MedDRA to SNOMED CT and SNOMED CT to MedDRA Mapping Conventions

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Introduction

Mapping conventions were created prior to undertaking the initial development of the maps and were revised during the process as experience was gained. The conventions serve to ensure accuracy and consistency in mapping and continue to be applied in the maintenance phase of the production maps. Users of the maps are encouraged to refer to these mapping conventions as a resource for understanding the scope, structure, and intended use of the maps.

Use Cases of the Maps

A major goal of the WEB-RADR 2 project is to use the enhanced functionality of the mobile application to facilitate exchange of data between regulatory databases (which use MedDRA) and healthcare databases/electronic health records (which use SNOMED CT). Two maps were developed (from MedDRA to SNOMED CT and SNOMED CT to MedDRA) to support seamless data exchange within the application platform. The sub-set of frequently used terms mapped in the project define a set of key pharmacovigilance terms that need to be linked to their counterparts in either terminology. In addition, a set of COVID-19 related terms are also included in the first production release of the maps to capture important aspects of the pandemic.

In one use case, these key pharmacovigilance concepts when coded in SNOMED CT in an electronic health record (EHR) could be converted to MedDRA for the purpose of adverse event reporting to regulatory authorities or for the purposes of epidemiological research. In the opposite direction, these same key terms coded in MedDRA representing adverse events, warnings, and other regulatory information could be converted into SNOMED CT so that the information is available in the patient's record to aid in clinical decision-making.

Timeline

Development of the initial maps based on a sub-set of ~7,400 key pharmacovigilance terms (February-November 2019)

- MedDRA v21.1
- SNOMED CT version Jan 2019 International edition

Alpha test of the maps (April-September 2020)

Final Production release of the maps (April 2021)

- Based on feedback from alpha release and including COVID-19 terms
- MedDRA Version 23.1 (September 2020)
- SNOMED CT January 2021 International edition

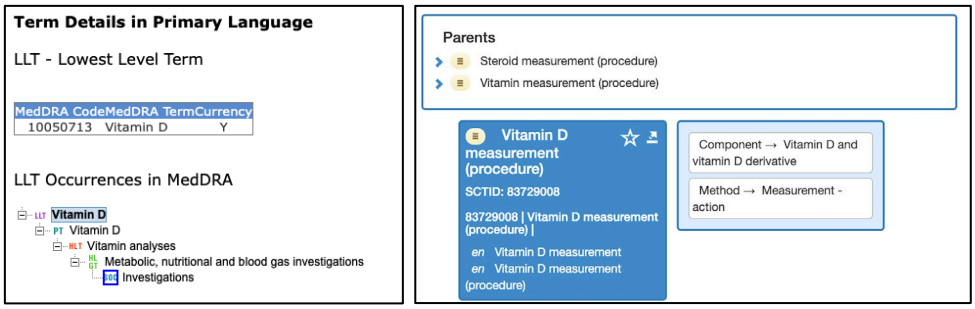
General Mapping Guidance

A. **MedDRA groups its terms in a five level hierarchy.** The Preferred Term (PT) level represents single medical concepts and the Lowest Level Term (LLT) level represents synonyms, lexical variants, and sub-elements. SNOMED CT structure uses concepts as Fully Specified Names (FSNs) with a number of descriptions available (synonyms). Screenshots and examples are current as of January 2021.

