



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

Robert Hausam, MD

TermInfo Project Lead

Co-Chair of HL7 Vocabulary and Orders and
Observations Work Groups

SNOMED CT Implementation Showcase

30 October 2014

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

(Reference)

- 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*

HL7 and IHTSDO

- 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 Terminology 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 attributes¹**
 - **Vocabulary² (code system³ / terminology²)**
- The way these interact is critical to **unambiguous communication of processable meaning⁴**
- TermInfo is developing standards for the **semantic interface** of HL7 models and vocabularies for clinical information, to enable semantic interoperability⁵

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.)

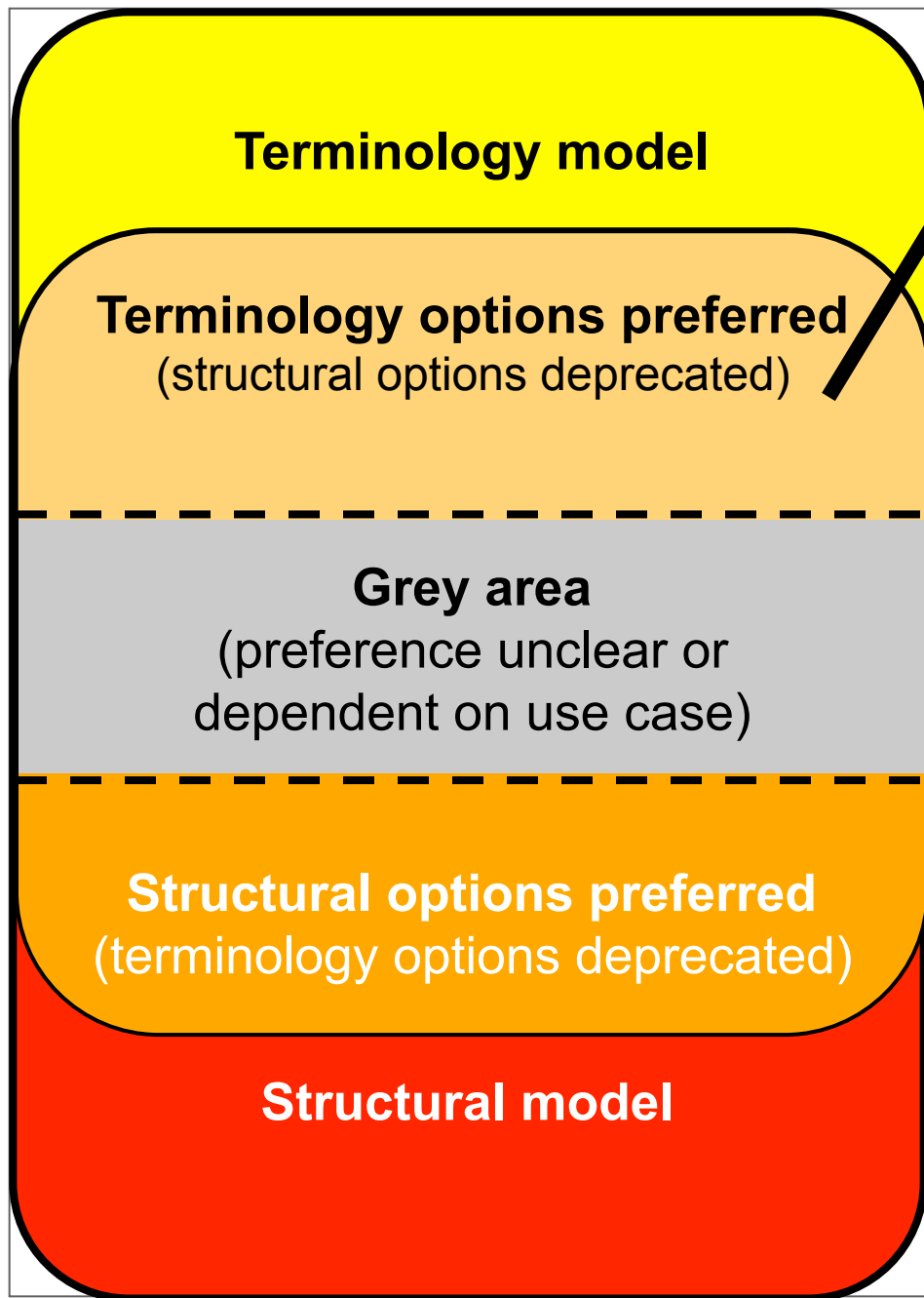
- Option 2 (“general” code plus method)
 - **code**
 - **code** = “Appendectomy” (80146002)
 - **qualifier** absent
 - **methodCode**
 - **code** = “Laparoscopic procedure” (51316009)
- Option 3 (“post-coordinated”)
 - **code**
 - **code** = “Appendectomy” (80146002)
 - **qualifier**
 - ✓ **name code** = “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.

