# Introduction AND SCOPE

Purpose of the Guide

The purpose of this guide is 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®[[1]](#endnote-2) (SNOMED CT).

This version of the guide addresses use of SNOMED CT in the CDA Release 2 standard in particular. There are two primary reasons for this focus: (1) The current guidance in this ballot represents an incremental update from the prior DSTU (May 2009), as the CDA R2 standard (as a part of the HL7 V3 family) is based on versions of the RIM and Clinical Statement Pattern that are similar to those that were addressed in the prior DSTU; (2) CDA R2 represents a very important current use case of HL7 V3, as there is a great deal of CDA implementation activity occurring worldwide at present and likely for the foreseeable future (including Meaningful Use of Electronic Health Records in the US). Future guide versions are anticipated to expand the guidance related to other HL7 standards and terminologies.

Overview

This implementation guide has been developed by the HL7 TermInfo Project (a project of the HL7 Vocabulary Work Group) with significant contributions by the International Health Terminology Standards Development Organisation (IHTSDO). The guide is the result of a consensus process involving a wide range of interested parties who have contributed at various times over the span of the project.

* The HL7 Vocabulary and Structured Documents Work Groups
* The HL7 Clinical Statement Project
* Other current and past HL7 Technical Committees and Work Groups that have contributed to the project
* The SNOMED International Standards Board and Concept Model Working Group
* The IHTSDO, which took over ownership of SNOMED Clinical Terms in April 2007
* Vendors and providers actively implementing HL7 Version 3, including CDA R2, with SNOMED CT
* National Health Service (NHS) Connecting for Health in the United Kingdom
* A variety of other organizations and individuals who have contributed to the project or submitted ballot comments

The guide takes account of:

* The SNOMED CT Concept Model, including those elements concerned with the representation of context.
* The structure and semantics of the HL7 Reference Information Model (RIM).
* The particular features of CDA R2, to which the guidance in this version of the TermInfo implementation guide is specifically addressed.

Future Work

Future versions of this guide are anticipated to add guidance for:

* Use of both Clinical and Laboratory LOINC within HL7 V3 and CDA R2
* Use of SNOMED CT and LOINC with HL7 V3 features that are not available in CDA R2
* Use of both SNOMED CT and LOINC in FHIR
* Use of both SNOMED CT and LOINC in HL7 V2.x

Intended Audience – Who Should Read This Guide?

The guide can be used in various ways to assist the design, evaluation, operational implementation and use of various types of software applications that use SNOMED CT. The intended audience includes systems developers, health informatics specialists, purchasers, and system integrators.

**Software designers and developers**

Software designers and developers should use this guide:

• To enhance their technical understanding of SNOMED CT and the value it offers to their applications;

• As a point of reference when designing a SNOMED CT enabled application and when planning and undertaking the required development.

Designers and developers of fully integrated applications should use the guide:

• As a checklist of *SNOMED CT* services necessary to meet the needs of their users;

• For advice on how to implement the required services in ways that make the best use of *SNOMED CT* and which known pitfalls to avoid.

Designers and developers of *terminology servers* should use the guide:

• As a checklist when deciding which *SNOMED CT* services their server should offer;

• For advice on ways to implement the required services in ways that make the best use of *SNOMED CT* and avoid known pitfalls;

• As a point of reference when describing the functionality of their server.

Designers and developers of applications that use terminology services should use the guide:

• As a checklist of *SNOMED CT* services necessary to meet the needs of their users;

• To assist consideration of whether to use a *terminology server*;

• As a point of reference when reviewing the functionality of *terminology servers*.

**Health informatics specialists, analysts, purchasers and integrators**

Health informatics specialists, analysts, purchasers and integrators should use this guide:

• To enhance their technical understanding of SNOMED CT and the value it offers to their organization;

• As a point of reference when specifying, procuring and evaluating SNOMED CT enabled applications.

Health informatics specialists analyzing the needs of users and organizations should use this guide:

• As a checklist of *SNOMED CT* services necessary to meet the needs of their users;

• For advice on known pitfalls when implementing clinical terminologies;

• To assist decisions on technical approaches to design and implementation of applications that use *SNOMED CT*.