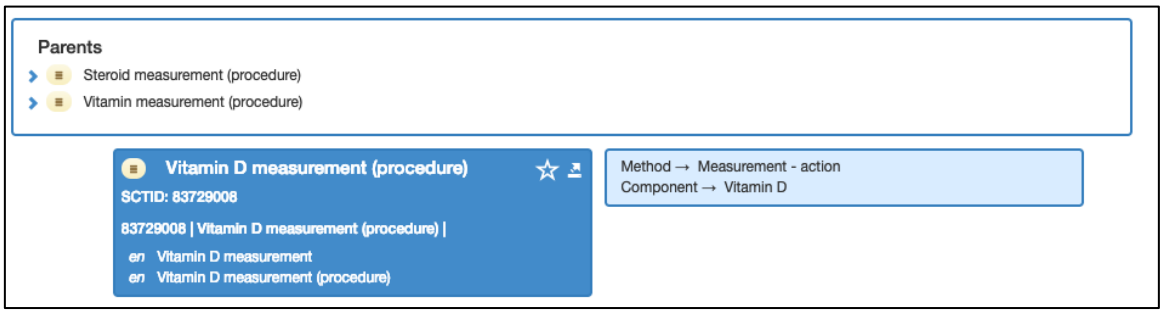
B. **Check SNOMED CT concepts and MedDRA terms against hierarchy placement to determine if concepts/terms are equivalent.**

Example

Vitamin D. Direct lexical match but is a test name in MedDRA and a substance in SNOMED CT



In this case, LLT *Vitamin D* should be mapped instead to SNOMED CT Vitamin D measurement (procedure)



C. **Mapping in both directions is to an exact conceptual match for the concept/term.**

This is defined as the source terminology concept/term and the target terminology concept/term having the same conceptual medical meaning.

Examples

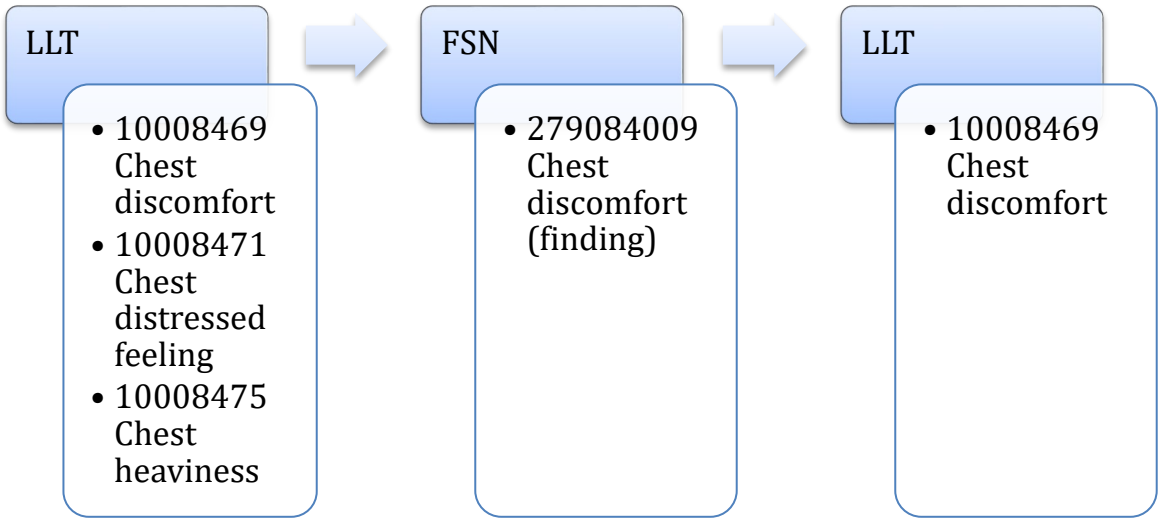
- LLT Permanent cardiac pacemaker insertion maps to SNOMED CT Implantation of cardiac pacemaker (procedure)
- SNOMED CT Implantation of cardiac pacemaker maps to LLT Cardiac pacemaker insertion
- LLT Emotional lability maps to SNOMED CT Mood swings
- SNOMED CT Mood swings maps to LLT Mood swings

Note that while Emotional lability is a synonym of Mood swings in SNOMED CT, in MedDRA, LLT *Emotional lability* is under PT *Affect lability* (HLT *Affect alterations NEC*) and LLT *Mood swings* is under PT *Mood swings* (HLT *Fluctuating mood symptoms*). Both terms are under HLGT *Mood disorders and disturbances NEC*. The two terminologies use different editorial guidance for their organisation and in some cases such as this one where the structure of SOC *Psychiatric disorders* is based on DSM-5, closely related terms may be in different parts of the hierarchy. For the

purposes of the maps, a pragmatic approach is taken, and concepts/terms are either considered to be exact conceptual matches or unmappable.

