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Inforoute Santé du Canada

HL7 v3 pan-Canadian Messaging Standards

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Version	Author(s)	Change Description	Date
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2.01	SC Standards Team	• Minor edits requested during public review, specifically edits of the boilerplates	2009-02-20
2.02	SC Standards Team	• Disposition of comments approved by SCWG 9 are summarized below: • Corrected spelling errors • Added numeric values and titles for each table • Added a list of tables • Added references to Appendix A and cross-referenced with footnotes • Added a section on Use of OIDs • Added new sections: 6.1 UCUM Atomic Unit Symbols, 6.2 Prefixes and 6.3 Unit Expression Rules • Ensured consistency for SNOMED CT®, IHTSDO® and LOINC® • Editorial changes for sentence structures • Enhanced how to apply ICD-0-03 Canadian Cancer Registry • Added to the benefits table to Clinical Administrators and Benefits to Patients • Added new section 2.1.2 Terminology Design Considerations • Created placeholders for future enhancements in the next publication within the Notes to Reader, for example, topics related to: Creating Subsets, Mapping, Code System Selection Methodology, TermInfo Project, Naming Rules, • Added reference to the SCTEMP document and its approved recommendation • Enhanced Section VII International Statistical Classification of Diseases and Related Health Problems • Clarified definitions between Glossary and Implementation Guide Volume 2 • Added section on SNOMED CT® Licenses • Edited document for consistency for usage of terms, however, this is ongoing	2009-02-23 to 2009-03-11
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Version	Author(s)	Change Description	Date
	Team	• Replaced all instances of ‘Value Set’ with ‘Value Set’.	
02.05	SC Terminology Team	• All sections of the guide were updated and only a clean version of this guide will be published • Re-written with more implementation content for stakeholders • Removed Related Documents and External Documents table and provided a link to InfoCentral, updated urls and clarified information provided • A copy of this guide with track changes shown can be made available upon request to the Infodesk at standards@infoway-inforoute.ca	2013-09-23

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PREFACE – QUICK DOCUMENT OVERVIEW

Purpose	The purpose of this document is to provide implementation, compliance, and conformance guidelines for use in developing software that conforms to the Message and Terminology Specifications developed by *Infoway* through the Standards Collaborative governance process Specifically this Implementation Guide Volume contains material related to terminology and general vocabulary guidance as it relates to messaging. This guide is intended to be used with the implementation guide or guides related to the specific domain being implemented.
Audience	The audience for this document includes organizations implementing the Message and Terminology Specifications contained in the appropriate Implementation Guide Volumes of this maintenance release (e.g., Shared Health Record Medication Management, Laboratory, Provider and Client Registries). It does not include domain specific terminology guidance. Stakeholders must consult the domain specific Implementation Guides for information on these areas as applicable. This document is intended for business and technical audiences in order to support their implementation of the pan-Canadian standards.

Structure	This document includes the following sections:	
	Introduction	General introduction to this document.
	Terminology Overview	Brief introduction to interface vs reference terminologies, semantic interoperability and terminology selection
	HL7 v3	Key underlying terminology integration capabilities.
	SNOMED CT	Key highlights on the evolvement of SNOMED CT and its use.
	LOINC	Key highlights on the use and implementation of LOINC.
	UCUM	Key highlights on the use and implementation of UCUM.
	International Classification of Diseases and Related Health Problems	Brief overview of the International Classification of Diseases and Related Health Problems, its use and where to find more information.
	Master Terminology Worksheet User Guide (MTW)	Guidance on how to use the Master Terminology Worksheet.
	Model Interchange Format (MIF)	An explanation of the vocabulary Model Interchange Format files including a formal definition of the vocabulary.
	Schemas	Information on the vocabulary schemas published for use with the message schemas.

	Terminology Maintenance	High level guidance on how to maintain terminologies.

TABLE OF CONTENTS

List of Tables and Figures

I INTRODUCTION

1.1 Background

This Implementation Guide provides general information and guidance to Implementers implementing the vocabulary used in *Infoway*'s pan-Canadian EHR Message Specifications. Combined with professional judgment, the Implementation Guide is an additional tool, among a set of tools, designed to support providing better healthcare and electronic health surveillance.

1.2 Scope

The scope of this Volume is limited to terminology, and it is intended to be used with the other Domain Implementation Guides within the pan-Canadian messaging standards, the Master Terminology Worksheet (MTW) and the MIF (Model Interchange Format) to support implementations. Common topics such as glossary, data types, message wrappers and CMETs (Common Message Element Types) are included in other volumes (see the Related Documents section for information on how to access other artifacts within this release).These companion documents, in conjunction with this Volume, make up the complete Terminology and Message Specifications for any particular implementation.

Implementers of these messages and terminology may also wish to consider providing additional jurisdictional guidance on communication protocols, business rules, and policy guidelines as applicable.

1.3 Purpose

The Implementation Guide defines and references terminology used in the pan-Canadian Message Specifications. It provides implementation, compliance and conformance guidelines for use in developing software that conforms to the Message Specifications developed through the Standards Collaborative governance process. It also provides additional information necessary to implement the developed Message Specifications such as business rules not specified through the message constructs. However, Implementers must also review any additional guidance provided by implementing jurisdictions.

Although the primary purpose of this document is to support message specifications, the terminology guidance may be applied to implementations that are using the terminology specifications in other projects.

1.4 Audience

The audience for this document includes:

- Organizations implementing these Terminology and Message Specifications including jurisdictions establishing an EHR or jurisdictional applications (e.g., Drug Information Systems);
- Software developers building or enhancing systems that will interoperate with EHR solutions; and
- Technical and business readers wishing to use this guide to inform the development of implementations and validate that these implementations conform both to the Message Specifications and to the requirements of the associated stakeholder organizations.

This guide assumes that the reader has a basic understanding of both the HL7 Reference Information Model (RIM) and terminologies such as SNOMED CT, HL7 and LOINC.

Readers who do not have an understanding of the HL7 Reference Information Model (RIM), or the HL7 methodology should read the HL7 Release documentation (available to HL7 members at www.hl7.org), to supplement this Implementation Guide. A brief background on HL7 Methodology has been included in Volume 0 – Overview.

Readers who do not have a basic understanding of Terminology, SNOMED CT, and LOINC® are encouraged to take advantage of *Infoway's* free on-line educational offerings and other educational

opportunities. For additional information of our educational offerings, please see the *Infoway* website (https://www.infoway-inforoute.ca/index.php/programs-services/standards-collaborative/standards-education) or contact the SC (Standards@infoway-inforoute.ca) for additional assistance.