Purchasers of healthcare information systems should use this guide:

• As a checklist when specifying procurement requirements for applications that use *SNOMED CT*;

• As a starting point for the evaluation of the *SNOMED CT* related technical features of the available systems.

Healthcare information systems integrators should use this guide:

• As a checklist for confirming the claimed functionality of *SNOMED CT enabled applications*;

• For advice on alternative approaches to integration of *SNOMED CT* related services into a wider information system.

Information systems departments and project teams should use this guide:

• As a checklist for the *SNOMED CT* related functionality needed to meet the requirements of their users;

• For advice on alternative approaches to delivery

Standards designers/developers

• To enhance their technical understanding of the described standards and their relationship when implemented together;

• As a point of reference when updating or designing new artifacts including implementation guides

Scope

The primary scope of this implementation guide is to provide guidance for the use of SNOMED CT in the HL7 V3 Clinical Statement Pattern, especially as used within the CDA R2 standard. The guide will be useful to those constructing content based on the Clinical Statement Pattern, representing clinical information from various HL7 domains including Structured Documents (CDA release 2), Patient Care, Orders and Observations and models using the Clinical Statement Common Message Element Types (CMET[[2]](#endnote-3)).

The guidance in this document should also be applied to the use of SNOMED CT in other HL7 V3 models that share features with the Clinical Statement Pattern, unless domain specific requirements prevent this.

While other code systems (such as LOINC, ICD-9 and ICD-10) may be preferred or even required in some situations, these situations are outside the scope of this current version of the guide. Where a particular constraint profile requires the use of other code systems, that profile should complement and not contradict recommendations stated here.

How to read this document

Following this introduction (Section 1) this guide contains both normative and informative sections.

Section 1 (informative) covers the background, suggested audience and describes the documentation conventions used in the remainder of the document.

Section **Error! Reference source not found.** (normative) provides detailed guidance on dealing with specific overlaps between RIM and SNOMED CT semantics. It contains normative recommendations for use of SNOMED CT in relevant attributes of various RIM classes including Acts, ActRelationships and Participations. It also contains a subsection providing recommendations on Context conduction. Each subsection consists of:

* A brief introduction to the item;
* An explanation of the potential overlap;
* A statement of rules and guidance on usage;
* A supporting discussion and rationale.

Section **Error! Reference source not found.** (informative) provides a set of examples and patterns for representing common clinical statements. The approaches taken are consistent with the normative statements in Sections **Error! Reference source not found.** and **Error! Reference source not found.**, as well as work being done within HL7 domain committees.

Section **Error! Reference source not found.** (informative) describes normal forms, including their use with SNOMED CT. It also discusses considerations for transformations between various common representations and SNOMED CT or HL7 RIM based normal forms.

Section **Error! Reference source not found.** (normative) contains a number of constraints on SNOMED CT concepts applicable to relevant attributes in each of the major classes in the Clinical Statement Pattern. These normative constraints are presented as a series of tables in section **Error! Reference source not found.**. This section also summarizes the benefits and weaknesses of the constraints offered (see also **Error! Reference source not found.**).

The Glossary in Section 6 (informative) is a collection of abbreviations and terms used in this document with their respective definitions.

**Error! Reference source not found.** (informative) provides a general discussion of the potential overlaps between an information model and a terminology model and the pros and cons of various possible approaches to managing these overlaps.

**Error! Reference source not found.** (reference) provides references to relevant documents including SNOMED CT specifications and also outlines the compositional grammar used to express many of the examples in this document.

**Error! Reference source not found.** (informative) notes the changes to this document since the last ballot draft.

**Error! Reference source not found.** (informative) identifies known open issues in SNOMED CT that limit the completeness and consistent application of some of the guidance in this document.

**Error! Reference source not found.** (informative) provides a more detailed discussion of approaches to normative constraints on SNOMED CT and identifies the need for further development of formal vocabulary rules to support this.

This document includes hyperlinks to external documents as well as to other sections within this document, which can be identified by the cited section number listed at the end of the reference, e.g. (§ **Error! Reference source not found.**) for Appendix B Section 3.