D. **Any concepts/terms that are not an Exact Match are flagged as unmappable.** This identifies relevant concepts in either terminology that might be missing and are required to provide a more complete mapping. The addition of any new content is discussed by the relevant terminology organisation.

E. **The source term (MedDRA or SNOMED CT) is mapped to the equivalent concept in the target terminology (SNOMED CT or MedDRA).** That same concept in the target terminology then becomes the source for mapping in the reverse direction back to the starting terminology which becomes the target, whilst aiming for the same semantic match. For example, if a MedDRA term is to be mapped (source), the MedDRA LLT/PT is mapped to an FSN in SNOMED CT (target) to create the MedDRA to SNOMED CT map. Then the same FSN (source) is mapped back to the equivalent concept in MedDRA (target) to create the SNOMED CT to MedDRA map.



F. **Taking the MedDRA to SNOMED CT map as an example**, in many instances, the LLT/PT mapped from MedDRA to SNOMED CT will be the same as the LLT when mapped in the reverse direction from SNOMED CT to MedDRA, i.e., LLT 1 to FSN; FSN to LLT 1. In others, the LLT mapped from MedDRA to SNOMED CT will differ from the resulting LLT when mapped in the reverse direction, i.e., LLT 1 to FSN; FSN to LLT 2. This occurs because the two terminologies differ with respect to lexical variants, spellings, etc. However, the clinical meaning of the term/concept should always be the same in both directions. See Principles 1 and 2 for specific examples.

While more than one LLT can map to a single FSN, in the reverse direction going from SNOMED CT to MedDRA, this will always be a 1:1 map. This supports the use case of using SNOMED EHR data to report adverse events without double counting.

G. **The maps include active SNOMED CT concepts and current MedDRA LLTs only, i.e., inactive and non-current terms are excluded.**

H. **Typically the maps use (finding/disorders), (event), (procedure), and (situation with explicit context) concepts in SNOMED CT. However, there may be valid exceptions.**

Example

- LLT Blood pressure systolic maps to FSN Systolic arterial pressure (observable entity)

The map does not use (substance) concepts in SNOMED CT since the names of drugs and other substances are out of scope of MedDRA.

Unqualified test name terms that indicate simply that a test was performed, e.g., PT *Blood glucose,* are not included in the maps due to their limited value from a pharmacovigilance or clinical information perspective.

Specific Mapping Conventions

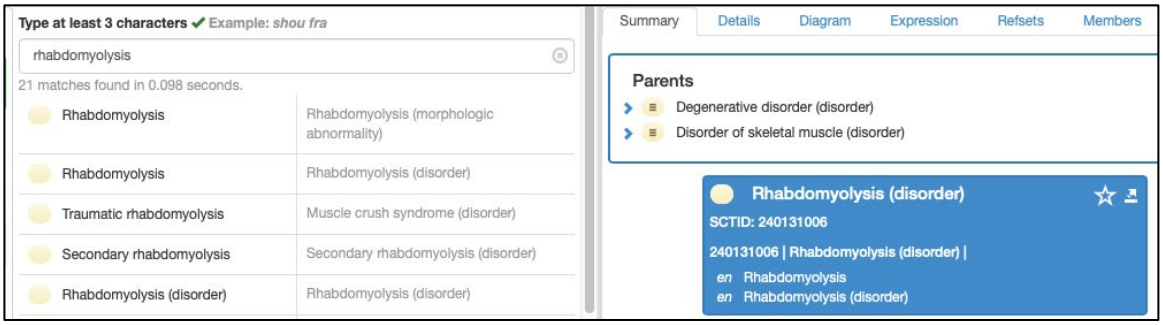
Principle 1

MedDRA LLT/PT is mapped to SNOMED CT Fully Specified Name (FSN) concept, finding the same semantic match. The FSN is used to confirm the meaning. The same applies to the SNOMED CT concept to MedDRA LLT/PT map.

