1. **Mapping Overview**

Inter-source mappings in the Metathesaurus provide links from entities in one terminology (the source terminology) to entities in another terminology (the target terminology). Entities may be terms, codes, concepts, descriptors, or expressions. Mappings may be used for a variety of purposes, including:

* reuse of data for another purpose (e.g. translating clinical information coded with SNOMED CT to ICD-9-CM for reimbursement purposes)
* retaining the value of data when migrating to newer terminology requirements (e.g. updating from ICD-9-CM to ICD-10-CM)

Given the diversity of mapping applications, it is important to understand the purpose, approach, and authority and validation of a mapping when evaluating it for a particular use case.

Inter-source mapping data are represented in MRMAP.RRF and MRSMAP.RRF, with auxiliary data in MRCONSO.RRF, MRSTY.RRF, and MRSAT.RRF. Mapping data may also be redundantly represented as relationships in MRREL.RRF.

See the [Mappings page](http://www.nlm.nih.gov/research/umls/knowledge_sources/metathesaurus/release/mappings.html) for a list of Mappings in the current release.

1. **Representation of Mappings in the Metathesaurus:**

Inter-source mapping data is represented using the following specifications (there may be exceptions, e.g. for map sets that have not been updated recently):

1. **MRCONSO.RRF:** For each map set represented in MRMAP.RRF, there is a single “Cross mapping set” concept in MRCONSO.RRF. Note that the CUI changes when the map set is updated from one version to the next.

Field values are assigned as follows:

* + SAB: the source that asserts the mapping information. For example, ICD10PCS provides three kinds of mappings:
    1. ICD9CM\_2009 to ICD10PCS\_2009 Mappings (GEMs)
    2. ICD10PCS\_2009 to ICD9CM\_2009 Mappings (GEMs)
    3. ICD10PCS\_2009 to ICD9CM\_2009 Mappings (Reimbursement)

The SAB for each of these map set atoms is “ICD10PCS.”

* + TTY: XM for all map set atoms
  + STR: The atom name is created as “<VSAB> to <VSAB> Mappings <optional additional information>” For example:
    1. SNOMEDCT\_2010\_01\_31 to ICD9CM\_2010 Mappings
    2. ICD10PCS\_2009 to ICD9CM\_2009 Mappings (Reimbursement)
  + CODE: If an appropriate identifier for the map set is available from the source, it will be used as the CODE. SAUI, SCUI and SDUI may also be populated. If no source-asserted identifier is available, a CODE beginning with “MTHU” will be generated during Metathesaurus production.

Example:

C2936849|ENG|P|L9490342|PF|S11805375|Y|A18475060||MTHU000001||ICD10CM|XM|MTHU000001|ICD9CM\_2010 to ICD10CM\_2010\_03 Mappings (GEMs)|0|N||

1. **MRSTY.RRF:** All map set concepts are assigned an STY of “Intellectual Product”.

Example:

C2936849|T170|A2.4|Intellectual Product|AT128740721||

1. **MRSAT.RRF:** Every map set concept has numerous attributes in MRSAT.RRF which provide additional details. The following attributes can be found in MRSAT.RRF. The attributes are attached using STYPE=CODE.

**Required Attributes:**

|  |  |  |
| --- | --- | --- |
| **ATN** | **ATV** | **Valid Values** |
| FROMRSAB | Root source abbreviation for the "from" identifiers of a map set | range=MRSAB.RSAB |
| FROMVSAB | Versioned source abbreviation for the "from" identifiers of a map set | range=MRSAB.VSAB |
| MAPSETRSAB | Root source abbreviation for a map set. In general, the same as the value for FROMRSAB. | range=MRSAB.RSAB |
| MAPSETVERSION | Version of the map set. | N/A |
| MAPSETVSAB | Versioned source abbreviation for the provider of a map set | range=MRSAB.VSAB |
| TORSAB | Root source abbreviation for the "to" identifiers of a map set | range=MRSAB.RSAB |
| TOVSAB | Versioned source abbreviation for the "to" identifiers of a map set | range=MRSAB.VSAB |

**Optional Attributes:** In general, these attributes are extracted directly from source provided data and may have a diverse range of values and formats.