In this document references to SNOMED CT concepts and expressions are represented using the SNOMED CT Compositional Grammar. An extension to this grammar is used in this document to represent constraints on use of SNOMED CT concepts and expressions.

It is recommended to review the material on the extended grammar, which is explained in [SNOMED CT Compositional Grammar - extended (§](file:///C%3A%5C%5CUsers%5C%5CLisa%5C%5CDocuments%5C%5C05%20Professional%5C%5C90%20HL7%5C%5C00%20Standard%20-%20TermInfo%5C%5CTermInfo%20Course%2020130506%5C%5Chtml%5C%5Cinfrastructure%5C%5Cterminfo%5C%5Cterminfo.htm%22%20%5Cl%20%22TerminfoAppendRefsGrammar) **[Error! Reference source not found.](file:///C%3A%5C%5CUsers%5C%5CLisa%5C%5CDocuments%5C%5C05%20Professional%5C%5C90%20HL7%5C%5C00%20Standard%20-%20TermInfo%5C%5CTermInfo%20Course%2020130506%5C%5Chtml%5C%5Cinfrastructure%5C%5Cterminfo%5C%5Cterminfo.htm%22%20%5Cl%20%22TerminfoAppendRefsGrammar)**[)](file:///C%3A%5C%5CUsers%5C%5CLisa%5C%5CDocuments%5C%5C05%20Professional%5C%5C90%20HL7%5C%5C00%20Standard%20-%20TermInfo%5C%5CTermInfo%20Course%2020130506%5C%5Chtml%5C%5Cinfrastructure%5C%5Cterminfo%5C%5Cterminfo.htm%22%20%5Cl%20%22TerminfoAppendRefsGrammar), together with references to the SNOMED CT source material related to the underlying logical model before reading the main part of this guide. Reviewing **Table 12 (Compositional Grammar extension - Constraint symbols)** should be especially useful, as it provides the meaning of the symbols that are used in the compositional grammar examples that are provided throughout this document.

Conformance statements are identified in the normative sections using this convention:

Background

Semantic interoperability of clinical information

One of the primary goals of HL7 Version 3 is to deliver standards that enable semantic interoperability. Semantic interoperability is a step beyond the exchange of information between different applications that was demonstrated by earlier versions of HL7. The additional requirement is that a receiving application should be able to retrieve and process communicated information, in the same way that it is able to retrieve and process information that originated within its own application. To meet this requirement the meaning of the information communicated must be represented in an agreed upon, consistent and adequately expressive form.

Clinical information is information that is entered and used primarily for clinical purposes. The clinical purposes for which information may be used include care of the individual patient and support to population care. In both cases there are requirements for selective retrieval of information either from within a single patient record or from the set of records pertaining to the population being studied. Meeting these requirements depends on consistent interpretation of the meaning of stored and communicated information. This requires an understanding of the varied and potentially complex ways in which similar information may be represented. This complexity is apparent both in the range of clinical concepts that need to be expressed and the relationships between instances of these concepts. One way to organize information is in templates, which do not carry semantic meaning. The semantics must be communicated through the structure and vocabulary of the data itself.

Delivering semantic interoperability in this field presents a challenge for traditional methods of data processing and exchange. Addressing this challenge requires an established way to represent reusable clinical concepts and a way to express instances of those concepts within a standard clinical record, document or other communication.

 Reference Information Model

The HL7 Version 3 Reference Information Model ([RIM](http://www.hl7.org/implement/standards/rim.cfm)) provides an abstract model for representing health related information. The RIM comprises classes which include sets of attributes and which are associated with one another by relationships.

Documentation of RIM classes, attributes and relationships and the concept domains specified for particular coded attributes provide standard ways to represent particular kinds of information. The RIM specifies internal vocabularies for some structurally essential coded attributes but also supports use of external terminologies to express more detailed information. SNOMED CT is one of the external terminologies that may be used in HL7 communications.

Clinical Statements

The RIM is an abstract model and leaves many degrees of freedom with regard to representing a specific item of clinical information. The HL7 Clinical Statement project has developed and is now maintaining a more refined model for representing discrete instances of clinical information and the context within which they are recorded.