1.5 Document Assumptions

The following assumptions were made in the preparation of this document:

- Establishment of health care related solutions in Canada is an area of provincial, federal and territorial jurisdiction. As a result, the specific application of this Terminology and Message Specification may vary between jurisdictions. Efforts have been made in the development of the Terminology and Message Specification to minimize the need for such variation. However, while it is assumed that jurisdictional implementation guides will augment this publication, where applicable, additional guidance is provided to help maintain consistency.
- The implementation of this Terminology and Message Specification will likely impact workflows.. As a result, regulatory bodies, organizations or other stakeholders in each jurisdiction may need to consider the need to change legislation, policy, professional practice guidelines or other rules governing workflow. Their response may impact the business implementation and could inform the technical deployment of the Terminology and Message Specification.

1.6 Publication Assumptions

This Volume is a part of a series of Implementation Guide Volumes:

- Volume 0 – Overview: This is necessary in order to understand the publication of the full suite of Implementation Guide volumes and other related technical materials.
- Volume 1 – Infrastructure: is necessary in order to determine how to incorporate wrappers, data types and CMETs into the technical contents of this Volume.
- The Volume 2- Terminology Implementation Guide provides general guidance on the use of vocabulary in support of our pan-Canadian standards. Some Implementation Guides, such as Volume 9 – Laboratory do provide more detailed vocabulary guidance, but this does not apply to all of the pan-Canadian standards Implementations Guides. For additional domain specific vocabulary guidance, please contact the SC. (Standards@infoway-inforoute.ca)
- In addition, any shared interactions that an implementer requires will be found in Volume 3. These cannot be grouped for each domain because the choice of shared interactions to implement is largely a jurisdictional decision not dictated by a domain standard.

1.7 Related Documents

This document is published as part of a collection of documents making up a pan-Canadian HL7 v3 Specification. The full Specification, with a description of each of the documents, is available at https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Messaging/u_HL7_v3_Releases/Current_Releases/MR_02.05

II TERMINOLOGY OVERVIEW

There are two common types of terminology standards used in the healthcare setting, each with its own purpose. The first type, known as an Interface terminology tends to be very user friendly, easily readable and is most often the terminology used in day-to-day activities. The second type known as a Reference Terminology tends to be more formal and descriptive in nature and is used for data transmission and storage. They are defined as follows:

Interface terminology:

- Is a collection of healthcare-related terms used to support user entry information into computer clinical applications to facilitate the clinician's viewing of health information (e.g., synonyms or alternate or common term);
- Provides consistent data entry; and
- Are ***not*** used for data transmission, storage, statistics or other analytical purposes.

Reference Terminology:

- Represents a large number and range of possible concepts in a consistent manner;
- Allows patient data across the clinical spectrum to be encoded with the same coding system;
- Is a semantic foundation for reliable data retrieval;
- Is based on inherent meaning;
- Is independent of initial purpose of collection; and
- May not meet the requirements for ease of data entry (not user friendly).

One of the primary goals of pan-Canadian message specifications is to enable semantic interoperability. Semantic interoperability is a step beyond the exchange of information between different applications. The additional requirement is that a receiving application needs to be able to retrieve and process the communicated data in the same way that it is able to retrieve and process information that originated within that application (with no change in meaning). Standard terminologies are the key to achieving semantic interoperability.

There are various types of health care terminologies, with some meeting the needs of financial and administrative requirements, while others work best to reflect clinical requirements. It is important to note that a single terminology may not meet the needs of all these requirements; thus, implementers are encouraged to refer to the Standards Collaborative Terminology Selection Guide in order to select the terminology that best meets their requirements.

2.1 Terminology Basics

To help provide some additional background information and context for this guide, a few basic definitions are listed below.

A *Concept*:

- Is a unitary mental representation of a real or abstract thing – an atomic unit of thought ;
- Is a core data component to have a name or a way of representing it, and a way to uniquely identify it;
- Is not a full sentence;
- Should be unique in a given Reference Terminology; and
- May have synonyms.

A *Data Element* is a single unit of data that may correspond to a field in a data base record and is an instantiation of a concept. Typically, it is a combination of characters referring to one separate item of information, such as name, address, or age.

Metadata is data about data. It:

- Allows for a full description of a data element such that the data element can be classified and potentially reproduced; and
- Provides the necessary information to allow semantic interoperability.

  Examples of metadata associate with LOINC code 25916-8:Glucose

  - The viewer name is Glucose; Urine; 24 h
  - The result value type is Numeric
  - The example and recommended units are mmol/L

The following key terms are used in pan-Canadian message and terminology specifications:

Table 1 Key Terminology Components Use, Characteristics and Rules in the Context of HL7

Key Terminology Components	Terminology Use, Characteristics and Rules
Coded Model Element	• A coded model element is any attribute in a static model (payload, wrapper or CMET) and any property in a datatype that is allowed to convey codes from a Code System. • In HL7 v3, this includes the datatypes CS, CV, CE, CD, SC, CO as well as ANY (ANY can be constrained to one of the coded datatypes). • Every coded model element will be associated with either a Concept Domain or directly with a Value Set • Associations with Value Sets are generally only performed when the selection of codes is arbitrary and specific to a particular message design rather than representing a re-usable construct that might appear in multiple specifications. • When referencing a Value Set, the static model or datatype specification will indicate whether the reference has a coding strength of Coded No Extensibility (CNE) or Coded With Extensibility (CWE). • The Value Set or Concept Domain associated with a coded element can be seen in the various publications of the datatypes and static models, including MIF, Word documents, Table Views, Excel Views, etc.
Binding Realms	• Binding Realms define an interoperability space and exist because of the recognition that agreeing on a single terminology for all countries is unrealistic. • Instead, the determination of what codes are allowed in a given message element are determined within a specific context called a Binding Realm. • This context might be Universal (applies everywhere), specific to a particular affiliate (e.g., Canada vs. Australia), specific to a particular medical discipline (e.g., Psychological diagnosis vs. Dental diagnosis), type of patient (e.g., human vs. veterinary), etc. • Creation of universal bindings is generally limited to vocabulary used in the HL7 datatypes and structural attributes (classCode, moodCode, etc.) It requires consensus amongst all HL7 affiliates. • Creation of other Binding Realms is managed by the HL7 Affiliate, which in Canada is the Standards Collaborative. • Currently, there is only a single binding realm defined for Canada to maximize interoperability. • Every message element has an element at the root that identifies the Binding Realm that applies for the context of that instance.

