LOINC - SNOMED Cooperation Project Technology Preview

26 September 2014

Introduction

This document is intended to give a brief description, background context and explanatory notes on the LOINC - SNOMED CT Cooperative Project Technology Preview – September 2014. It is not a detailed technical document about the release file formats or on implementing LOINC and SNOMED CT together. See "Guidelines for using SNOMED CT and LOINC together - Phase 2 Draft" [1] for this information.

Background

A cooperative agreement was signed between the Regenstrief Institute and the IHTSDO in July 2013. The agreement details how SNOMED and LOINC will be linked through: 1) a map of LOINC terms to post-coordinated SNOMED CT expressions; 2) a map of LOINC parts to SNOMED concepts; 3) a map between LOINC terms and existing pre-coordinated SNOMED concepts; 4) LOINC Answer sets mapped to SNOMED codes; and 5) addition of new content in either terminology. See Figure 1 for an illustration of these connections. This Technology Preview includes artifacts related to items 1, 2, and 5 above.
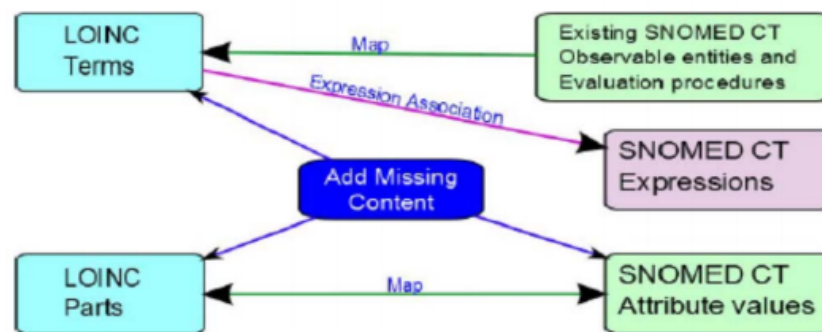

Figure 1. Diagram showing an overview of maps, Expression Associations and content additions that form part of the Cooperative Works of the Agreement [2].

Desired feedback:

Feedback is requested on the Technology Preview release to inform future development and determine fitness for purpose. Feedback on the formatting of expressions, maps and reference sets is expected; feedback on the content of the expressions or mapping themselves is also welcome.

Please provide feedback by **15 December, 2014** through one of the following two options:
- Enter responses into an online feedback form

- Send feedback via email to LOINC-SNOMEDProject@ihtsdo.org with a subject line of "LOINC-SNOMED Technology Preview." If using this option, please utilize the IHTSDO standard feedback form available in the release package.

Release content:

Overview:

This Technology Preview release is RF2 compliant but only contains the full release files for the refsets (no delta, snapshot, or history) as this is the first release. The Technology Preview content is released under the 705115006 | Technology Preview module (core metadata concept) with concept identifiers from the 20140731 version of the IHTSDO International release of SNOMED and the June 27 release of LOINC. Note that some SNOMED attribute and metadata concepts included in the Technology Preview are not present in the July release of SNOMED; full and snapshot release files are included for these concepts. These concepts are planned for addition to the 20150131 SNOMED release.

The content of this release was developed by focusing on the list of Top 2000 LOINC Lab Observations and LOINC parts needed to represent these LOINC terms. Some LOINC terms on the Top 2000 list were excluded from the scope of the Technology Preview. Over 200 concepts were added to SNOMED to produce the preview, include 13 concept attributes.

The Expressions RefSet was generated through multiple steps starting with the map of LOINC parts to SNOMED concepts. This map was used to generate an OWL file which contained LOINC terms and equivalent SNOMED definitions. The OWL API "Snomed CT Parser [3]," developed by Daniel Karlsson, created an output file of expressions in SNOMED compositional grammar from the OWL file. Metadata was added to this output file to create the final refset file. Note that it should be possible to run this preview through a parser, create an OWL file, run a classifier on it and then regenerate the preview expressions.