The HL7 Clinical Statement Pattern is a refinement of the RIM, which provides a consistent structural approach to representation of clinical information across a range of different domains. However, neither the RIM nor the Clinical Statement Pattern place any limits on the level of clinical detail that may be expressed in a structured form. At the least structured extreme, an HL7 Clinical Document Architecture (CDA) document may express an entire encounter as text with presentational markup, without any coded clinical information. An intermediate level of structure might be applied when communicating a clinical summary with each diagnosis and operative procedure represented as a separate coded statement. Requirements for more comprehensive communication of electronic health records can be met by using the Clinical Statement Pattern to fully structure and encode each individual finding and/or each step in a procedure.

The Clinical Statement Pattern is the common foundation for the CDA Entries in HL7 Clinical Document Architecture release 2 and for the clinical information content of HL7 Care Provision messages. Details of the Clinical Statement Pattern can be found in the Universal Domains section of the HL7 Version 3 Normative Edition ([2013 version](http://www.hl7.org/implement/standards/product_brief.cfm?product_id=306)). The clinical statement models used in CDA R2 are based on an early pre-publication version of the Clinical Statement Pattern (the closest available version is published in the [May 2005 ballot package](http://www.hl7.org/v3ballotarchive_temp_EAFE5005-1C23-BA17-0C14FAD30AD1332A/v3ballot2005MAY/html/welcome/environment/index.htm) under Common Domains – available to members).

Even within the constraints of the Clinical Statement Pattern, similar clinical information can be represented in different ways. One key variable is the nature of the code system chosen to represent the primary semantics of each statement. The other key variable is the way in which overlaps and gaps between the expressiveness of the information model (clinical statement) and the chosen terminology are reconciled.

Data Types

HL7 has defined “abstract” data types for use in HL7 models, and these definitions have been revised. While R2 addresses concerns some users have had with the original version (R1), the R1 datatype is normative for many existing specifications, including CDA R2. Of particular interest for this implementation guide is the Concept Descriptor (CD) data type (present in both versions), which is used for the representation of coded data (in SNOMED CT or other terminologies), and is the most general coded data type. The CD data types provide for the representation of post-coordinated expressions, although by different mechanism in the two versions.

The Data Types R1 specification, which is used by CDA R2 (and other earlier versions of V3), supports representation of post-coordination using “qualifier” elements (one or more) which encode attribute-value pairs that “qualify” (or modify) a primary concept (code) and are represented as an XML structure. Datypes R2 instead uses an arbitrary length string representation for the “code” attribute, which allows post-coordination to be represented by the grammar (if any) that is defined for that purpose by the terminology (code system) itself. In the case of SNOMED CT, this is the Compositional Grammar.

In this guide examples will be showing the use of both Data Types R1 and R2, with the R1 examples being directly applicable to use in CDA R2. Both datatypes can support translation, though translation is not specifically in scope of TermInfo, as the translational mappings should be to the content represented in the respective datatype, regardless of its representation.

Example of CD R1:

Example of CD R2:

Coding and Terminologies

The scope of clinical information is very broad, and this, together with the need to express similar concepts at different levels of detail (granularity), results in a requirement to support a large number of concepts and to recognize the relationships between them.

Several candidate terminologies have been identified at national and international levels. HL7 does not endorse or recommend a particular clinical terminology. However, HL7 is seeking to address the issues raised by combining particular widely-used terminologies with HL7 standards.

This guide focuses on the issues posed by using SNOMED Clinical Terms® (SNOMED CT) with HL7 clinical statements. It includes specific advice on how to specify communications that use SNOMED CT to provide the primary source of clinical meaning in each clinical statement.

Although this guide is specifically concerned with SNOMED CT, it is likely that similar issues will be encountered when considering the use of other code systems within HL7 clinical statements. Therefore some of the advice related to general approaches to gaps and overlaps is more widely applicable.

SNOMED CT

SNOMED CT is a clinical terminology which covers a broad scope of clinical concepts to a considerable level of detail. It is one of the external terminologies that can and will be used in HL7 Version 3 communications. SNOMED CT has various features that add flexibility to the range and detail of meanings that can be represented. These features summarized below are documented in detail in documents listed in SNOMED CT Reference materials (§ **Error! Reference source not found.** ). The OID value that identifies SNOMED CT when used in HL7 V3 models (in CD and additional coded datatypes) is "2.16.840.1.113883.6.96".