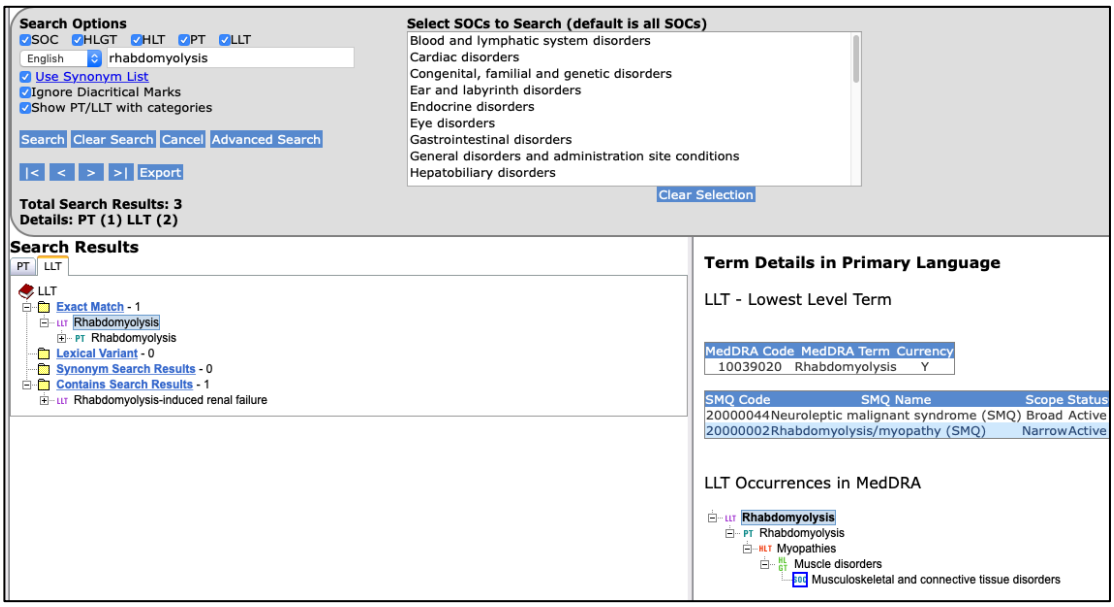
Example

- MedDRA LLT Rhabdomyolysis maps to SNOMED CT Rhabdomyolysis (disorder)
- The map is not to SNOMED CT Rhabdomyolysis (morphologic abnormality) as this concept

refers to a pathological related finding rather than a clinical one



- SNOMED CT Rhabdomyolysis (disorder) maps to LLT Rhabdomyolysis



Note that in this example, the starting LLT (Rhabdomyolysis) in the MedDRA to SNOMED CT map is the same as the LLT (Rhabdomyolysis) in the reverse SNOMED CT to MedDRA map. i.e., LLT 1 to FSN and FSN to LLT 1.

