Null
sourceCodingSchemeVersion	Null
targetCodingScheme	urn:oid:11.11.0.72
targetCodingSchemeVersion	<provided by user>
description	ICD-10 CM to ICD-9 procedure CMS relations container.