Logical concept definitions

Each SNOMED CT concept has an associated set of one or more relationships to other concepts, and may be fully defined by these relationships (if the set of relationships is insufficient to fully define the concept, the concept is considered to be primitive).. The following example illustrates the type of logical definitions that are distributed as part of SNOMED CT.

|  |
| --- |
| Example 1. SNOMED CT definition of 'fracture of femur' |
| [ 71620000 | fracture of femur |] is fully defined as...    116680003 | is a | = 46866001 | fracture of lower limb |,   116680003 | is a | = 7523003 | injury of thigh |,     {116676008 | associated morphology | = 72704001 | fracture |,     363698007 | finding site | = 71341001 | bone structure of femur |} |

**NOTE:** This example and many of the other illustrations in this document are expressed using the SNOMED CT compositional grammar. Where relevant this document also uses proposed extensions to this grammar to represent constraints on use of SNOMED CT concepts and expressions. The extended grammar is explained in [SNOMED CT Compositional Grammar - extended (§](file:///C%3A%5C%5CUsers%5C%5CLisa%5C%5CDocuments%5C%5C05%20Professional%5C%5C90%20HL7%5C%5C00%20Standard%20-%20TermInfo%5C%5CTermInfo%20Course%2020130506%5C%5Chtml%5C%5Cinfrastructure%5C%5Cterminfo%5C%5Cterminfo.htm%22%20%5Cl%20%22TerminfoAppendRefsGrammar) **[Error! Reference source not found.](file:///C%3A%5C%5CUsers%5C%5CLisa%5C%5CDocuments%5C%5C05%20Professional%5C%5C90%20HL7%5C%5C00%20Standard%20-%20TermInfo%5C%5CTermInfo%20Course%2020130506%5C%5Chtml%5C%5Cinfrastructure%5C%5Cterminfo%5C%5Cterminfo.htm%22%20%5Cl%20%22TerminfoAppendRefsGrammar)**[)](file:///C%3A%5C%5CUsers%5C%5CLisa%5C%5CDocuments%5C%5C05%20Professional%5C%5C90%20HL7%5C%5C00%20Standard%20-%20TermInfo%5C%5CTermInfo%20Course%2020130506%5C%5Chtml%5C%5Cinfrastructure%5C%5Cterminfo%5C%5Cterminfo.htm%22%20%5Cl%20%22TerminfoAppendRefsGrammar), together with references to the SNOMED CT source material.

Formal rules for post-coordinated expressions

When a SNOMED CT concept is used to record an instance of information, it can be refined in accordance with the SNOMED CT Concept Model to represent more precise meanings.

* For example, it might be necessary to record a "compression fracture of the neck of the femur".
	+ SNOMED CT does not contain a concept identifier for this specific type of fracture at this precise location. However, the post-coordination rules allow refinement of the "finding site" and "associated morphology" attributes in the definition of the concept "fracture of femur" (see above example).
	+ Therefore the required information can be recorded by refining the concept "fracture of femur" with the site "neck of femur" and the morphology "compression fracture".

The result of a refinement is referred to as a *post-coordinated expression*. A post-coordinated expression conforms to an abstract logical model specified in the "SNOMED CT Technical Implementation Guide" (see SNOMED CT Reference materials (§ **Error! Reference source not found.**)). The same guide also specifies a compositional grammar for representing these expressions in a way that is both human-readable and computer-processable (see also SNOMED CT Compositional Grammar - extended (§ **Error! Reference source not found.**)). The example below uses this grammar to represent a post-coordinated expression for "compression fracture of neck of femur".

|  |
| --- |
| Example 2. Expression representing 'Compression fracture of neck of femur' in SNOMED CT compositional grammar |
| 71620000 | fracture of femur |:   116676008 | associated morphology | =21947006 | compression fracture |   ,363698007 | finding site | =29627003 | structure of neck of femur | |