Terminology model

Terminology options preferred
(structural options deprecated)

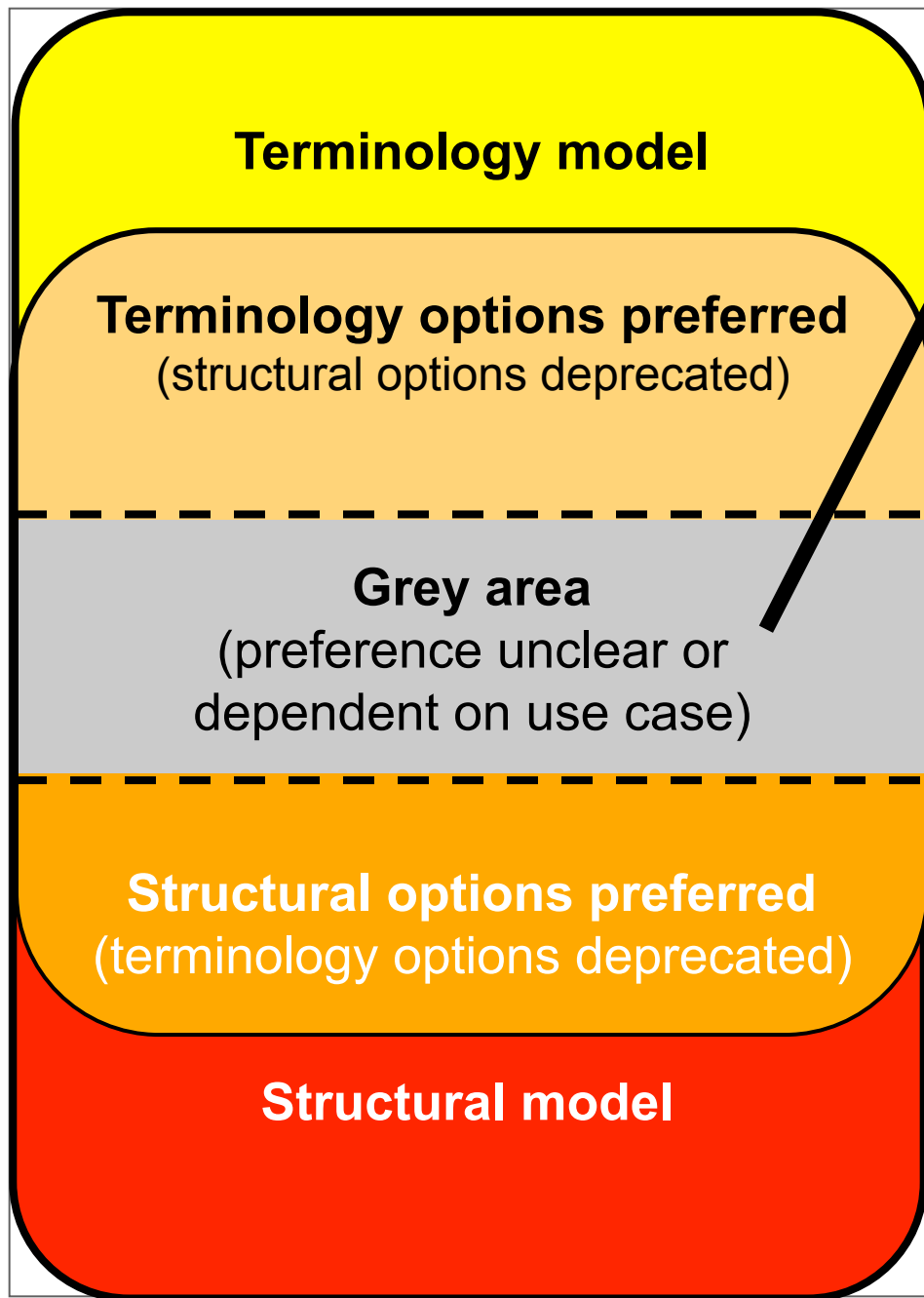
Grey area
(preference unclear or
dependent on use case)