This Technology Preview does not represent a set of data ready for clinical use within a system. It has been made available at this time for review and evaluation purposes only.

USE WITHIN A CLINICAL SYSTEM CANNOT BE SUPPORTED AT THIS TIME

Technology Preview status means that:
• The release format specification of the product is public but not fixed.
• The method of product content preparation may be public (but is not required to be) but is not fixed.
• Quality or safety assurance of the product may be ill defined and/or incomplete.
• So far as is possible within internal resourcing constraints, IHTSDO undertakes to support the product and maintain it in synchronization with the primary release data as required.
• Trial implementation is encouraged to evaluate utility and safety.

• Trial implementation is at the user's own risk, where such risk is permitted by other governance processes.
• Trial implementations may have to change if and when the product design changes in the light of experience and release of the baseline.

Content detail:

LOINC Term to SNOMED Expression Reference Set

The LOINC Term to SNOMED Expression Reference Set contains 9730 active LOINC terms associated with post-coordinated SNOMED CT expressions. All of the LOINC terms are subclasses of 363787002 | Observable entity (observable entity) in SNOMED and the expressions follow the draft SNOMED Observables model [4]. See Table 1 for an example.

The majority of the expressions included are fully defined and are an exact match with a LOINC term, with the exception of LOINC terms containing "Leukocytes other" as their meaning is unspecified at this time. The expressions are represented in the stated form with no hierarchy included. We will consider releasing a version of the expressions with a hierarchy in the future.

A.

id	mapTarget	expression	correlationId
823815fc-cb5a-4655-b486-19da62053943	27182-5 | Calcium:ACnc:Pt :Bld:Ord	363787002|Observable entity|:70434600|Specified by|=(386053000|Observation procedure|:704347000|Observes|=(414237002|Feature of entity|:704319004|Inheres in|=87612001|Blood|,704320005|Towards|=5540006 |Calcium|,704318007|Property type|=118569000|Arbitrary concentration|),704327008|Direct site|=119297000|Blood specimen|,370132008|Scale|=117363000|Ordinal value|)	447557004 | Exact match map from SNOMED CT source code to target code (foundation metadata concept)

B.

id	mapTarget	expression	correlationId
823815fc-cb5a-4655-b486-19da62053943	27182-5	363787002:70434600=(386053000:704347000=(414237002:704319004=87612001,704320005=5540006,704318007=118569000),704327008=119297000,370132008=117363000)	447557004

Table 1. Example from the LOINC Term to SNOMED Expression Reference Set. This shows a LOINC term "Calcium:ACnc:Pt:Bld:Ord" (LOINC code 27182-5) with an equivalent post-coordinated expression. Note that A includes text labels for demonstration purposes; the actual refset will not contain the text descriptions (shown in B). For brevity, not all fields in the LOINC Term to SNOMED Expression Reference Set are included in this table.

LOINC Part to SNOMED Map Reference Set

The LOINC Part to SNOMED Reference Set consists of 2121 LOINC Parts (LP) mapped to one or more SNOMED concepts. While the majority of the maps are one to one, occasionally one LP maps to more than one SNOMED concept or a combination of LPs map to one SNOMED concept or combination of SNOMED concepts. An example of the former is when one LP such as LP14328-6 Basophils could map to an individual basophil cell or a population of basophils in SNOMED; the property type and scale of the associated LOINC term will determine which map is appropriate for that LOINC term. Additionally, a concept may be used as a value in more than one attribute. For example, creatinine is used as a value of the Towards attribute as well as the Process output attribute. A small number of LOINC Parts might be duplicates; this needs confirmation by the Regenstrief Institute. See Table 2 for examples of Part maps. Note that this Technology Preview excludes some LPs that are not to be mapped.