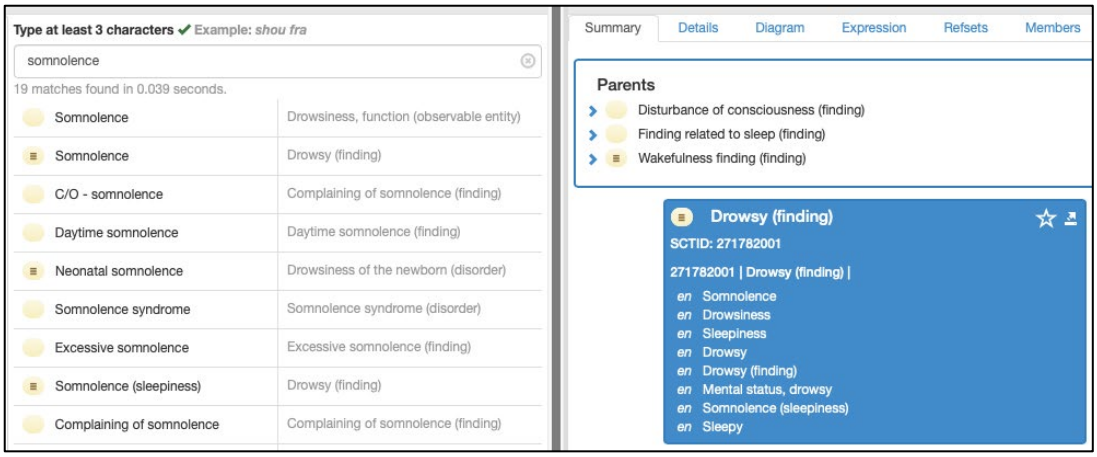
Principle 2

When identifying maps, the synonyms in SNOMED CT are only used to inform the choice of the FSN. The maps do not allow mapping to synonyms.

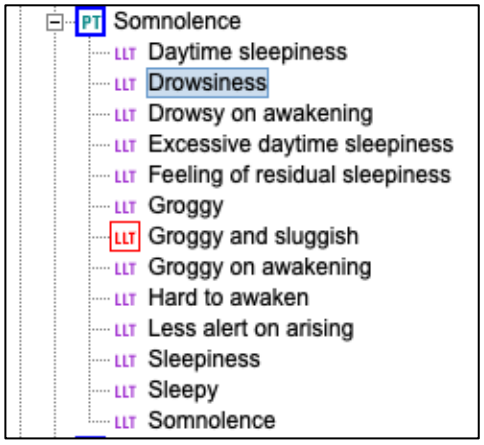
Example

- MedDRA LLT Somnolence maps to SNOMED CT Drowsy (finding)
- SNOMED CT Somnolence is a synonym of Drowsy (finding) and cannot be used to map

- Other LLTs under PT Somnolence such as LLT Sleepiness, LLT Sleepy, and LLT Daytime sleepiness are also included in the list of terms to map and these will also map to SNOMED CT Drowsy (finding), i.e., a many to one map



- In the reverse direction, SNOMED CT Drowsy maps to MedDRA LLT Drowsiness (1:1 map). “Drowsy” is not in MedDRA, only LLT Drowsy on awakening. MedDRA LLT Drowsiness is the closest match to SNOMED CT Drowsy.



Note that in this example, the source LLT (Somnolence) in the MedDRA to SNOMED CT map differs from the LLT (Drowsiness) in the reverse SNOMED CT to MedDRA map. i.e., LLT 1 to FSN (Drowsy) and FSN to LLT 2. This results from finding the closest match to SNOMED CT Drowsy which is LLT *Drowsiness* in MedDRA. All of the maps represent the same medical meaning however: LLT *Somnolence* and LLT *Drowsiness* both are under PT *Somnolence* and they are represented in SNOMED CT as FSN Drowsy (with its synonyms including Somnolence, Drowsiness, Sleepiness, etc.).

Principle 3

Not Otherwise Specified (NOS) and Unspecified terms in MedDRA

- In the MedDRA to SNOMED CT map, NOS and unspecified LLTs are mapped to the unqualified SNOMED CT concept, i.e., without any further classification

Example

- LLT Pain NOS maps to SNOMED CT Pain (finding)
- LLT Non-autoimmune hemolytic anemia, unspecified maps to SNOMED CT Non autoimmune hemolytic anemia (disorder)

- NOS and unspecified concepts will not be added to SNOMED CT
- In the SNOMED CT to MedDRA map, the SNOMED CT FSN is mapped to the unqualified LLT, i.e., there is no map to NOS or unspecified LLTs in this direction

Example

- SNOMED CT Pain (finding) maps to LLT Pain
- SNOMED CT Non-autoimmune hemolytic anemia maps to LLT Non-autoimmune hemolytic anemia