Structural options preferred
(terminology options deprecated)

Structural model

Structural model preferred

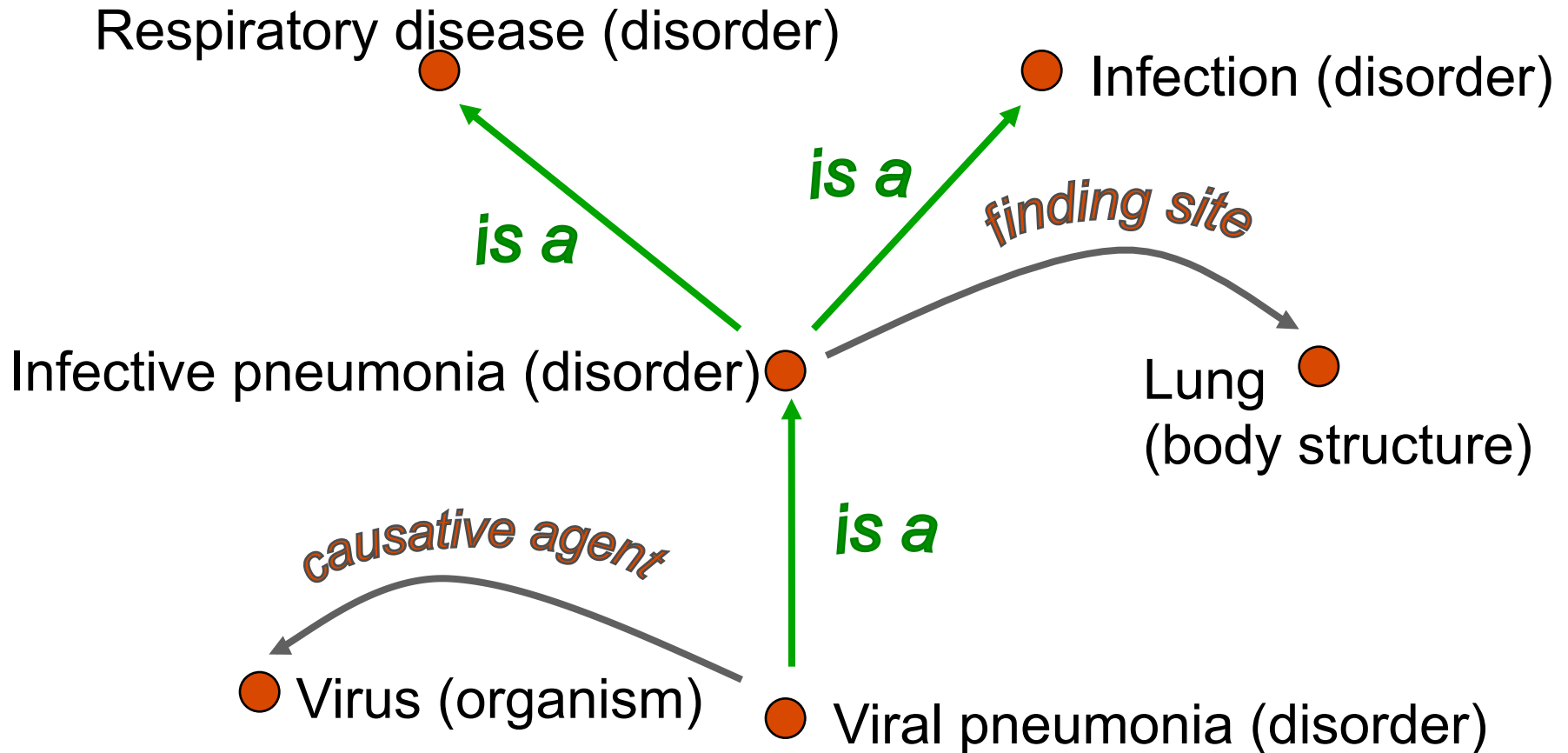
- Representation of **relationships between distinct instances of record entries** and other classes
 - For example, grouping of record entries related by timing, a particular problem or another organizing principle.