A.

id	mapTarget	referenced Component Id	attributeId	correlationId
e8001e5d-95fd-4e6b-a750-7cacd50d99bb	LP15257-6 | Calcium	5540006 | Calcium (substance)	704320005 | Towards (attribute)	447559001 | Broad to narrow map from SNOMED CT source code to target code (foundation metadata concept)
fcab2a6d-ca5b-4288-9051-e6c656ec7c5c	LP15257-6 | Calcium	5540006 | Calcium (substance)	704324001 | Process output (attribute)	447559001 | Broad to narrow map from SNOMED CT source code to target code (foundation metadata concept)

B.

id	mapTarget	referenced Component Id	attributeId	correlationId
e8001e5d-95fd-4e6b-a750-7cacd50d99bb	LP15257-6	5540006	704320005	447559001
fcab2a6d-ca5b-4288-9051-e6c656ec7c5c	LP15257-6	5540006	704324001	447559001

Table 2. Example of one LOINC part mapped to a SNOMED concept to be used with two different attributes. LP15257-6 is a component part type in LOINC. The attributeId column indicates for which attribute in SNOMED this concept would be a value; in this case the concept is used as value for two different SNOMED attributes. Note that A includes text labels for demonstration purposes; the actual refset will not contain the text descriptions (shown in B). For brevity, not all fields in the LOINC Part to SNOMED Complex Map Reference Set are included in this table.

Next Steps

Next steps in the project include:
- Evaluate feedback received on the Technology Preview
- Finish the map of LOINC Parts to SNOMED concepts. This will involve creating a significant number of new SNOMED concepts, mainly in the substances hierarchy.
- Use the above map to create more expressions for LOINC terms. This will include resolving some known complex content issues.
- Prepare candidate baseline release
- Implement the SNOMED Observables model to define existing pre-coordinated SNOMED concepts

References:

1. "Guidelines for using SNOMED CT and LOINC together - Phase 2 Draft" (doc10699 on CollabNet): https://csfe.aceworkspace.net/sf/go/doc10699
2. COOPERATION AGREEMENT dated July 2013 Between The International Health Terminology Standards Development Organisation (IHTSDO) and The Regenstrief Institute, Incorporated (RII): http://www.ihtsdo.org/about-ihtsdo/governance-and-advisory/harmonization/loinc
3. SNOMED CT Parser (OWL API): https://github.com/danka74/SnomedCTParser
4. Draft SNOMED Observables Model described in a PowerPoint presentation titled "Observables model in the context of the concept model" (https://csfe.aceworkspace.net/sf/go/doc9931)
   a. Note that viewing this presentation requires being a user in the Observable and Investigation Model Project on CollabNet. If you are not yet a user of this project on CollabNet, please request addition through the site.
5. Information about Expressions can be found in the "SNOMED CT Technical Implementation Guide:" http://ihtsdo.org/fileadmin/user_upload/doc/
6. The International Health Terminology Standards Organization (IHTSDO): http://www.ihtsdo.org/
7. IHTSDO CollabNet: https://csfe.aceworkspace.net/sf/sfmain/do/home
8. Technology Preview release files of LOINC SNOMED Cooperation Project: https://csfe.aceworkspace.net/sf/frs/do/listReleases/projects.snomed_ct_international_releases/frs.technology_preview_packages
   a. Note that downloading these files requires being a user in the SNOMED CT International Releases project on CollabNet. If you are not yet a user of this project on CollabNet, please request addition through the site.
9. Alpha prototype release file of LOINC SNOMED Cooperation Project: https://csfe.aceworkspace.net/sf/frs/do/viewRelease/projects.snomed_ct_international_releases/frs.3_other_releases.loinc_snomed_alpha_prototype
   a. Note that downloading this file requires being a user in the SNOMED CT International Releases project on CollabNet. If you are not yet a user of this project on CollabNet, please request addition through the site.

10. Logical Identifiers Names and Codes (LOINC): http://loinc.org/
11. Online form for submitting feedback on the LOINC - SNOMED Technology Preview: https://docs.google.com/forms/d/1XGETeodQbavcC-vw6tY_p17D-bMzJmKsSbDdOWeSQPw/viewform?usp=send_form