Principle 4

UK English and US English variants

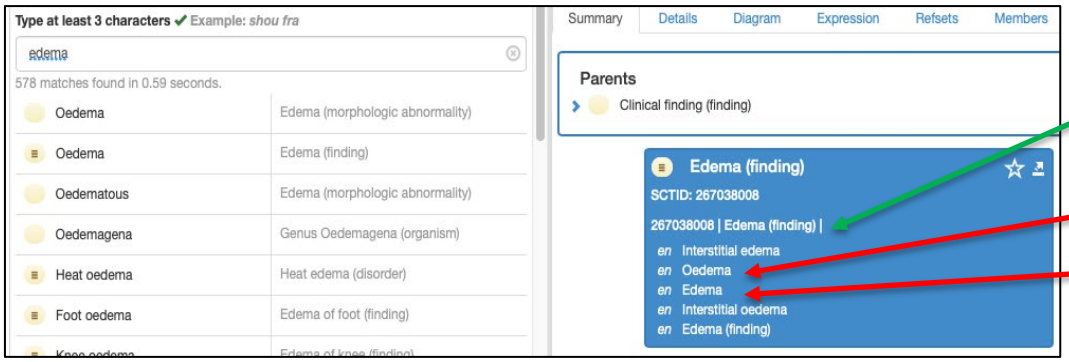
For MedDRA to SNOMED CT map:

- Both US and UK spelling variants in MedDRA are mapped to the SNOMED CT concept, i.e., the FSN which uses the US spelling. The UK spellings in SNOMED CT (descriptions) are synonyms and are used to help identify the correct FSN, but the actual map is to the FSN, not the synonym. (See Principles 1 and 2).

Example

- LLT Edema and LLT Oedema both map to SNOMED CT Edema

If the MedDRA source terms have either the UK or US spelling of an LLT, the equivalent alternate missing spellings will be added and mapped to the appropriate FSN (US spelling) during the maintenance change request process.



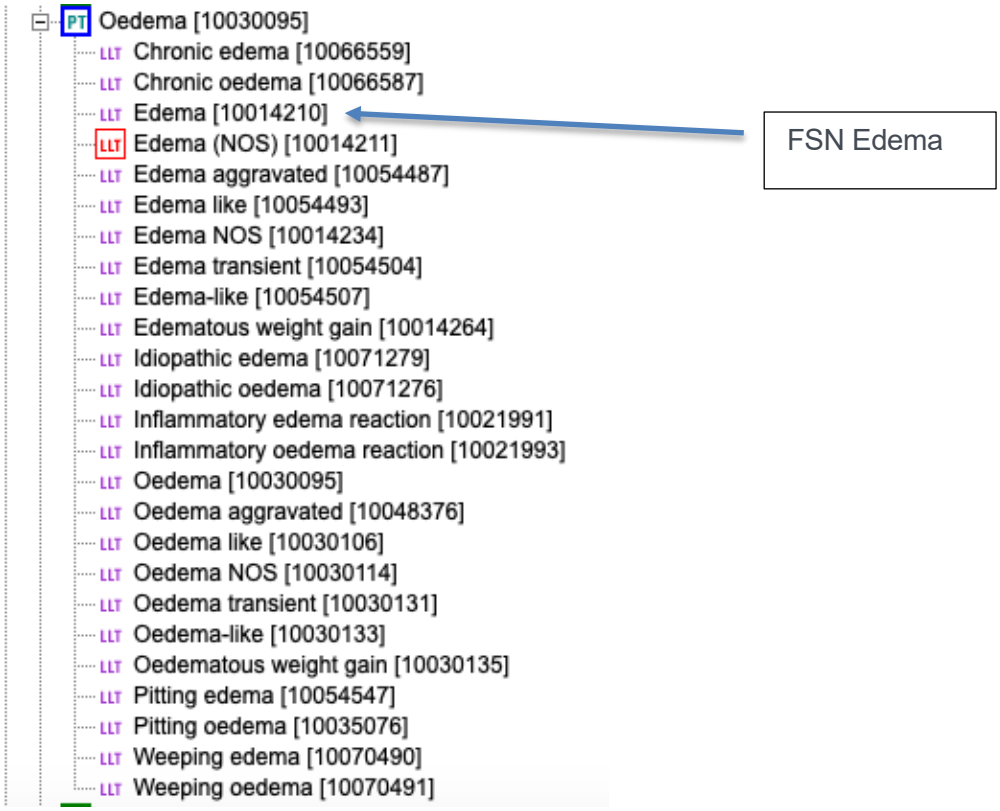
SNOMED CT concept (FSN)

