

Evaluation of LOINC as a reference terminology for clinical document types: A case report of an outpatient EHR

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Abstract

To support federated computerized phenotyping, we studied the suitability of LOINC to represent clinical document types in an outpatient integrated data repository (IDR). Our results indicate that 35 document types accounts for 80% of all documents. Only 69% of those have a corresponding LOINC concept.

Introduction

With recent advances in clinical research informatics and the existence of federated repositories such as SHRINE, it is important to have reference ontologies for all common EHR data sources. There are well established reference ontologies for several data feeds such as diagnoses, procedures, medications and lab (core set). Type of textual document filed in an EHR (e.g., spirometry report) can contain information which may complement the current core data set.

Our goal was to evaluate the suitability of Clinical Document Ontology (CDO) within Clinical LOINC (=Logical Observation Identifiers Names and Codes) to capture document types. Our work complements prior work done by Hyun [1] with results from a predominantly outpatient healthcare system.

This work was conducted as part of our effort to support inclusion of EHR events with coded type of clinical report into our framework for computerized high-throughput phenotyping (see <http://healthcareworkflow.wordpress.com>).

Methods

We used a sample of lifetime data of 250 thousand patients from Marshfield Clinic (MC) IDR. We computed descriptive statistics and mapped a subset of document types to LOINC (v2.27) using RELMA and other search tools.

Preliminary results

Marshfield Clinic document types are described by two internal codes: *document class* (e.g., pathology report or radiology interpretation) and *document subclass* (e.g., GYN cytopathology report or chest radiograph). For lifetime EHR data spanning from 1985 to 2009, 35 document types accounted for 80% of all reports and 311 document types accounted for 99% of all reports (retired document types were included). Within the subset of 35 most frequent document types,

CDO's fully corresponding terms were identified for 24 (69%) of them. For 7 types (20%), only a higher-granularity term was identified, and for 4 types (11%), there was no CDO's concept found.

For example, the CDO had a code for "Prescription for durable medical equipment" (52063-5), but lacked a code for MC's subclass of "Prescription note". Or, CDO had three codes for consent for abortion, sterilization and hysterectomy (52027-0, 52029-6, 52028-8) but lacked a less granular code for MC's document subclass "Consent Form (Outpatient Administrative Doc)". In another example, MC's document subclass "Psychiatric Telephone Note" had to be mapped to a generic telephone encounter note despite existence of psychiatry specific concepts for counseling note, consultation note, evaluation and management note and group counseling note). MC data contained 1323 distinct document subclasses, while CDO has 528 concepts. Within the subset of 35 most frequent types, 8 subclasses mapped to a set of three CDO codes (51852-2 Letter, 34748-4 Telephone encounter note, 47045-0 Study report). We have communicated these results to the LOINC committee. We hope to contribute towards improving the CDO coverage for clinical research informatics purposes.

Conclusion and Discussion

Our result of 69% full-correspondence coverage of LOINC is lower than Hyun's results [1]. The review of non-covered terms indicates that CDO seems to be more complete for inpatient documents. For example, we did not find adequately granular concept for "Well Child Visit" document type. This preliminary data is limited since mapping was done by a single expert. We plan to validate this mapping by using one more expert and calculate inter-rater reliability) and further study granularity issues.

References

1. Hyun S, Shapiro JS, Melton G, Schlegel C, Stetson PD, Johnson SB, et al. Iterative evaluation of the HL7-LOINC Document Ontology for representing clinical document names: a case report. J Am Med Inform Assoc 2009;16(3):395-9.