These expressions can also be accommodated within the HL7 Concept Descriptor (CD) data type which may be applied to various coded attributes in HL7 specification. For example, the SNOMED CT expression indicating a "compression fracture of neck of femur" can be represented as shown in the following example:

|  |
| --- |
| Example 3. Expression representing 'Compression fracture of neck of femur' in CD datatype |
| **CDA R2 and R1 CD datatype**<code code="71620000" codeSystem="2.16.840.1.113883.6.96" displayName="fracture of femur"> <originalText> < Compression fracture of neck of femur> </originalText><qualifier> <name code="363698007" displayName="finding site"/> <value code="29627003" displayName="structure of neck of femur"/> </qualifier> <qualifier> <name code="116676008" displayName="associated morphology"/> <value code="21947006" displayName="compression fracture"/> </qualifier> </code>  **R2 CD datatype**<code code="71620000 | fracture of femur |:116676008 | associated morphology | =21947006 | compression fracture |,363698007 | finding site | =29627003 | structure of neck of femur |"  codeSystem="2.16.840.1.113883.6.96"/><originalText> < Compression fracture of neck of femur> </originalText> |

A logical model for representation of semantic context

SNOMED CT "clinical finding" and "procedure" concepts have assumed (default) contexts which apply if they are used in a record without an explicit context.

1. Default Context:

The default context for a [ <<404684003 | **clinical finding** |] is that the finding is asserted to be present in the person who is the subject of the record at the current time (or at a specified time).

o E.g. When the concept [ 233604007 | pneumonia |] is used in a clinical record it is assumed to mean that pneumonia was found to be present in the subject of the record either at an explicitly stated effective time or at the current time when the statement was made.

The default context for a [ <<71388002 | **procedure** |] is that the procedure is asserted to have been done to the person who is the subject of the record, at the current time (or at a specified time).

o E.g. When the concept [ 80146002 | appendectomy |] is used in a clinical record it is assumed to mean that an appendectomy was done on the subject of the record either at an explicitly stated effective time or at the current time when the statement was made.

2. Overwriting default context:

The default context for a [ <<404684003 | **clinical finding** |] can be overridden by an explicit representation of context. Alternative contexts include:

* Finding contexts such as: present, absent, unknown, goal, risk, etc.
* Subject relationship contexts such as: family member, mother, father, sibling, contact, etc.
* Temporal contexts such as: past, current, recent, etc.

The default context for a [ <<71388002 | **procedure** |] can be overridden by an explicit representation of context. Alternative contexts include:

• Procedure contexts such as: requested, planned, in progress, done, not done, not to be done, etc.

• Subject relationship contexts: as above for findings

• Temporal contexts: as above for findings.

Explicit context may be represented either in a pre-coordinated form using a concept that is a subtype of [ <<243796009 | situation with explicit context | ] or by using a post-coordinated expression.

2.1 Using Pre-coordination to overwrite default context:

The following concepts provide examples of pre-coordinated concepts that include explicit context:

* [ 297243001 | family history of pernicious anemia | ]
* [ 399211009 | past history of myocardial infarction | ]
* [ 160274005 | no family history diabetes | ]
* [ 168748001 | mammography requested | ]

No pre-coordinated concept exists for “Patient has goal of being able to walk”

2.2 Using Post coordination to overwrite default context:

The following expressions illustrate ways in which in post-coordination can be applied to represent explicit context:

* [ 281666001 | family history of disorder |: 246090004 | associated finding | = 84027009 | pernicious anemia | ]
* [ 417662000 | past history of clinical finding |: 246090004 | associated finding | = 22298006 | myocardial infarction | ]
* [ 281666001 | family history of disorder |: 408729009| finding context | = 410516002 | known absent |, 246090004 | associated finding | = 73211009 | diabetes mellitus | ]
* [ 129125009 | procedure with explicit context | : 363589002 | associated procedure |= 71651007 | mammography |: 408730004 | procedure context | = 385644000 | requested | ]
* [ 413350009 | finding with explicit context |: 246090004 | associated finding | = 282144007 | able to walk |, 408729009 | finding context | = 410518001 | goal | ]

2.3 Example in CDA:

Family history of pernicious anemia

Mammography requested

Depending on how the information model is set up, selection of pre-coordination or post-cordination using the terminology or the information model is important. For example, where the information model supports the use of qualifiers, pre-coordination of concpets that overlap with said qualifiers should be disallowed.