Key Terminology Components	Terminology Use, Characteristics and Rules
Terminology Binding	• Terminology Bindings are the association between a Concept Domain and a Value Set within the context of a single binding realm. They identify the set of codes to be used for all coded model elements that reference a particular "conceptual space" when sending instances in a particular binding realm. • In general, there will only be a single binding for a given Concept Domain/Binding Realm combination. • It should be noted that prior to January 2013, previous releases of the pan-Canadian terminology , some Concept Domains had a "primary" and a "secondary" Terminology Binding defined to provide support for legacy applications (e.g., support for both SNOMED CT and ICD-10-CA Value Sets for DiagnosisValue). o Please see Section 8.2 on ICD for updated information pertaining to the use of primary and secondary bindings. • When creating a binding, the binding can refer to either a specific Value Set version indicated by a Value Set date (static binding) or reference the Value Set independent of version (dynamic binding), which is a Value Set without a date. All pan-Canadian Value Sets defined to date are specified with a Value Set version. • Static binding means the set of codes that can be used for a Concept Domain is explicitly stated prior to messaging the concept. For example, the Value Set SeverityObservationValue employs the use of the January 2013 release of SNOMED CT International as the Code System version. • Dynamic bindings mean that the set of codes defined as part of a Value Set can be used for a Concept Domain and will change whenever the Value Set definition is updated [e.g., to add new codes to an extensional (enumerated) Value Set] or to modify the filter expression for an intentional Value Set. In this case, the Code System version is unspecified. • Note that even if the Value Set is statically bound, the set of codes might still change if the Value Set Definition is intentionally dynamic. For example, the TriggerEventID Value Set will never be fully enumerated at the pan-Canadian level because the list of triggers in your Value Set will depend on the set of pan-Canadian messages you are implementing and there is no specific version of the Code System as the allowable list of trigger events are defined by the local implementation.

Key Terminology Components	Terminology Use, Characteristics and Rules

Code Systems	• Within the HL7 context, it is a collection of codes with associated designations and meanings established by an authoritative source.
	• All Code Systems used in HL7 v3 instances communicating between distinct organizations must be registered with HL7 International.
	• This registration includes identification of the Object Identifier[1] (OID) that must be used when referencing the Code System within HL7 v3 instances. Each concept represented within a Code System is usually represented by a single code; however, some Code Systems have multiple codes (synonyms) for the same concept.
	• The following characteristics apply to Code Systems
	• Code Systems may also define "display" or "print" names for the concept intended for display and selection in user interfaces.
	  o Print names should be unique within a Code System.
	  o Some concepts may have multiple print names (also known as synonyms), possibly in different languages or for different contexts of use.
	• Code Systems might also define semantic relationships between concepts.
	• Examples include parent-child (subsumption), whole part, qualifier and other types of relationships.
	• A collection of relationships in a Code System will result in a hierarchy
	• The hierarchies may be used to help define the semantic relationship of the concepts, to support user navigation or other purposes.
	• Some Code Systems allow for post co-ordination (for example, UCUM and SNOMED CT®) where multiple codes can be combined using an expression syntax to convey new concepts not represented on their own within the Code System.
	• Code Systems have versions reflecting the set of codes approved for use at a particular time.
	• Codes within a Code System must not change 'meaning' across versions, though they can be maintained;
	• Codes may be added or retired;
	• Definitions may be clarified;
	• New relationships may be established; and
	• Previously retired codes must not be reused with a different definition

Value Sets	• A Value Set is created to address a specific context of use that represents a uniquely identifiable set of valid concept representations, where any concept representation can be tested to determine whether or not it is a member of the Value Set. • Value Sets exist to define the content for a coded element in an HL7 static model or data type property. Value Sets cannot have null content, and must contain at least one concept representation. • They consist of codes from one or more Code Systems, but cannot have representations of a single concept from more than one Code System. • Value Sets have "Coding Strength" indicating whether non pan-Canadian (or local) extensions are allowed by implementations.

[1] http://www.hl7.org/oid/index.cfm

Key Terminology Components	Terminology Use, Characteristics and Rules
	• CWE (Coded with Extensibility) Value Sets may be supplemented with local codes for concepts not in the Value Set definition. • CNE (Coded No Extensibility) Value Sets are restricted to only those codes defined in the Value Set. If one of those codes does not apply, the element must be treated as null. • See section 2.4 for more details around using CNE and CWE • There are two types of Value Set Definitions: *Extensional* (or enumerated), explicitly listing the individual allowed codes; or *Intentional* (or definitional expression), where a "filter" or rules are defined against the characteristics of the Code System to specify the allowable codes. • Extensional definitions can be based on a specific version of a Code System (static Value Set) in which case the set of codes in the Value Set is fixed. They can also reference a Code System independent of version (dynamic Value Set), in which case the set of codes will change as the underlying Code System changes and the application of the filter results in different codes being returned. However, this is not recommended as it may cause challenges for conformance testing. • Extensional filter expressions may be complex, defining intersections, inclusions and exclusions of codes based on code properties, associations, etc. • Value Sets may be created by anyone and do not need to be registered. The SC maintains a list of all Value Sets agreed to at the pan-Canadian level. • Value Sets owned and maintained by Standards Collaborative are indicated in the MTW as Value Set Owner: Canada. • Value Sets owned and maintained by HL7 International are indicated in the MTW as Value Set Owner: Universal. • Jurisdictional implementers may define additional Value Sets to support jurisdictional specific information.
Reference Sets	• The SC publishes subsets and Reference Sets that have multiple uses. Some of the Reference Sets are bound to a Concept Domain and a data element (such as the Primary Health Care Content Standard data elements). • The Reference Sets published by the SC are very similar to Value Sets. The format of the content is simply a different format and has different types of metadata

2.1.1 Use of Object Identifiers (OIDs) in Context of Terminology

In the context of terminology specifications, Object Identifiers (OIDs) are used to uniquely identify the Code System from which the coded concept was drawn from or to uniquely identify a Value Set.

There are two types of OIDs used in the context of Terminology: Code System OID and Value Set OID.

Code System OID:

- Code System OIDs are intended to be communicated in HL7 v3 message instances along with the concept being transmitted, in accordance to the specified coded model element's corresponding HL7 data type, specified within the "HL7 v3 pan-Canadian Messaging Standards – Data Type Specification".
- Code System OIDs used in a pan-Canadian message specification must be registered with HL7 International in the HL7 OID registry. (http://www.hl7.org/oid/index.cfm)

- Due to the extensive use of Code Systems OIDs for interoperability interfaces, great caution is recommended to be taken when adopting concepts where the Code System OID may change

Value Set OIDs

- Value Set OIDs are not communicated as part of HL7 v3 message instances.
- They are used for Value Set management and are intended for those who have set up Terminology Services.
- Value Set OIDs are used to uniquely identify the semantic definition or space that the Value Set is using to address a business requirement

OIDs can be created and deprecated and cannot be re-used whether they are active or deprecated. More information on OIDs can be found in the SC OID MANAGEMENT WHITE PAPER.

2.1.2 Terminology Design Considerations

This section on Terminology design considerations[2] describes how applications in EHRs have different functions, and how Terminologies fit into their design.