Grey area

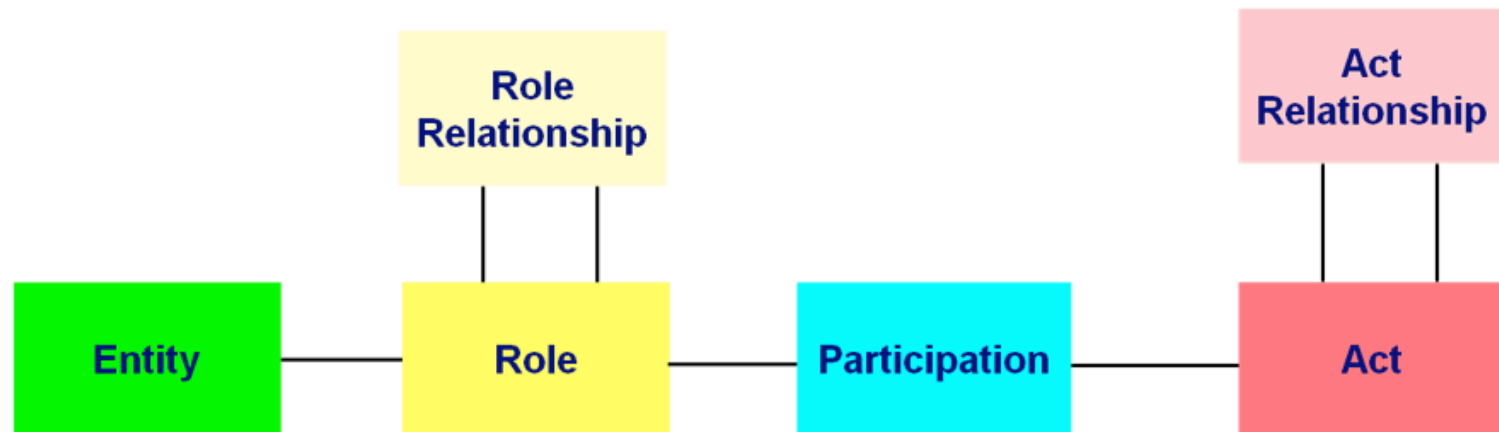
- Representation of **contextual information** related to instances of clinical situations
 - For example, family history, presence/absence, certainty, goals, past/current, etc.
- Representation of additional constraints on post-coordination of concepts for specific use cases
 - For example, constraints on terminology use specific to immunization and related adverse reaction reporting

SNOMED CT example - Relationships



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)

