The HL7 TermInfo Project
Updates to the Draft Standard for Trial Use for SNOMED CT in HL7 Information Models

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What is TermInfo?

TermInfo is an HL7 Project developing standard guidance on use of **Terminologies** within **Information models**

- **Term** = Vocabulary = SNOMED CT®
  - In the future, include LOINC® and other “coded terminologies”
- **Info** = Structure = HL7 V3 RIM
  - Constrained Information Models (e.g. DIM/DMIM, SIM/RMIM, etc…)
    - Clinical Statement Model (used in multiple conformant models)
    - **Clinical Document Architecture (CDA)**
      - CDA R2 is specifically addressed in the current TermInfo ballot
TermInfo Project History

- Project launched by NASA in July 2004
  - Initial purpose was to enable effective coding and structuring of astronaut health records
- Adopted by HL7 Vocabulary TC in Sept. 2004
- Successfully balloted as a DSTU in Sept. 2007
- DSTU expired in May 2009
- Project re-launched in January 2012
- New DSTU balloted in January 2014
  - HL7 Version 3 Implementation Guide: TermInfo - Using SNOMED CT in CDA R2 Models, Release 1
Associate Charter Agreement – June 2005
Memorandum of Understanding (MOU) – March 2009
Public good license of SNOMED CT codes and descriptions for use in HL7 products – July 2011
New 2 year agreement signed 23 Sept 2014
HL7 Terminology Authority – Sept 2013
  Serves as central resource for interaction of HL7 with IHTSDO and other external terminology developers
Jointly publish the TermInfo Draft Standard for Trial Use (DSTU)
Why does TermInfo matter?

When using Structure and vocabulary together:

- Meaning depends on the combination of
  - Structure (RIM / CDA) – with coded attributes
  - Vocabulary (code system / terminology)

- The way these interact is critical to unambiguous communication of processable meaning

- TermInfo is developing standards for the semantic interface of HL7 models and vocabularies for clinical information, to enable semantic interoperability
Example – possible representation options

How do you record the performance of a “laparoscopic appendectomy” in the Procedures section of a C-CDA document?

- Option 1 (“pre-coordinated”)
  - code
    - code = “Laparoscopic appendectomy” (6025007)
    - qualifier absent
  - methodCode (or methodCode absent)
    - nullFlavor = “…”
Example (cont.)

- Option 2 ("general" code plus method)
  - **code**
    - code = “Appendectomy” (80146002)
    - qualifier absent
  - **methodCode**
    - code = “Laparoscopic procedure” (51316009)

- Option 3 ("post-coordinated")
  - **code**
    - code = “Appendectomy” (80146002)
    - qualifier
      - name code = “Using access device” (425391005)
      - value code = “Laparoscope” (86174004)
  - **methodCode** (or methodCode absent)
    - nullFlavor = “…”
Example (cont.)

- Option 4 ("post-coordinated" plus redundant method)
  - code
    - code = "Appendectomy" (80146002)
    - qualifier
      - name code = "Using access device" (425391005)
      - value code = "Laparoscope" (86174004)
  - methodCode
    - code = "Laparoscopic procedure" (51316009)

- Are there other possible options? – yes
- In your clinical systems, can you reliably determine if these different options have the same meaning?
- If not, then how should you interpret and use the data?
Obstacles to semantic interoperability

- Different views of which aspects of clinical information are important
- Different ways of structuring clinical information
  - Different uses of the same information model
- Different terminologies or coding systems
  - Limitations in the relationships between concepts represented in a coding system
- Different views of the interface between structure and terminology
  - Overlaps and gaps between the information model and the terminology model
Terminology model preferred

- Constraints on combinations of concepts and lists of permissible attributes (for refinement of concepts in specified domains)
  - For example, restrictions on "finding site" refinement of "appendicitis", conventions on representation of laparoscopic variants of procedures.
Structural model preferred

- Representation of relationships between distinct instances of record entries and other classes
  - For example, grouping of record entries related by timing, a particular problem or another organizing principle.
 Representation of contextual information related to instances of clinical situations
  - For example, family history, presence/absence, certainty, goals, past/current, etc.