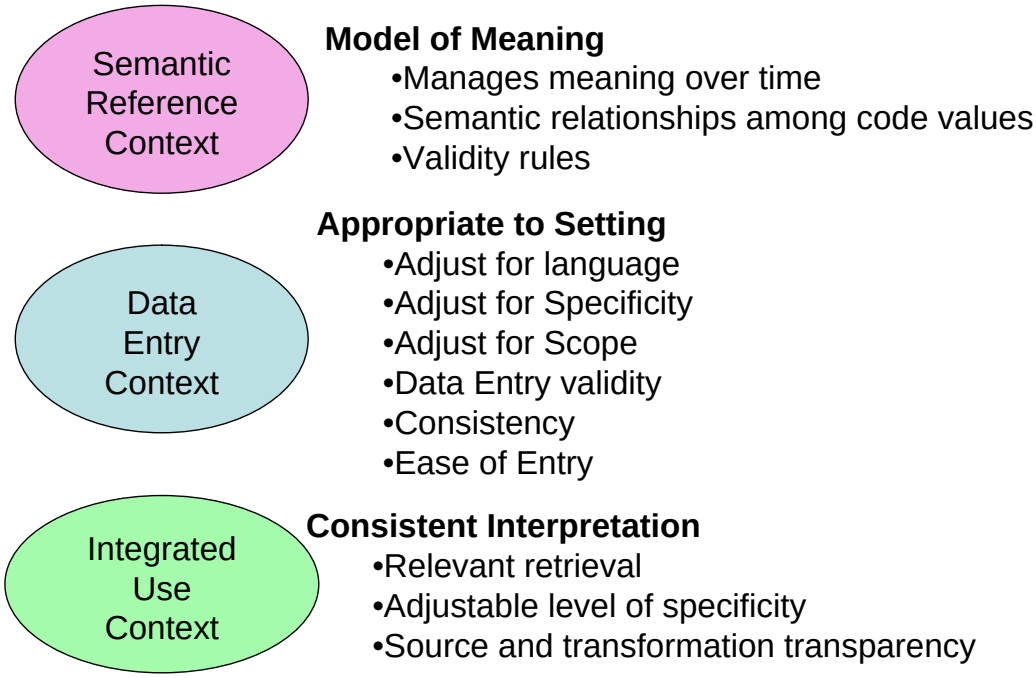
The three classes of applications are:

1) Applications managing the integration of clinical knowledge into clinical practice, emphasizing the integration of terminology into a coherent model of meaning;
2) Applications managing data entry at the Point-of-Service, emphasizing the terminology used in a particular care setting; and
3) Applications managing Shared Health Record integration, emphasizing the terminology relationships that optimize indexing and retrieval.

Managing a single terminology to support all three types of applications is a challenge and is one of the reasons different terminologies for the same topic exist. The design focus for current clinical terminologies such as SNOMED CT has been to enable clinical knowledge representation. The focus on the integration of concepts to be able to represent clinical knowledge has led to a robust terminology model that can also support other application contexts. These application contexts have different terminology quality criteria as shown in the following figure.

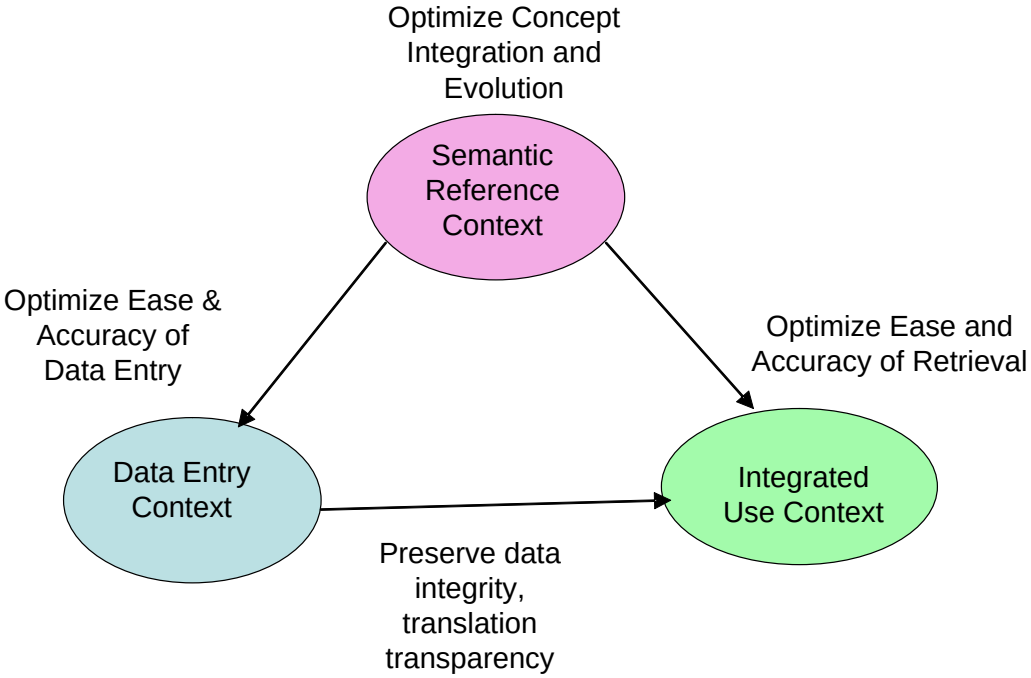
[2] Adapted from pan-Canadian iEHR Standards Terminology Implementation Considerations v.4.0 October 23, 2006

Figure 1 Three Semantic Contexts for Terminology Use



The three application contexts are dependent and many software products incorporate more than one of these semantic contexts, which may be integrated or are otherwise interdependent. Scaling up from single integrated product suites operated in single organizations to multiple products integrated across multiple organizations increases the reliance on coherent terminologies, as the following figure illustrates.

Figure 2 Interdependence among Terminology Uses



Implementers are primarily concerned with the application functions of supporting data entry and optimizing information retrieval. The iEHR messages are focused on communicating between applications sending information to be included in the Shared Health Record and applications supporting the integration of and retrieval of information from the Shared Health Record.

2.2 Terminology Usage

The Message Specifications use coded data to establish functional support for complex business processes. Codes are critical for the meaningful exchange of data among health providers in all settings across Canada. For example, including coded drug information is essential to enable drug contraindication checks by Drug Information System (DIS) applications. Additionally, codifying responses for drug-to-drug, drug-to-allergy and other contraindication checking will allow prescribers and/or dispensers to make meaningful decisions based on agreed terminology. This is in contrast to sending the same concepts in notes or as free text that are open to more subjective interpretation.

Codes for the associated data attributes are drawn from reference terminologies that have a pan-Canadian basis. Where International core reference terminologies do not exist to meet the business requirements, the Standards Collaborative establishes its own reference terminology (which may be an extension to the International core reference terminology) to fill the gap. Examples include Provider qualification type codes within the QualifiedRoleType Concept Domain and the SNOMED CT Canadian English Extension.