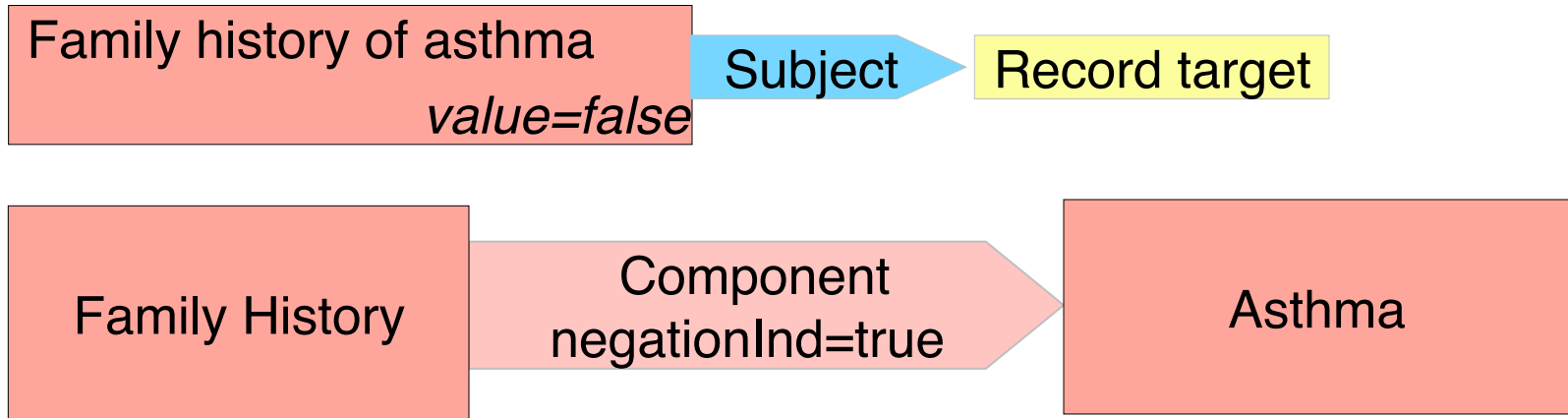
- HL7 CD data type (Concept Descriptor)

```
<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

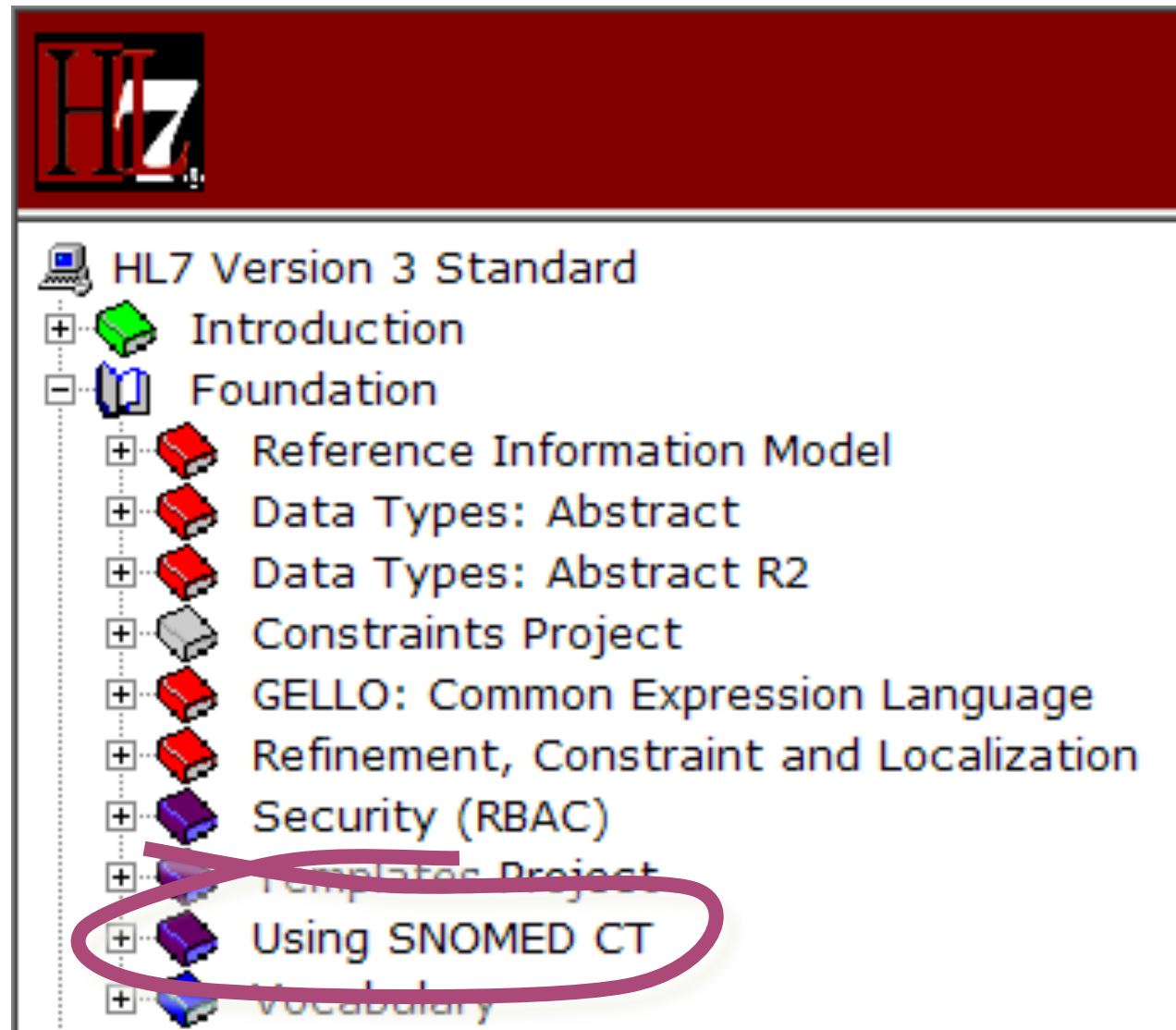
- Omit or prohibit one representation
 - Avoid use of either the HL7 or the terminology representation
- Generate a required representation
 - Apply rules to generate one representation from the other
- Validate and/or merge representations
 - Allow both representations and apply rules that validate 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)

Technical Implementation Guide

www.ihtsdo.org/fileadmin/user_upload/doc/tig/tig_webhelp.html

INTERNATIONAL HEALTH TERMINOLOGY STANDARDS DEVELOPMENT ORGANISATION

Using SNOMED CT in HL7 Version 3; Implementation Guide, Release 1.5

Technical Implementation Guide

Content | Search

- 1. Preface
- 2. Overview of the guide
- 3. SNOMED CT implementation
- 4. Structure and Content Guide
- 5. Release File Specifications
- 6. Concept Model Guide
- 7. Terminology Services Guide
- 8. Record Services Guide
 - 8.1. Entering Expressions
 - 8.2. Storing Expressions
 - 8.3. Retrieval and Aggregation
 - 8.4. Communicating Expressions
 - 8.4.1. Representation of SNOMED CT information in communications
 - 8.4.2. Overlaps between SNOMED CT and Structural Semantics
 - 8.4.3. Using Subsets to represent allowable value sets
 - 8.4.4. SNOMED Clinical Terms and HL7
- 9. Change Management Guide
- 10. Extension Services Guide
- 12. References

[Document Directory](#)

Project Leader & Principal Contributor	Edward Cheetham NHS Connecting for Health
Principal Contributor	Robert H. Dolin, MD Kaiser Permanente
Principal Contributor & Editor	David Markwell, MB BS The Clinical Information Consultancy Ltd
Contributor	Jane Curry Health Information Strategies
Contributor	Davera Gabriel, RN University of California, Davis Health System
Contributor	Robert Hausam TheraDoc
Contributor	Beverly Knight Canada Health Infoway
Contributor	Alan Rector Manchester University
Contributor	Kent Spackman Oregon Health Sciences University
Contributor	Ian Townend NHS Connecting for Health
Vocabulary Co-Chair	Chris Chute Mayo Clinic/Foundation
Vocabulary Co-Chair	Russ Hamm Apelon
Vocabulary Co-Chair	Stanley Huff, MD Intermountain Health Care
Vocabulary Co-Chair	Ted Klein Klein Consulting, Inc.
Vocabulary Co-Chair	Cecil Lynch OntoReason, LLC

