

The Specimen Cross Mapping Table - A Tool for Harmonizing the Specimen Vocabulary Domain

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Abstract

Public Health Laboratory Interoperability Project (PHLIP) recognized the need for harmonization of the specimen vocabulary during development of the lab-to-lab Electronic Test Order and Result (ETOR) message guide in HL7v 2.6, where the specimen segment (SPM) has more than two fields and different vocabulary than HL7 table 0070. PHLIP turned to SNOMED for standardized codes describing specimen related terms, following work by the National Animal Health Network (NAHLN). PHLIP collected varied local terms from partner labs for the same concept and noted support for maximally two terms to fully describe specimens.

Creating a *PHLIP-preferred term* describing the standard concept and defining SNOMED hierarchies for each of the SPM fields was the basis for the specimen cross-mapping table (Specimen-CMT) to harmonize the various local terms. Each *PHLIP-preferred term* was mapped first for specimen type to the SNOMED specimen hierarchy and, if needed to properly identify the concept, additional SPM fields. This Specimen-CMT was presented to the ELR-2.5.1 guide authors and the Laboratory Messaging Community of Practice (LMCoP) to collect more terms spanning human, animal and environmental samples.

The Laboratory Technical Interoperability Assistance for Public Health (LTIAPH) project is a companion grant to the Epidemiology And Laboratory Capacity For Infectious Diseases (ELC) grants to enhance and advance local public health jurisdiction's infrastructure in preparation for Stage 1 Meaningful Use (MU). LTIAPH and ELC grantees' main objective is to help public health agencies consume a MU conformant electronic Reportable Laboratory Result (RLR). The Specimen-CMT was leveraged to harmonize specimen vocabulary among LTIAPH partners, adding new concepts and cross-mapping HL7 table 0070 terms to SNOMED making the Specimen-CMT more comprehensive.

Implementation of the Specimen-CMT uncovered several key issues with ELR251 vocabulary constraints and those were forwarded to the National ELR-taskforce for discussion and resolution.

Description

The Public Health Laboratory Interoperability Project (PHLIP) team identified several deficits and issues in implementation of standard vocabulary for specimen during the initial design and implementation of an HL7 v2.6 electronic order message between state public health laboratories and the CDC Salmonella laboratory. In addition, it was found that most jurisdictions had Lab systems that could contain at most 2 fields to describe

Description (cont.)

specimen, and many of these local terms are un-mappable to the existing HL7 terminologies, HL7 table 0070 and its successor HL7 table 0487. The HL7 code sets are limited and ambiguous. For example, the common respiratory sample, "Nasopharyngeal Swab", could not be mapped to these terminologies. There are several terms like "GEN Genital" that are not specimen types but rather source site terms. Therefore, PHLIP decided to use the SNOMED (SCT) terminology for standardized codes describing specimen related terms, because this, along with multiple specimen descriptor fields in the SPM segment (Figure 1), allowed for richer and more accurate descriptions of specimen concepts.

Figure 1: HL7 SPM Fields with the Identified SNOMED Hierarchies

Field	HL7 Name	Value set defined by ELR251
SPM.4	Specimen Type	HL7 table 0487 and SNOMED CT Specimen Hierarchy
SPM.5	Specimen Type Modifier	SNOMED CT Qualifier Hierarchy terms, possibly morphologic abnormalities hierarchy
SPM.6	Specimen Additives	HL7 table 0371
SPM.7	Specimen Collection Method	HL7 Table 0488 and SNOMED CT Specimen Collection Hierarchy
SPM.8	Specimen Source Site	SNOMED CT Body Site Hierarchy terms
SPM.9	Specimen Source Site Modifier	SNOMED CT Modifier and Qualifier Hierarchy terms

A constrained set of SCT specimen terms were created with three goals in mind: 1) Harmonization of standard specimen terms among the PHLIP and later the LTIAPH participants. 2) Mapping the SCT terms to the HL7 terms. 3) identifying and filling any gaps in the SCT specimen terminology. To meet these requirements, the specimen-CMT was created. A unique PHLIP-preferred term relates the standard concepts to a single PHLIP specimen concept. Although many local concepts can be described with a single specimen SCT concept, other local and HL7 concepts need additional data elements such as specimen source site to fully describe them. The Specimen-CMT was leveraged by the LTIAPH team to harmonize specimen vocabulary among ELC grantees. Through this process we were able to refine the table, adding new concepts and complete the cross-mapping of HL7 table 0070 terms. Additionally, we identified several specimen concepts which will be submitted for addition to the SNOMED nomenclature. Examples of terms in the Specimen-CMT are shown in Figure 2:

Figure 2: Specimen CMT Examples

PHLIP Preferred Name	HL7 SPM.4 Specimen type (SNOMED)	HL7 SPM.5 Specimen type modifier or qualifier (SNOMED)	HL7 SPM.6 Specimen Additives (SNOMED)	HL7 SPM.7 Specimen Collection Method (SNOMED)	HL7 SPM.8 Source site/Body site (SNOMED)	HL7 SPM.9 Specimen type modifier or qualifier (SNOMED)	HL7 Table 0070	HL7 Table 0487
Stool*	Stool specimen (specimen)	-	-	-	-	-	Stool = Fecal	Stool = Fecal
Nasopharyngeal swab**	Nasopharyngeal swab (specimen)	-	-	-	-	-		
Abscess_Liver***	Specimen from abscess (specimen)	-	-	-	Liver structure (body structure)	-		

* This example cross-mapping illustrates a one to one mapping from the PHLIP preferred term ("Stool") to the SCT standard term. It also illustrates the mapping from the HL7 standard term to the SCT standard term

** This example cross-mapping illustrates a one to one mapping from the PHLIP preferred term ("Nasopharyngeal swab") to the SCT standard term. In this example, no equivalent term exists in the HL7 standard.

*** This example cross-mapping illustrates the need for multiple SPM fields needed for fully describing the PHLIP preferred term ("Abscess_Liver"). In this example, no equivalent term exists in the HL7 standard.

Next Steps

Inspired by the success of the RCMT format, the Specimen-CMT is being presented to the Public Health lab community through LabMCoP webinars and phConnect in order to work through several outstanding issues. We have invited attendees with subject matter expertise in environmental and animal testing, pathology and SNOMED to help facilitate discussion, refine, and standardize the specimen vocabulary across the community. These issues include how to message Isolate and DNA samples, environmental samples, and animal carcass samples for rabies related messaging. Through this process many new specimen type concepts have been identified and will be submitted to SNOMED for consideration.

To encourage standardization of specimen term coding outside of the Public Health domain, we are inviting participation in the LabMCoP through the vocabulary group of the Lab results Interface of the Standards and Interoperability (S&I) Framework to commercial labs, hospital labs, and LIMS vendors

As a long term deliverable we plan to propose a set of preferred specimen concepts for use as a recommended vocabulary on a national scale.

So join us!

Reference

<http://www.phconnect.org/group/laboratorymessagingcommunityofpractice/forum/topics/specimen-crossmap>

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