Values from value sets are not typically used in isolation but are intended to work in concert with other values to support important functions such as contraindication checking, status management, and general workflows between health care providers. An example is a coded concept is returned indicating that a prescription refill is requested too soon, then another coded concept is used to indicate that the patient is going on vacation therefore requires the additional refill. Another example is the use of “code/value” pair of coded clinical data where the information in the “code” message element is the “question” and is coded using LOINC, and the information in the “value” message element is the “answer” and is coded using SNOMED CT.

The message specifications have defined each discrete message element (e.g., name, address, drug, form, etc.) as either a code, an identifier, free text, or a specialized datatype. For each coded element, the specific set of allowable codes needs to be defined in order to ensure interoperability between trading partners.

In order to streamline this process, HL7 has established a series of Concept Domains (e.g., Business Name: Severity Level, HL7 name: SeverityObservationValue) that describe what types of codes are appropriate to use for those coded elements associated with the domain. Once the set of Concept Domains has been established, candidate Value Sets can be analysed, revised and confirmed.

The Concept Domain and Values Set information referenced in the pan-Canadian Message Specifications are contained in the Master Terminology Worksheet (MTW).

2.2.1 Mapping

The quality of the user interface of any application is independent of the terminology used in the messaging behind it. The successful terminology implementations depend on quality software solutions with good user interfaces that speak the language of the user. Coding should be transparent to the user and be done in the background by the software.

Typically, the user solution is designed so that the user sees their preferred set of “local” terms (possibly in their own language). Mapping to a specific terminology or other terminologies is done in the background by the application software. The user interface to the standards is a unique functionality of the vendor’s solutions.

Implementers must decide whether to adopt the standard codes natively within their systems or adapt them to their needs. To enable transparent coding of data within an existing user system, and to adapt to

the standard codes, a mapping from the standard to the local system codes must take place. Mapping can be done manually or with mapping tools.

Infoway does provide mapping tools (https://infocentral.infoway-inforoute.ca/3_Tools_and_solutions/Terminology_Tools/Apelon_TermWorks) for SNOMED CT and also provides additional education (https://www.infoway-inforoute.ca/index.php/programs-services/standards-collaborative/standards-education/online-education)on mapping should additional support be required.

2.2.2 Extensions and Requests for Change

Implementers may find that a concept or term required to meet their business needs is missing from the reference terminology they are using. If this is the case, implementers may make a request to the Standards Collaborative to have this concept added to the applicable terminology.

Information on the RFC process for *Infoway* supported terminologies can be found on InfoCentral.

- SNOMED CT
  https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/1_SNOMED_CT/5_Request_For_Change_(RFC)_to_SNOMED_CT

- LOINC /pCLOCD
  https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/2_pan_Canadian_LOINC_Observation_Code_Database_pCLOCD/pCLOCD_Maintenance_and_Request_For_Change

- HL7 (MTW)
  https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/3_pan-Canadian_Terminology_Artifacts/MTW_Request_For_Change

Users may create their own local extensions using the SDO prescribed mechanism for use. For more information and guidance on the use of local extensions, please contact the SC InfoDesk (Standards@infoway-inforoute.ca) to request additional support.

2.3 Terminology Selection Guidance

This section provides guidance to jurisdictional stakeholders in the selection of Reference Terminology standards for use in electronic health records (EHR) initiatives that have not been defined in the pan-Canadian Messaging and Terminology Standards.

The following terminology selection principles and associated guidelines should be considered when selecting one or more terminology standard for the intended use (ex. eHealth and/ secondary use of data). The terminology for selection consideration must embody criteria in the following four (4) categorized groupings:

- Terminology Affiliate
- Terminology Standard Quality
- Fit for Purpose
- Terminology Content Quality

To ensure the overall process is most suitable for the intended purpose(s), stakeholders may wish to perform additional analysis to complement the Pan-Canadian Terminology Selection Guide, such as:

- Add in additional stakeholder specific criteria that are not in scope for this document; and/or
- Tailor the existing Pan-Canadian Terminology Selection Guide to accommodate stakeholder needs; and/or
- Add weighting to reflect the relative importance of specific principle(s) and associated guideline(s); and/or
- Add a mathematical scoring system to evaluate the appropriateness of the terminology standard being considered.

2.3.1 Term Usage of Shall and Should

Both terms **"Shall"** and **"Should"** are used throughout this section to indicate the importance of each recommended criteria. For the purpose and context of this document, please refer to the following descriptions to interpret the intended significance.

Shall - Principle and guideline (or aspect of guideline), that is highly and strongly recommended to be used when the Terminology Selection Guide is utilized either as a whole, or in part.

Should - Principle and guideline (or aspect of guideline), that is recommended to be used and adopted when possible. However, adopting the indicated principles and guidelines is not as critically important as is adopting the "Shall" principles and guidelines.

2.3.2 Terminology Affiliate Criteria

The Terminology Affiliate Criteria evaluates the organization or entity, which will distribute, promote and/or enforce use of the selected terminology standard, and follows the criteria below to adequately support use of the standard. The criteria outlined below are to evaluate this organization or entity, not an evaluation of the terminology content itself. Additional criteria for terminology selection may be defined by the stakeholder before actually selecting a terminology.

Table 2 Terminology Affiliate Criteria

Principle	Guideline
Affordability	The organization shall consider if the standard has affordable licensing and maintenance fees as well as develop a funding strategy to support the standard. Affordable fees considerations shall include: terms of the fees, if the fee is an annual cost or one-time cost, and if any distribution restrictions apply.
Governance Structure	The organization shall have a defined process in place for a governance structure to guarantee distribution, promotion, and/or enforce use of the standard and responsiveness of collaboration between the appropriate stakeholders within defined scope. The defined process shall include change management plan to manage governance structure changes.
Intellectual Property	Any intellectual property (IP) agreements, disclaimers, including licensing shall be made available if selecting an existing terminology standard, and shall be documented for future reference and consideration if developing a standard.
Maintenance Process	The organization shall have a terminology asset management maintenance plan which accommodates multiple terminologies being owned and/or utilized. This includes a terminology service infrastructure to manage receiving and distributing terminology content and updates.

Migration Costs	The migration impact should be minimal to implement the standard over the long term. Broad impacts may occur and shall be anticipated for short term. Migration impact considerations shall include financial cost, re-engineering of processes required, and re-training of both processes and people to be able to work with the proposed standard. Duration of long term and short term may be further defined by the stakeholder.
Sustainability	The organization shall document established or planned processes and resources to maintain and/or enhance the terminology standard, and enforce conformance to the terminology standard.
System Impacts	The organization shall consider when mandating the implementation of the standard to existing systems, if this will not result in a substantial increase in product pricing from the vendor(s), as well as impact on the vendor's client(s) (e.g., healthcare organizations).