Descriptions (synonyms). Both UK and US spellings in MedDRA map through the synonyms to the single FSN Edema.

For SNOMED CT to MedDRA map:

Example

- FSN Edema maps to LLT Edema (1:1 cardinality)



FSN Edema

Note that clinical records using SNOMED CT use either UK or US spellings. When SNOMED CT is implemented in EHRs, a language subset (UK or US English) will be implemented by the system depending on the country of location. The end user will thus view the US or UK synonyms but these are represented by the unambiguous SNOMED CT concept which uses the US spelling.

Every PT in MedDRA has an LLT that is identical to it and shares the same code. In MedDRA, UK English spelling is used at the PT level and above; US spellings are only represented at the LLT level. Analysis is performed at the PT level.

In the use case of taking SNOMED CT EHR data and converting it to MedDRA to report or count adverse events, one needs to avoid double counting. The 1:1 cardinality from SNOMED CT (US spelling) to MedDRA (US spelling) would ensure that events are only counted once in MedDRA. Maps are generated based on SNOMED CT concepts; whether the EHR uses the SNOMED CT US spelling or the UK spelling, both would map via the FSN to the same single term in MedDRA.

Principle 5

Combination terms and infection/body site.

- Map MedDRA LLT to an equivalent SNOMED CT combination term if available

Examples

  - LLT Dementia due to Parkinson's disease maps to SNOMED CT Dementia due to Parkinson's disease
  - LLT Escherichia urinary tract infection maps to SNOMED CT Escherichia coli urinary tract infection

- Similar principles apply in the SNOMED CT to MedDRA map
- If an equivalent combination term is not available in either terminology, the term is flagged as unmappable for discussion and potential addition

Principle 6

Test results

- MedDRA test results concepts are typically found in SNOMED CT (finding) but may also be represented in SNOMED CT (disorder)

Examples

- MedDRA LLT Blood glucose increased maps to SNOMED CT Increased glucose level (finding)
- LLT Calcium decreased maps to SNOMED CT Calcium deficiency (disorder)

Principle 7

Specimen type

- If the specimen type is not specified in the source concept/term, it is mapped to the concept/term without the specimen type, if available
- If the specimen type is not specified in the source concept/term and the concept/term without the specimen type is not available in the target terminology, it is acceptable to default to blood or the most common specimen type for that particular test

- The default specimen type is serum, not plasma, if blood is specified
- The maps attempt to preserve the specimen type whenever possible

Examples

- LLT Lactate dehydrogenase maps to SNOMED CT Lactate dehydrogenase level (not to SNOMED CT Plasma lactate dehydrogenase level)
- LLT Drug level increased maps to SNOMED CT Blood drug level high (there is no drug level high concept without the specimen type available so it is acceptable to default to blood)
- LLT Lactate dehydrogenase increased maps to SNOMED CT Serum lactate dehydrogenase level elevated (concepts for the increased/elevated term without the specimen type, or specifying blood or plasma are not available so it is acceptable to map to serum in this case)
- LLT Blood creatinine maps to SNOMED CT Creatinine measurement, serum

Principle 8

Tumour types and stages

- If one terminology does not contain a term with both the histopathologic type and site of the tumour, the term is flagged as unmappable and reviewed for possible addition. (Renal granular cell carcinoma is an example of a concept/term combining both the histopathologic type and tumour site and it is contained within both terminologies).