 Representation of additional constraints on post-coordination of concepts for specific use cases
  - For example, constraints on terminology use specific to immunization and related adverse reaction reporting
SNOMED CT example - Relationships

- Respiratory disease (disorder)
- Infective pneumonia (disorder)
- Infection (disorder)
- Lung (body structure)
- Virus (organism)
- Viral pneumonia (disorder)
The supertypes of “Viral Pneumonia”
CDA (R2) features

- Human readable clinical information
- Author identified (person or organization)
- Can be authenticated
- Complete record for particular purpose
- Can include **structured data**, images, other multimedia in addition to human readable text
- Basis is the V3 Reference Information Model (RIM)
Representing post-coordination in HL7 V3 (Data Types R1 = used in CDA R2)

- HL7 CD data type (Concept Descriptor)
  
  ```xml
  <code codeSystem="2.16.840.1.113883.6.96"
        code="83738005" displayName="index finger structure">
    <qualifier>
      <name code="272741003" displayName="laterality"/>
      <value code="7771000" displayName="left"/>
    </qualifier>
  </code>
  
- Same expression in SNOMED compositional grammar
  
  83738005 | index finger structure | :  
  272741003 | laterality | = 7771000 | left |
Possible representations of “No family history of Asthma”

416471007 |Family history of clinical finding|:
246090004 |Associated finding| = 195967001 |Asthma|,
408729009 |Finding context| = 410516002 |Known absent|
Semantic interface issues occur with all information model and terminology combinations

- In practice the issue arises whenever you try to process meaning expressed in …
  - human language
    - grammar + vocabulary
  - a proprietary coded structured record
    - proprietary model + one or more code systems
  - a standard information model and terminology
    - HL7 V3 RIM + SNOMED CT or ICD9 or ICD10, etc.
    - EN 13606 + SNOMED CT or ICD10, etc.
Determining factors for the nature of semantic interface issues

- The type and complexity of these issues depend on several factors:
  - What do you need to say / how many ways can you say it?
    - Requirements for expressing processable meaning
  - How much structure do you use?
    - Expressivity of the information model
  - How flexible is your terminology?
    - Expressivity of the terminology model
  - How does the combination of structure and vocabulary work?
    - Expressivity of the information and terminology model together
Possible approaches to managing overlaps

- Omit or prohibit one representation
  - Avoid use of either the HL7 or the terminology representation

- Generate a required representation
  - Apply rules to generate one representation from the other

- Validate and/or merge representations
  - Allow both representations and apply rules that validate compatibility and merge the representations to an agreed consistent composite meaning
The TermInfo DSTU
TermInfo in the HL7 V3 Ballot
(expired – last balloted May 2009)
TermInfo in SNOMED CT Technical Implementation Guide (TIG) (expired)
New TermInfo DSTU Document
(January 2014 ballot)

HL7 Version 3 Implementation Guide: TermInfo - Using SNOMED CT in CDA R2 Models, Release 1
HL7 5th DSTU Ballot

Sponsored by:
Vocabulary Working Group
Purpose of the guide

- To ensure that HL7 Version 3 standards achieve their stated goal of semantic interoperability when used to communicate clinical information that is represented using concepts from SNOMED Clinical Terms® (SNOMED CT)

- The new January 2014 balloted version of the guide addresses the use of SNOMED CT in the CDA Release 2 standard in particular
Requirements and Criteria

Criteria for assessing alternative approaches to gaps and overlaps

Data should be:

- Understandable, Reproducible and Useful
- Transformable into a common “Model of Meaning”
- Practical
- Not superfluous
Contents

- **Normative sections**
  - Guidance on Overlaps Between RIM and SNOMED CT Semantics (2)
  - SNOMED CT Concept Domain Constraints (5)

- **Non-normative sections**
  - Introduction and Scope (1)
  - Common Patterns (3)
  - Normal Forms (4)
  - Glossary (6)
  - Appendices
New in TermInfo January 2014

- Further specified the focus to applications in CDA R2 models
  - CDA R2 is based on RIM and Clinical Statement versions that are close to prior TermInfo guidance
  - Significant current implementation activity (US and worldwide) is based on CDA R2

- Updated to reflect changes to SNOMED CT
  - Further refinement of Concept Model, Compositional Grammar, etc.
New in TermInfo January 2014

- Applied the ballot comment resolutions from the May 2009 ballot cycle
- Re-organized some material for better accessibility and flow
- Added a new "Audience" section
- Updated references to reflect newer tools and definitions
- Updated Glossary
TermInfo Guidance Example

2.2.3 Observation.code and Observation.value

- 2.2.3.1 Potential Overlap
- 2.2.3.2 Rules and Guidance
  
  [...] 
  
  2. In an Observation class instance where the Observation.code attribute is a SNOMED CT expression:

  • the expression SHOULD represent a type of [ <<363787002 | observable entity |] or [<<386053000 | evaluation procedure |], with application of the SNOMED CT Context Model when appropriate.

  [...] 

- 2.2.3.3 Discussion and Rationale
Where is TermInfo going?

- Complete ballot comment resolution for the January 2014 DSTU
- Once ballot comment resolution is complete, HL7 and IHTSDO will jointly publish the new updated DSTU (expected in early 2015!)
- Plan and begin next steps
  - Updated guidance to address the current HL7 RIM and clinical statement versions
  - Address similar issues in the new FHIR (Fast Healthcare Interoperability Resources) standard
Join the HL7 TermInfo Project at http://www.hl7.org/Special/committees/termino
Thank you!

Questions?

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