Transformation and comparison of alternative representations

SNOMED CT expressions can be compared by applying "normal form" transformations that make use of logical concept definitions. These transformations generate the same normal form when applied to two expressions that logically have the same meaning. For more information on transformation to normal forms refer to [Normal Forms (§](file:///C%3A%5C%5CUsers%5C%5CLisa%5C%5CDocuments%5C%5C05%20Professional%5C%5C90%20HL7%5C%5C00%20Standard%20-%20TermInfo%5C%5CTermInfo%20Course%2020130506%5C%5Chtml%5C%5Cinfrastructure%5C%5Cterminfo%5C%5Cterminfo.htm%22%20%5Cl%20%22TerminfoAppendRefsGrammar) **[Error! Reference source not found.](file:///C%3A%5C%5CUsers%5C%5CLisa%5C%5CDocuments%5C%5C05%20Professional%5C%5C90%20HL7%5C%5C00%20Standard%20-%20TermInfo%5C%5CTermInfo%20Course%2020130506%5C%5Chtml%5C%5Cinfrastructure%5C%5Cterminfo%5C%5Cterminfo.htm%22%20%5Cl%20%22TerminfoAppendRefsGrammar)**[)](file:///C%3A%5C%5CUsers%5C%5CLisa%5C%5CDocuments%5C%5C05%20Professional%5C%5C90%20HL7%5C%5C00%20Standard%20-%20TermInfo%5C%5CTermInfo%20Course%2020130506%5C%5Chtml%5C%5Cinfrastructure%5C%5Cterminfo%5C%5Cterminfo.htm%22%20%5Cl%20%22TerminfoAppendRefsGrammar)

* When the transformation rules are applied to either of the following two expressions:
	+ [ 297243001 | family history of pernicious anemia |]
	+ [ 281666001 | family history of disorder |: 246090004 | associated finding | = 84027009 | pernicious anemia |]

the following normal form is generated

* + 243796009 | situation with explicit context | :
	{ 246090004 | associated finding | = 84027009 | pernicious anemia |, 408729009 | finding context | = 410515003 | known present |,
	408731000 | temporal context | = 410512000 | current or specified |,
	408732007 | subject relationship context | = 303071001 | person in the family | }

This means that these two expressions are equivalent - they mean the same thing, and are computably equivalent, as they transform to the same normal form.

Potential conflicts when using SNOMED CT within HL7

The expressivity of SNOMED CT is one of its strengths. However this also leads to cases where overlaps may occur with semantics that may also be represented by an information model such as the HL7 RIM. For example:

* a single SNOMED CT coded expression can represent a meaning that the HL7 RIM could also represent using a combination of several coded attributes or related classes;
* HL7 RIM semantics may modify the default assumptions about the meaning of a SNOMED CT expression;
* HL7 RIM semantics may contradict the meaning expressed by a SNOMED CT expression.

There is a requirement for clear rules and guidance on these overlaps to minimize the risk that alternative representational forms, may lead to duplication, ambiguity and erroneous interpretation.

Guidance

This guide identifies gaps between the SNOMED CT terminology model and the HL7 RIM model and areas in which they overlapas a potential source of inconsistency and variablility in representation. Both overlaps and gaps will require identifying them and then either adjusting the information model or terminology model, but ideally not both at the same time to address them. Bridging gaps may require new functionality, while overlaps can be managed by adjusting how information and terminology model are used together to meet the common goal of semantic interoperability. Gaps will be identified as people implement the standards and are not specifically addressed further in the document. Identified gaps should be taken back to the appropriate standards organizations such as HL7 or IHTSDO.

The guide identifies options for use of SNOMED CT concepts, in both pre and post-coordinated forms in various attributes of HL7 RIM classes. The primary focus is on the RIM class clones used in the HL7 Clinical Statement Pattern. However, the general principles of the advice are also applicable to many RIM class clones used in constrained information models that form part of other HL7 specifications and standards.

In some situations, the features of HL7 Version 3 and SNOMED CT dictate a single way to utilize these two models together. Where this is true, the guide contains a single recommended approach which is normative, based on referenced pre-existing standards.