2.3.3 Terminology Standard Quality Criteria

The Terminology Standard Quality Criteria evaluate overall quality aspects of the terminology standard that are not related to the terminology content itself including: capability of the standard to expand content in breadth (business case spectrum coverage) dimension, tooling solution for specific and/or general terminology activities, backwards compatibility, maturity and stability, and version management. Concept maintenance activities will always be required as stakeholders and new business use cases continue to demand these updates. Therefore, a formal process to minimize the content gap between the current standard and new standard is required[i]. This set of criteria may also be used to evaluate non-terminology standard as the stakeholder deem appropriate. Additional criteria for terminology selection may be defined by the stakeholder before actually selecting a terminology.

Table 3 Terminology Standards Quality Criteria

Principle	Guideline
Backwards Compatibility	The standard shall be backwards compatible to allow previous data and legacy systems map to the new standard and stakeholders are able to upgrade to the new standard when requested by jurisdiction department of health.
Explicit Version Identifiers	Each version of the standard shall be designated with a unique identifier, allowing systems exchanging data associated with the terminology to readily determine if they are using the same set of terms.
Harmonization with other terminologies	The terminology should have the ability to harmonize with other terminologies. A model should also be considered for mapping and/or integrating standardized terminologies to create the envisioned cohesive and mutually consistent whole terminology. This model may have implications for required technical features.
Local Terminologies Adaptability	For consideration of addressing immediate needs such as project timelines, it is acceptable to have short-term solutions and processes which allows users to make local additions. However from the pan-Canadian interoperability view, it is not recommended to use those tools and processes as long term solutions as this negatively impacts interoperability. Short-term solutions and processes shall not compromise the defined interoperability space.
Maturity and Stability	The terminology standard selected shall have been previously implemented and tested so that lessons learned from previous implementations, can be leveraged in current and future implementations.

Multilingual	For jurisdictions (or the appropriate stakeholders) that are multilingual, the terminology shall be available in the official languages of Canada or translation support is available for implementation. Intellectual property ownership on multilingual support should be considered to determine financial and other types of feasibility. Other multilingual support factors to consider should include: can the terminology be used independently, ad-hoc translation availability with minimal dependency and/or negative impact between the Terminology Affiliate and the Terminology Authority.
Stakeholder Influence	Relevant stakeholder representations shall have opportunities to provide business and/or technical requirements input to the type of terminology to be selected for the intended purpose. The facilitation venue should be part of an open and transparent process. Stakeholders shall include professionals who have deep knowledge in the context field to utilize the terminology.
Terminology Infrastructure/Tools	The terminology shall be maintained using collaborative tools for development, maintenance, deployment (and other) purposes that: (1) allow many people to work on a terminology at the same time with possible role-based functionalities, and (2) support the assignment, scheduling, collection, and integration of their work.
Version Management	Each new version of the terminology includes a complete accounting of the added, retired, and modified concepts and terms (i.e., a "delta" file) to ease changes/updates required to be made by the stewardship organization.

2.3.4 Fit for Purpose Criteria

The Fit for Purpose Criteria evaluate the appropriateness of the terminology for the intended business context, which includes the following considerations: applicability across healthcare disciplines and settings, impact on current business process, and financial viability. The stakeholder may define additional criteria for terminology selection before actually selecting a terminology.

Table 4 Fit for Purpose Criteria

Principle	Guideline
Address Business Need	The terminology shall address the healthcare business requirements and shall be tested or piloted, to ensure the terminology selected fits the intended contexts.
Business System Impact	Current business process which uses some form of terminology and technology to capture the data shall be considered to ensure negative impact will be minimized due to the implementation of the new selected standard, including amount of data collected and data integrity. This is critical to guarantee success in the terminology uptake.
Cross Discipline	The standard shall be independent to allow extended use across appropriate disciplines for capturing the same concept. Example of providers in different disciplines include: physicians, nurses, allied health professionals.
Domain Relevant	The standard shall complement and/or support the subject domain in terms of structure, design, coverage, granularity, and accuracy.
Education Support	With the roll out of the terminology standard, education support shall be available to educate the users to use the tools associated with the standard or the standard itself.

Healthcare Delivery Setting	The standard shall be healthcare delivery setting neutral so that it can be used across multiple healthcare delivery settings. This allows the same terminology content to be reused when possible as part of general good vocabulary practice. Examples of healthcare settings include: acute care, community, and long-term care.
Multiple Code Usage	The terminology should be able to handle multiple codes to refine or modify one clinical concept (e.g., post-coordination). Field lengths or the use of multiple fields to accommodate multiple code usage should not negatively impact system performance at a perceptible level.
Simplicity	The terminology standard shall be feasible to implement in terms of human resources, financial resources, and allow for easy input and data retrieval.
Technical Viability	The terminology standard selected shall meet the technical criteria of the terminology requirement(s). This includes but is not limited to: suitability within defined architecture, and ability to be used in a messaging standard such as HL7 v3 with relevant technical artifacts.
Vendor Neutral	The standard shall be application and vendor independent, and should not be tailored to a specific vendor, application need, or functionality.
Workflow Future State	The terminology selected should not negatively impact user workflows or workload from the long-term perspective. Negative impact on short-term workload is expected due to steepness of learning curve to adapt to the standard. This could be counterbalanced by providing immediate benefits of the new terminology when compared to prior system.

2.3.5 Terminology Content Quality Criteria

The Content Quality Criteria evaluate the content of the standard on:

- Whether the content demonstrates use of existing national and international vocabulary practice and guidelines;
- Tooling availability to support the standard's continuing development and evolvement, content depth (granularity) expansion ability; and
- Comprehensive content coverage.

The stakeholder may define additional criteria for terminology selection before actually selecting a terminology.

Table 5 Terminology Content Quality Criteria

Principle	Guideline
Comprehensive Domain Coverage	The terminology shall include the vast majority of concepts and terms needed for the primary intended purpose.
Concept Definitions	The terminology shall include logical definitions of coded concepts, with automatic detection of redundancy, and predefined appropriate hierarchical relationships.
Concept Orientation	Elements of the terminology shall be coded concepts, with potential multiple synonymous text representations, and hierarchical or definitional relationships to other coded concepts.
Concept Permanence	The meaning of each coded concept in a terminology shall remain forever unchanged. If the meaning of a concept needs to be changed or refined, a new coded concept is introduced. Retired codes cannot be deleted or re-used.
Multi-Hierarchy	The terminology should be able to support a coded concept which is a child of more than one other coded concept in the terminology's hierarchy. Single hierarchy should also be available to accommodate business context requirements.

Non Redundant	Each unique meaning shall be represented by one single coded concept in the terminology. Each concept may have multiple synonymous terms, but the relationship of the terms to the concept shall be explicitly represented.
Non Semantic Identifiers	Unique codes shall be used to identify concepts in the terminology which are unrelated to the meaning of the concepts or concepts' other metadata.

It is common understanding and good vocabulary practice that proprietary or application specific terminology, are not encouraged to be used for interoperability purposes; existing standardized terminologies are strongly encouraged to be used where possible[ii].