HL7 DSTU EXPIRED
Copyright HL7 & IHTSDO

New TermInfo DSTU Document (January 2014 ballot)



V3_IG_SNOMED_R1_D5_2014JAN

■ IHTSDO delivering
■ SNOMED CT®
■ the global clinical terminology



**HL7 Version 3 Implementation Guide: Terminology - 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/terminfo> !

Health Level Seven International

Home | About HL7 | Standards | Membership | Resources | HL7 Store | Newsroom | Events | My HL7

Terminfo Project

Home | Overview | Leadership | Minutes | Documents | Listserv | Projects

OVERVIEW

Charter

Work Products and Contributions to HL7 Processes

WP1: Specification of a general approach to resolving issues related to the interface between HL7 information models and terminologies or code system... [\[More...\]](#)

DOCUMENTS AND PRESENTATIONS

RSS

1-10 of 33 Page: 1 2 3 4

Type	Name	Modified
	TermInfo Ballot materials minor update	Nov 20, 2006 12:00 AM
	Publication data for Jan 2007 DSTU ballot XML and HTML	Nov 19, 2006 12:00 AM
	Editing tool for TermInfo ballot	Sep 21, 2006 12:00 AM
	Source XML files and supporting files for TermInfo document	Sep 21, 2006 12:00 AM
	Ballot reconciliation at 2006-09-15 on May 2006 Ballot	Sep 18, 2006 12:00 AM
	SNOMED CT Guideline comments disposition	Sep 1, 2006 12:00 AM
	Representation of clinical findings with SNOMED CT and HL7 Version 3	Aug 31, 2006 12:00 AM
	Ballot comments spreadsheet post 2006-08-15 call	Aug 22, 2006 12:00 AM

LISTSERV DISCUSSIONS

[JOIN](#) Join the primary listserv, or edit your subscription

Jan 7 12:01pm ET **Terminfo Project (Terminfo Project)**
Re: To negate in vocab or by attribute?
Hi Thomas, There are some aspects of FHIR that will not be nailed down in the core specification. Selection of terminologies ...

Jan 3 11:22pm ET **Terminfo Project (Terminfo Project)**
Re: To negate in vocab or by attribute?
This is precisely the kind of issue that Terminfo is intended to deal with. I'm in agreement with Grahame and Peter that...

Jan 2 10:35am ET **Terminfo Project (Terminfo Project)**
RE: Terminfo 2 call agenda - January 2, 2013, 12:00 PM Eastern

[See this workgroup's Listservs or visit the Listserv Center.](#)

UPCOMING CALLS

No upcoming calls at this time.

Conference Call Center...



Thank you!

Questions?

Contact information

Robert Hausam, MD
Hausam Consulting LLC
rrhausam@gmail.com