In other situations, there are several possible ways to combine HL7 and SNOMED CT to resolve a gap or an overlap. In these cases, the advantages and disadvantages of each option are evaluated. The next section explains the criteria used in this evaluation.

Requirements and Criteria

The intent of this section is to describe the requirements and criteria used to weigh various instance representations in order to arrive at the recommendations in this specification.

As discussed above, there are situations where there are several possible ways to combine HL7 and SNOMED CT to resolve a gap or an overlap. In these cases, the advantages and disadvantages of each option are evaluated using the criteria stated here. The guide recommends against approaches that have a disproportionate balance of disadvantages and are unlikely to deliver semantic interoperability. In some cases, the guide contains advice on several alternative approaches and the recommended approach may be based on prior implementation in accordance with criterion 4 below.

The following criteria have been identified to address these requirements:

1. Understandable, Reproducible, Useful: Normative statements and recommendations in this guide:
* Must be widely understandable by implementers who are familiar with the use of SNOMED CT and HL7 V3.
* Must be able to be applied consistently.
* Must cover common scenarios, but need not cover all conceivable cases of SNOMED CT/HL7 overlap.
1. Transformable into a common "Model of Meaning": Normative statements and recommendations in this guide should result in instance representations that can be converted, by following a set of computationally tractable rules, into a single normal form (known as the "Model of Meaning").[[3]](#footnote-2)
* Where this implementation guide supports multiple representations of the same meaning, they are all transformable (using appropriate procedures/tooling) to one another and/or into a single Model of Meaning.
* Representations that can be reused consistently in many contexts (problem list, family history, chief complaint, medical history, documentation of findings, final diagnosis, etc.) are preferred to representations that are specific to a particular context.
* Representation of data, precisely in the form in which it was captured in the application of origin (also referred to as the "Model of Use"), is not recommended unless the representation is transformable into a common Model of Meaning.
1. Practical: Tractable tooling/data manipulation requirements
* We can confirm with tools that an instance conforms to the recommendations.
* Existing tools and applications, either in their current form or with reasonable enhancements, can produce the recommended instances.
* Model does not require a combinatorial explosion of pre-coordinated concepts. For example, the model should not require the creation of the cross product of "Allergic to" and all drugs and substances.
1. Not superfluous: Where more than one approach appears to be viable and broadly equal in respect of the criteria above a single approach is recommended to avoid unnecessary divergence.
* Where one approach has already been successfully implemented and the other has not, the implemented approach is recommended.
* Optionality is restricted where possible to simplify the delivery of semantic interoperability.

Asserting Conformance to this Implementation Guide

This specification defines constraints on the use of SNOMED CT in an HL7 CDA R2 or other V3 instance. HL7 V3 provides a mechanism to reference a template or implementation guide that has been assigned a unique identifier, by referencing the guide's identifier in the InfrastructureRoot.templateId field. The formal identifier for this guide is **'2.16.840.1.113883.10.5'.**

The following example shows how to formally assert the use of this implementation guide. Use of the templateId indicates that the HL7 V3 instance not only conforms to the base specification, but in addition, conforms to constraints specified in this implementation guide.

|  |
| --- |
| Example 4. Use of the templateId element to assert conformance to this guide  |
| <V3Instance> <templateId root='2.16.840.1.113883.10.5'/> ...</V3Instance> |

**NOTE:** The normative constraints in this guide are expressed in a technology-neutral formalism. The key words **"SHALL"**, **"SHALL NOT"**, **"SHOULD"**, **"SHOULD NOT"**, **"MAY"**, and **"NEED NOT"** in this document are to be interpreted as described in the HL7 Version 3 Publishing Facilitator's Guide (available to members at the [HL7 ballot site](http://www.hl7.org/participate/onlineballoting.cfm?ref=common)). Various options for computable representations are under consideration and non-

1. More information: <http://ihtsdo.org/snomed-ct/> [↑](#endnote-ref-2)
2. The Clinical Statement CMET is a proposed replacement for the Supporting Clinical Information CMET which is based on the Clinical Statement pattern. [↑](#endnote-ref-3)
3. Text TBD [↑](#footnote-ref-2)