Best practices for standardized terminology usage in the healthcare setting incorporate the methods below in most preferred, to least preferred order: adopt, adapt, and develop[iii]. When considering selecting a terminology to capture the intended business context, the most preferable option is to **adopt** an existing standardized national or international terminology standard, where one is able to utilize existing international or international terminology standard without modifications. If a current national or international terminology standard uptake cannot occur without changes to the standard, then looking to **adapt** the closest terminology standard that can be modified to suit the intended business needs, is the next favourable option. Lastly, if adoption or adaptation is not possible, then one will need to develop a new terminology with consideration for inclusion to an existing standardized national or international terminology standard.

2.4 Coded with No Extensibility (CNE) and Coded With Extensibility (CWE)

HL7 message specifications for coded data elements (e.g., Administrative gender) have a Binding Strength identified, and are noted as CNE (Coded with No Extensions) or CWE (Coded with Extensions).

CNE – Coded with No Extensibility

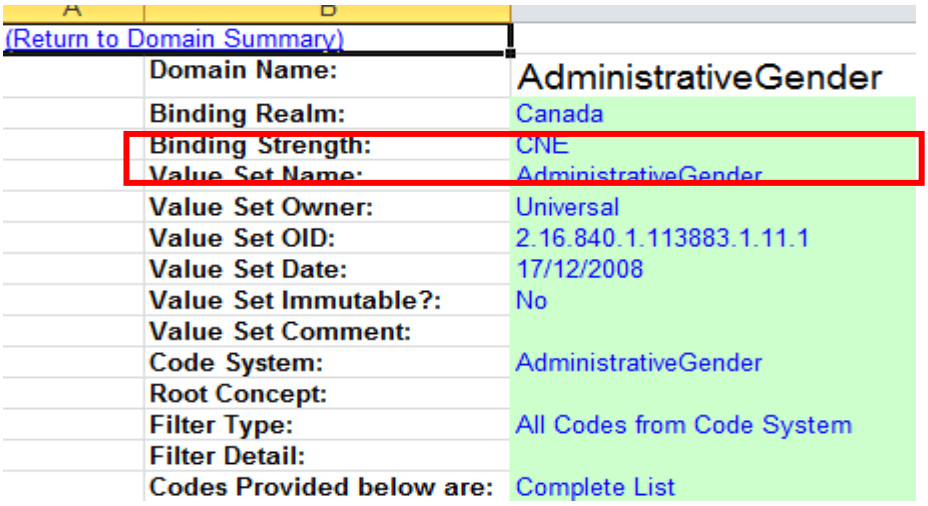
- Only approved & accepted codes from the Value Set can be sent in a message in order to be conformant to the specification.

CWE – Coded With Extensibility

- Implementers may use codes from the Value Set or may send codes that are not part of the Value Set to meet business needs, but use of codes that are not part of the Value Set should be avoided whenever possible.
- Additional codes to be used that are not part of the pan-Canadian Value Set MUST NOT use the same Code System OID where the rest of the codes come from, if they are not part of the Code System.

The source of truth of Binding Strength is in the Master Terminology Worksheet (see section 4). One can determine the Binding Strength of a Concept Domain by looking at the applicable property labelled *Binding Strength* as shown in the figure 3 in the MTW Value Set tab.

Figure 3 Binding Strength Indicator in the MTW



(Return to Domain Summary)	
Domain Name:	AdministrativeGender
Binding Realm:	Canada
Binding Strength:	CNE
Value Set Name:	AdministrativeGender
Value Set Owner:	Universal
Value Set OID:	2.16.840.1.113883.1.11.1
Value Set Date:	17/12/2008
Value Set Immutable?:	No
Value Set Comment:	
Code System:	AdministrativeGender
Root Concept:	
Filter Type:	All Codes from Code System
Filter Detail:	
Codes Provided below are:	Complete List

If the model-coded element is bound to a Value Set, the source of truth of Binding Strength is in the message-coded element in the messaging artifacts (e.g., Visio).

2.4.1 Interpreting CNE and CWE with Message Attribute Characteristics

CNE and CWE indicate whether codes defined outside of the pan-Canadian Value Set can be sent or not. Model element characteristics – Mandatory, Populated, Required, Optional, indicate whether a particular message attribute needs to be supported. The definition of supported is: the ability to send, validate, store, and retrieve for subsequent and different business processes.

A model element can be coded (those are called Model Coded Elements), and for the Model Coded Elements, they are supported by either a Concept Domain bound to a Value Set or directly to the Value Set. Once the model attribute is determined to be implemented, then permissibility to transmit codes [(binding strength) e.g. only the codes within the value set or additional codes can be transmitted], needs to be examined.

Implementers are strongly recommend to not add additional values to CNE Value Sets as this may cause system and semantic interoperability issues with other applications which they are sharing data with. If during the course of an implementation there is a need to add values to CNE Value Sets, please contact the SC at standards@infoway-inforoute.ca for additional assistance.

Table 6 CNE and CWE Conformance Rules

Conformance	Model Coded Element	Coded with No Extensibility (CNE)	Coded With Extensibility (CWE)	NullFlavour
Mandatory	Must be supported and must contain a valid value	Code from pan-Canadian Value Set only	Code from pan-Canadian Value Set or Code from a Value Set (if code is not available in pan-Canadian Value Set).	Not Allowed
Populated	Must be supported and sent. It is represented by indicating Required with cardinality 1..1	Code from pan-Canadian Value Set only if no NullFlavour	Code from pan-Canadian Value Set or Code from a Value Set (if code is not available in pan-Canadian Value Set) if no NullFlavor	NullFlavour must be sent if no Code
Required	Must be supported and may be sent	Code from pan-Canadian Value Set only if no NullFlavour	Code from pan-Canadian Value Set or Code from a Value Set (if code is not available in pan-Canadian Value Set) if no NullFlavor	NullFlavor may be sent if no code

Optional	May be sent	Code from pan-Canadian Value Set only if no NullFlavour	Code from pan-Canadian Value Set or Code from a Value Set (if code is not available in pan-Canadian Value Set) if no NullFlavor	NullFlavor may be sent if no code

For CWE Value Sets where local codes are used, it is expected these local codes are brought forward for consideration for inclusion in the pan-Canadian Value Set through the Standards Collaborative Process (SCP), or that a null value is allowed.

III HL7 v3 UNDERLYING TERMINOLOGY INTEGRATION CAPABILITIES

3.1 Relationship Between Data Elements, Information Models and Terminology Models

Implementers need to maintain alignment between the data they are responsible for and the data referenced in the specifications they are implementing. The definition of the data an application records and uses to support automated processes and inform users through a user interface is typically described as data elements, often documented in a data dictionary or in physical data models.

