Part I. Motivation and foundation

A recent whitepaper[2] cited that great strides have been made in healthcare data interoperability in the past decade… the vast majority of clinicians and patients have access to some portion of their health data in electronic format, thanks to the proliferation of electronic health record (EHR) systems installed in clinical care environments. The data in these EHRs usually follow HL7's Consolidated Clinical Document Architecture (C-CDA) as it has become the generally accepted primary data standard for structured clinical data exchange.

However, the whitepaper also found that significant gaps exist in the accurate encoding of the data contained in those C-CDA documents – in an analysis conducted of C-CDA documents produced by various EHR vendors and clinical organizations, the four most frequent problems identified as part of this analysis were that medications should be encoded in RxNorm (13.7% of all documents), vital signs and results should use LOINC (9.2% of all documents), vital signs, and results should use unified code of units of measure (UCUM) for physical values (8.7% of all documents) and the inclusion of conflicting status information for medications (6.7% of all documents)[3].

These issues can have a direct impact on patient safety and point to the need to be able to consistently represent and encode clinical data and observations. This is the next great challenge to conquer for health data interoperability to positively influence patient outcomes nationwide through clinical decision support.

SOLOR (System of Logical Representation) is an effort that is directly tackling these issues of representation. SOLOR is an integrated medical terminology system, based on the overlapping but distinct terminology systems of SNOMED, LOINC and RxNorm. SOLOR was designed to unambiguously define what can be measured (concepts). Working hand in hand with SOLOR there needs to be a clinical statement model, of which there are quite a few (HL7 FHIR, CIMI, ANF) which defines how to record a measurement. Measurements may quantitative or existential.

The following diagram shows how SOLOR and clinical statement models are interrelated in the architectural stack:

---

[2]John D. Amore, et. al; "Interoperability Progress and Remaining Data Quality Barriers of Certified Health Information Technologies", July 6, 2018
[3]Ibid, Page 6
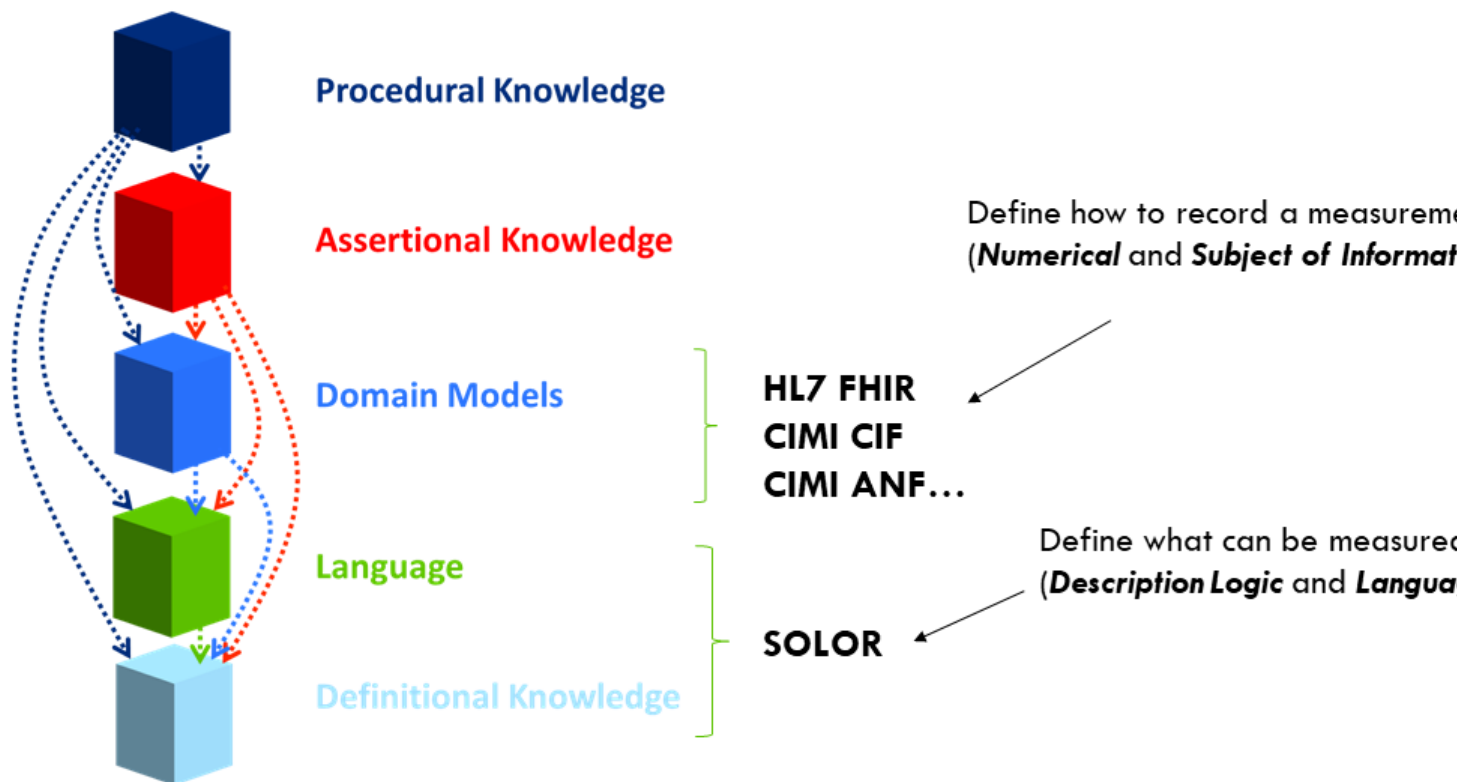
Current challenges include the following:

1. Further tooling and guidance needs to be developed to be able to show how concepts can be modeled in SOLOR and particular statement models applied

2. Gaps need to be addressed in the various statement models in terms of representing measurements consistently, especially with existential (non-quantitative) measurements