



Combined Utilization of SNOMED CT with LOINC for Comparative Effectiveness Research

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Audience

This presentation will be of interest to those interested in the combined use of SNOMED CT with LOINC for clinical research, within informatics platforms, and for exchange of electronic medical records.

Objectives

1. Mapping local coding schemata to SNOMED CT and LOINC for better representation of laboratory (lab) results and their enhanced retrieval for clinical research.
2. Opportunities for data validation and ontology reasoning on linking SNOMED CT with LOINC.

Abstract

The PHIS+ database is being populated using the [OpenFurther](#) platform, which federates heterogeneous data on demand, from multiple data sources, and provides syntactic and semantic data interoperability for clinical and translational research purposes [1]. This database is being used to conduct pediatric comparative effectiveness research (CER) and consists of data from six contributing hospitals using different electronic source systems and local coding schemata for their clinical data. Each hospital describes their local tests at different levels of granularity and specificity of specimens used for testing (e.g. calcium in blood vs. calcium). To accommodate these differences we obtained specimens codes for test codes (e.g. blood specimen test for calcium in blood and blood specimen test for calcium when tested on blood). We mapped the local test to the matching LOINC codes using metadata from each site (Calcium [Mass/volume] in Blood, and Calcium [Mass/volume] in Body fluid), and the specimens to SNOMED CT codes (Blood specimen). We currently have 3,069 distinct LOINC concepts that have 1,260 and 76 corresponding distinct specimen and body site SNOMED CT concepts in the PHIS+ database.

The IHSTDO and the Regenstrief Institute have agreed to align their terminology efforts by linking the rich semantics in SNOMED CT with the extensive lab test coverage present in LOINC [2]. This alignment of SNOMED CT and LOINC codes provides a complete representation of each lab test result irrespective of the local differences in granularity. The presence of a SNOMED CT code for a specimen in the test (e.g. Blood specimen) also allows us to automatically provide a more specific secondary LOINC code (e.g. Calcium [Mass/volume] in Blood for Calcium [Mass/volume] in Body fluid) that better describes the test result. For each of the CER studies, a combination of LOINC and SNOMED CT codes are being used to accurately select lab tests that are used in study cohort (inclusion/exclusion criteria), exposure variables, and study outcomes. In addition, these terminologies were used to validate the data for inappropriate specimens and tests (e.g. blood glucose test done on a sputum specimen) and to support ontology reasoning such as subsumption. Future work will include using this large set of lab results consisting of approximately 150 million lab results for the alignment of SNOMED CT and LOINC 'ontologies'. We present our processes and lessons learned in the combined use of SNOMED CT and LOINC for mapping and utilizing lab tests.

References

- [1] S. P. Narus, R. Srivastava, R. Gouripeddi, et. al, "Federating Clinical Data from Six Pediatric Hospitals: Process and Initial Results from the PHIS+ Consortium," *AMIA Annu Symp Proc*, vol. 2011, p. 994-1003.
- [2] "SNOMED CT and LOINC to be linked by cooperative work." Available: <http://www.ihtsdo.org/about-ihtsdo/governance-and-advisory/harmonization/loinc/>. [Accessed: 26-Apr-2014].