Interoperability of Data Models and Terminology Models: Issues with using the SNOMED CT terminology

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Abstract

Work in the field of recording standard, coded data in electronic health records and messages is important to support interoperability of clinical systems. It is also important for reducing medical errors caused by misinterpretation and misrepresentation of data. Standardisation of structured and unstructured data to one or more terminologies such as SNOMED-CT, or ICD requires the help of various integration procedures. We have previously highlighted issues in data models (*open*EHR Archetypes) when mapping to a terminology model (SNOMED CT) [1]. In this paper, we describe issues with terminology models (SNOMED CT) when aligning the concepts to a data model (*open*EHR Archetypes).

Terminologies and data models play an important role in building structured EHRs and achieving semantic interoperability. Semantic interoperability requires that all recorded data conforms to some reference terminology in order to interpret and reuse it uniformly in all partaking information systems. In the medical domain, standardising data is of great significance, as controlling the vocabulary used to record patient data is critical to making EHRs safe for exchange and reuse.

The paper recognises the value of SNOMED CT but demonstrates the difficulties of working with it at an integration level. The difficulties in integration arise primarily due to the semantic gaps in the content of the structured data models and terminology models. The same issues might also arise with data obtained from unstructured sources. Despite the broad coverage that SNOMED offers, there are several concepts that are missing. An efficient process for submission of concepts for inclusion is in need, along with formal rules for post coordination.

We believe that in order to achieve the overall objective of semantic interoperability, it is imperative that both data and terminology models are developed with the aim of being able to integrate their clinical content. It is important that both modeling communities are not only cognizant of each others existence but also work closely with each other to ensure that conformance is built into the systems from conception stage. These conformance or compatibility rules should be extended to all other stages of the modeling process i.e. at design time, data integration time, as well as at run-time. It is only then that true interoperability will be achieved, making it possible to build safer health care systems. Reliable and high quality data in these systems will improve the functioning of all health care units heavily dependent on data, reducing medical errors and ultimately providing safer and better patient care.

Reference
[1] Rahil Qamar, Jay Kola, and Alan Rector. Unambiguous data modeling to ensure higher accuracy term binding to clinical terminologies. AMIA 2007 Annual Symposium, November 2007. Chicago, U.S.A.