- SNOMED CT accepts tumor concepts included in the International Classification of Diseases for Oncology (ICD-O). A topography code and a morphology code express the complete morphological assessment as stated by the pathologist.
- MedDRA contains staging and classification systems that are used in clinical research and pharmacovigilance
- When a term specifies histopathologic type, tumour site, and staging, efforts are made to preserve all three aspects of the concept in the maps. Staging information is not always represented in SNOMED CT, however. In these cases, the term is flagged as unmappable and may be reviewed for possible addition to SNOMED CT if it is within the scope of the terminology.

Example

  - LLT Non-small cell lung cancer stage IIIB maps to FSN Non-small cell carcinoma of lung, stage TNM 3

- When a “recurrent” cancer term is not available in either terminology, the term is mapped to the primary cancer

Example

  - LLT Non-small cell lung cancer recurrent maps to FSN Non-small cell lung cancer

The exceptions to this principle are the stage 4 or metastatic cancers.

- For metastatic or stage 4 cancers, when an exact match is not available, “[Primary site] metastatic cancer” LLT/PTs map to the similar “Metastasis from [primary site]” FSN

Example:

  - LLT Lung cancer metastatic maps to FSN Metastasis from malignant neoplasm of lung

- Metastatic primary site terms are synonymous with stage IV/stage 4 if the metastatic term is not available

Example:

  - LLT Lung adenocarcinoma metastatic maps to FSN Adenocarcinoma of lung, stage IV

- Close attention is given to “secondary from” and “metastatic to” concepts. “Metastases [organ]” LLT/PTs map to FSNs of “Secondary malignant neoplasm of [organ]”

Example:

  - LLT Metastases to spine maps to FSN Secondary malignant neoplasm of vertebral column

Principle 9

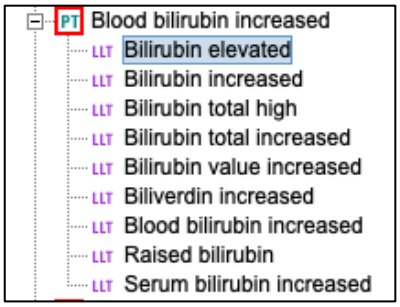
Increased/high and decreased/low qualifiers

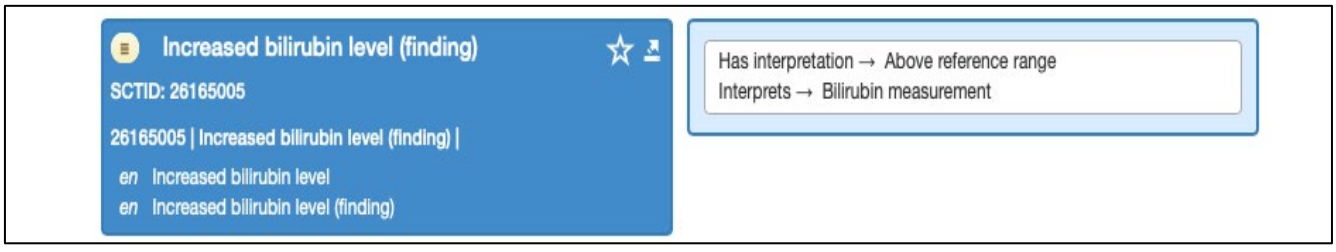
- In both MedDRA and SNOMED CT, qualifiers for investigation results such as increased/high/elevated and decreased/low are generally used synonymously and can be used to map in both directions

- In both terminologies, “increased” and “decreased” are generally used by reporters to refer to changes above and below the normal reference ranges (see Increased bilirubin level example below for how this is sometimes reflected in the SNOMED CT hierarchy)

Example

  - LLT Bilirubin elevated maps to SNOMED CT Increased bilirubin level (finding). Note that the interpretation is “Above reference range”.





Additional Information

Contact mapping@meddra.org or info@snomed.org for additional information or inquiries regarding request for change criteria.