

The Need for Standardized Medical Test Names

Usually in an entity like a regional hospital, the doctors work with a local laboratory. Between the two, the doctors and the laboratory, they have agreed upon exactly what to do when a specific test is ordered. If a doctor orders a CHEM 5, the laboratory performs a specific panel of tests. But if you go to a hospital in another state or hospital system, that same name, CHEM 5, may not be the same panel of tests. So if two hospital systems want to merge, they cannot merge until they decide on which test names to use and what they mean. Every test must be reviewed by a panel of experts and a procedure is agreed upon. They then map from the old set to the new set of names. Or instead of this multi-year time consuming review, both systems can agree to move to a new international standard. LOINC is such a standard.

Terminology: Laboratory Testing Using LOINC® for Interoperability

Preparing for interoperability means accepting the more stringent data integrity standards required for universal understanding

Overview



In the previous article *“Terminology: Making Sense When Talking about Apples and Oranges”*, we learned that to clearly exchange electronic patient care data across patient care entities we need to create a semantic understanding for the patient care data

communication. Semantic data exchange requires standard vocabularies. We need to speak ‘apples to apples and oranges to oranges’ to turn the patient data into actionable information both for the individual patient and the population health levels. This article focuses on electronic data exchange for laboratory diagnostic testing, and a terminology that will greatly enhance the semantic understanding for laboratory testing – LOINC. Laboratory testing is an important part of patient healthcare as more than 70% of diagnostic decision making is informed by laboratory test results.

What is semantic understanding?

Semantic understanding is the ability of computer systems to exchange data and to understand the data in the same way that it is understood by the sending entity.

Syntactic understanding is data which is understood by merit of the position of the data in a data file or message. This is to say that the data can be parsed. Semantic understanding is deeper than syntactic. Semantic understanding is computable whereas syntactic is not.

The Current State of Affairs

Some lab do not have comprehensive electronic information systems. For those that do, a large proportion use local codes (example: Na, K, Hgb ...) rather than the standardized

Preparing for interoperability means accepting the more stringent standards of data integrity required for understanding in a broader multi-entity healthcare community. It is no longer



enough to express grams as g, gm, or grams, it must be an agreed upon abbreviation. When everyone agrees upon the terminology to be used, we have arrived at a data standard.

vocabularies defined in the LOINC, SNOMED, and HL7 standards. An individual lab may only define lab order and result codes for tests that it performs and reports. The codes themselves only need to be described to the extent they are unique within the lab. Everyone in this local lab community understands their own codes, but the coding (called an *analyte*) would not be understood universally. The specific attributes (method, property, specimen type) need not be described in the terms as they are known within the lab unless they are required for uniqueness or interpretation. There are not enough descriptive attributes in the lab definition to universally identify this particular lab test. Additionally, local lab test codes may include workflow information that is not relevant to the order or result. To communicate electronically with other systems, a custom software interface must be developed and then translation tables created to map the lab codes between the systems. This is very expensive and inefficient.

What is LOINC®?

LOINC® - Logical Observation Identifiers Names and Codes, are universal identifiers for laboratory test results and other clinical observations. Our focus will be on Lab LOINC. LOINC was organized in 1994 by the Regenstrief Institute with ongoing support by Regenstrief and the National Library of Medicine (NLM). There are currently 40,302 Lab LOINC codes including the areas of chemistry, hematology, microbiology, histology, and cytology. Lab LOINC includes genetic testing and veterinary medicine testing as well. LOINC is guided by the LOINC committee and is free worldwide. Much of the work on LOINC is done by volunteers. LOINC has been endorsed by the American Clinical Laboratory Association and the College of American Pathologists.

Anatomy of a LOINC Term

The LOINC term identifies the question being asked, e.g. what is my hemoglobin level? Other standard terminologies or numbers will then supply the answer. So for the question "What is

my hemoglobin?" the LOINC term would look like, 718-7:Hemoglobin:MCnc:Pt:Blid:Bn. There are six axes that LOINC uses to describe the analyte: 1) component, 2) property measured, 3) timing, 4) system, 5) scale, and 6) method. To search LOINC terms and learn more about the anatomy of LOINC terms, go to <http://search.loinc.org/>. Once you agree to the terms of use, you can enter a name for a laboratory test and the search engine will find all matches related to this test. For instance if we enter Strep Throat, it will respond with nine different LOINC test codes for each of the 9 standard test names for Streptococcus agalactiae and Streptococcus pyogenes.

A clinician is not interested in seeing this LOINC term, so the term is mapped to the local lab code and kept in the background for computer-to-computer data sharing and aggregation. These 'under-the-covers' LOINC terms provide the semantic level of communication that facilitate the transmission and storing of clinical laboratory results for patient care, outcomes management and clinical research. By providing added descriptive information for the test, LOINC terms also increase the data comparability (assuring the equivalence of data from different sources) and the data quality (the measure of accessibility, completeness, accuracy and precision.)ⁱ



Other public health areas where LOINC terms are needed are syndromic surveillance, registries, and reportable diseases. For syndromic surveillance, laboratory tests ordered can be aggregated from hospital, emergency room, and ambulatory health center EHRs and then sent daily to local departments of health. SARS, bioterrorism, and bird flu are examples of public health threats where unambiguous data is urgently needed. LOINC terms will enhance registries such as cancer registries. Public health data collection of reportable disease is another area

where LOINC terms will enhance the process of aggregating reportable diseases from an EHR. Automating the process of aggregating reportable diseases from an EHR has the potential to save clinicians and health centers time and provide more accurate data.

Implementing LOINC

To implement LOINC terminology the user needs first to map the LOINC terms to the existing local laboratory test order names. The LOINC website supplies a tool called RELMA (Regenstrief LOINC Mapping Assistant) <http://loinc.org/slideshows/2009-12-17-loinc-and-relma-tutorial-cdc-vocab-team> to distribute the LOINC vocabulary and assist in the mapping. Along with

distributing and updating the vocabulary on an ongoing basis, RELMA helps users find the correct term to map and then can assist with quality assurance testing the mapping as well. LOINC can be added to the HL7 v2.x ORU message, OBX piece 3 to provide a universal identifier for electronic data exchange. For more information on LOINC terminology, please click on this link and visit www.LOINC.org.

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ⁱ <http://loinc.org/slideshows/lab-loinc-tutorial>