|  |  |
| --- | --- |
| **ATN** | **ATV** |
| MAPSETGRAMMAR | Grammar used by expressions in FROMEXPR or TOEXPR fields |
| MAPSETNAME | Official name of a map set |
| MAPSETREALMID | Identifier of a "Realm" to which a source is mapped, within which this cross mapping table is applicable. Used in cases where Realm specific business rules or guidelines alter the acceptable mappings. Realm is the same as used in SNOMED CT subsets. It includes a four character ISO6523 identifier followed by an optional series of concatenated subdivision codes defined by the registered organization. |
| MAPSETRULETYPE | Indicates the types of rules used in a map set and cross map targets to which a source is mapped. |
| MAPSETSCHEMEID | Standard identifier for the scheme to which a map set belongs. This may be an International Coding Scheme Identifier (ISO7826) or an Object Identifier (OID) used as specified by HL7. |
| MAPSETSCHEMENAME | Full name of the target scheme in a map set. |
| MAPSETSCHEMEVERSION | Version number of the target scheme (as published by the issuing organization) in a map set. |
| MAPSETSEPARATORCODE | XML entity code (for example, "&#x7c;" to represent the vertical-bar character) for the character used as a separator between the individual codes in the target codes field in a map set. |
| MAPSETSID | Source asserted identifier for a map set. If present, matches the CODE in MRCONSO.RRF. |
| MAPSETTYPE | Indicates the nature of a map set. Its value is map set specific. It can be used to indicate the inclusion of one to one, one to many, or rule based. |
| MAPSETXRTARGETID | Map set target identifier used for XR mappings. Only used for map sets that explicitly map source codes to “nothing.” |
| SOS | Scope statement |
| TARGETSCHEMEID | Identifier for the target scheme in the map set. This may be an International Coding Scheme Identifier (ISO7826) or an Object Identifier (OID) used as specified by HL7. |

**Optional MTH Attributes:** ATNs for attributes created during Metathesaurus source processing begin with “MTH\_”.

|  |  |  |
| --- | --- | --- |
| **ATN** | **ATV** | **Valid Values** |
| MTH\_MAPFROMCOMPLEXITY | Two-part value indicating the complexity of "from" expressions used in a map set. Valid values can be combined in a comma-separated list | Part 1  SINGLE  LIST  BOOLEAN\_EXPRESSION  Part 2  AUI  CODE  CUI  LUI  SAUI  SCUI  SDUI  SUI  STR |
| MTH\_MAPFROMEXHAUSTIVE | Indicates whether or not the "from" source of a map set is completely mapped | Y/N |
| MTH\_MAPSETCOMPLEXITY | Indicates the overall complexity of a map set. To compute this field:   1. Compute FROMEXPR cardinality (left hand side) based on whether >1 FROMEXPR exists for same TOEXPR OR MTH\_MAPTOCOMPLEXITY indicates MULTIPLE. 2. Compute TOEXPR cardinality (right hand side) based on whether >1 TOEXPR exists for same FROMEXPR OR MTH\_MAPFROMCOMPLEXITY indicates MULTIPLE. 3. RULE\_BASED if >1 non-null distinct MAPSUBSETID | N\_TO\_N  N\_TO\_ONE  ONE\_TO\_N  ONE\_TO\_ONE  RULE\_BASED |
| MTH\_MAPTOCOMPLEXITY | Two-part value indicating the complexity of "to" expressions used in a map set. Valid values can be combined in a comma-separated list | Part 1  SINGLE  LIST  BOOLEAN\_EXPRESSION  Part 2  AUI  CODE  CUI  LUI  SAUI  SCUI  SDUI  SUI  STR |
| MTH\_MAPTOEXHAUSTIVE | Indicates whether or not the "to" source is completely mapped | Y/N |
| MTH\_UMLSMAPSETSEPARATOR | The character used in the UMLS Metathesaurus as a separator between the individual codes in the target codes field of the cross map targets to which a source is mapped. | AND |

Examples:

C2936849|L9490342|S11805375|A18475060|CODE|MTHU000001|AT127594510||FROMVSAB|ICD10CM|ICD9CM\_2010|N||

C2936849|L9490342|S11805375|A18475060|CODE|MTHU000001|AT127594541||SOS|ICD10CM|This set maps ICD-9-CM codes to ICD-10-CM. These are "General Equivalence Mappings" (GEMs) and are rule-based.|N||

C2936849|L9490342|S11805375|A18475060|CODE|MTHU000001|AT127594529||MTH\_MAPFROMEXHAUSTIVE|ICD10CM|Y|N||

1. **MRMAP.RRF:** MRMAP.RRF contains information on entities that are mapped to each other and on the source responsible for the mapping. See Section 3.3.13 for more information on this file.
2. **MRSMAP.RRF:** This file provides a simpler representation of most of the mappings in MRMAP.RRF to serve applications which do not require the full richness of the MRMAP.RRF data structure. See Section 3.3.14 for more information on this file.
3. **MRREL.RRF:** A subset of mappings is redundantly represented as relationships in MRREL.RRF, based on the following guidelines:
   * FROMEXPR and TOEXPR are simple expressions
   * Map set is not rule-based
   * REL is not XR
   * Partial map sets may be represented in MRREL

There is currently no simple way of identifying cross-source mappings in MRREL.RRF. The RELAs for these relationships currently include “mapped\_to/from,” “same\_as,” “classified\_as/classified\_by” and the null RELA. All of these RELAs are also used for within-source RELAs. To identify cross-source mapping relationships, find MRREL.RRF cases where the AUI1 and AUI2 in MRCONSO.RRF have different SAB values and neither STYPE1 nor STYPE2 is CUI.