A Data Element as defined above in section 2.1 is a single unit of data that may correspond to a field in a data base record and is an instantiation of a concept. It can be typically a combination of characters referring to one separate item of information, such as name, address, or age. It has not only a logical definition, but also defined physical characteristics constrained by the technical environment in which it operates. The specification defines the potential content of the data element – the set of valid values that can be contained. Values representing encoded concepts have both meaning and physical characteristics that permit automated processing. Data element definitions are difficult to understand outside the specific context in which they are used. When documented in a particular physical storage layout understood by the applications that access it, a simple name and description may be sufficient.

However, more information about the purpose and context itself is needed in order to understand the meaning of a data element when the data is used in other applications or shared through an EHR. Application and message implementers need to "map" between their physical data element definitions and the data definitions used in the HL7 message specifications. The HL7 messaging specifications for a specific version produce data definitions by binding a set of models.

The HL7 v3 RIM as well as models derived by constraining the RIM using HL7's methodology are information models. HL7 terminology and the SNOMED CT terminology are based on terminology models. These models are interdependent. The pan-Canadian message specifications need both the message models and the terminology models to fully convey clinical meaning.

The purpose of an information model is to specify the meaning, structure and organization of each atomic data item that can be communicated. For this document, these atomic data items will be referred to as "slots" – places to put content.

Terminology Models manage the meaning and relationship of the coded concepts that can be placed in the slots. Some Code Systems have an implicit terminology model behind the structure of code representation. Others have concept identifiers and an explicit terminology model that relates the concepts together. Both HL7 v3 and SNOMED CT, have explicit terminology models. HL7 has a terminology model to manage the coded concepts for all the slots that define the structure and relationships in message models. SNOMED CT has a terminology model that organizes and defines relationships among the clinical coded concepts.

Therefore, the HL7 v3 message model specifications are made up of a combination of slots about the message structure and application context, and slots containing the clinical values that are processed by sending and receiving applications.

Message models that are fully specified for implementation indicate what content is expected in both the message structure slots and the clinical slots. The message model specifies the Concept Domain, a Data Type, the binding strength, and optionality plus repeatability for each content slot. These attribute characteristics identify:

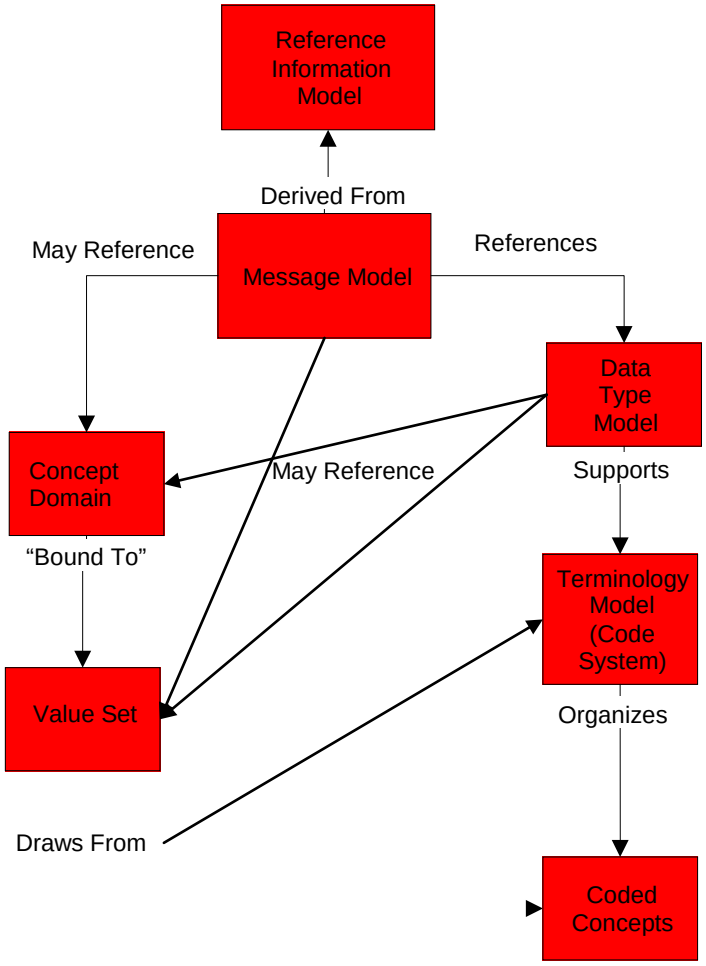
- the set of concepts appropriate for the attribute;
- the physical data type required to carry the content;
- whether the specified values from the Value Set must be used,

- whether the attribute must be sent; and
- whether more than one attribute can be expected or is permitted in a message instance (see section 2.4.1 for details).

Since both message specifications and terminologies change over time, Point-of-Service applications and EHR infrastructure components must manage changes to message specification versions and terminology versions as part of regular software maintenance and upgrade processes.

Figure 4 shows how the various independently managed HL7 artifacts relate to each other.

Figure 4 Relationships Between Models



Each specific artifact goes through its own change process to produce new versions:

- The HL7 RIM and HL7 terminology supporting the RIM or RIM derived message models may be changed during designated HL7 International harmonization meetings with approved changes applied to produce a new version. Normative editions of HL7 v3 messages are based on the version of the HL7 RIM at the end of the preceding calendar year.
- The Message Model is defined at the international level through an HL7 International ballot process, or at the realm level, through ballot by an International Affiliate. Each interaction defined in the ballot is bound to the version of the RIM Data Type definitions and HL7 Vocabulary, in effect when the interaction becomes normative.
- The Data Type Model defines the structure, properties, and relationships among all data types defined by HL7. The Data Type specification must be balloted at the International Level before a new version is applied.

- A Concept Domain is defined for coded attributes expressed in the Message Model. Concept Domain definitions are maintained through the same harmonization process used to maintain the HL7 RIM. Sub-domains may be specified to support models that are more constrained. Since a Concept Domain represents an abstract concept, it cannot be implemented without being "bound" to a Value Set.
- A Terminology Model is maintained by the organization responsible for a particular Code System. For example, *Infoway* Standards Collaborative maintains the Provider Types Code System (SCPTYPE) used in HealthcareProviderRoleType Value Set. Changes to a Code System's terminology model may be introduced during a change process to produce a new version of the Code System. For Code Systems that do not have a separate explicit Terminology Model, each Code System version is also a new Terminology Model version. For more information on how to update non-SNOMED CT, and non-pCLOCD terminology, please find more details here: https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/3_pan-Canadian_Terminology_Artifacts/MTW_Request_For_Change.
- Coded Concepts may be added or deprecated (made obsolete), during Code System maintenance. Changes can occur in descriptions or the relationship among coded concepts if those characteristics exist.
- A Value Set is defined as part of a specification at:
    - An international level for message structure Value Sets; or
    - At the Canadian realm, level for attributes deemed sufficiently important to be standardized for pan-Canadian use.

Implementers are expected to ensure their software and configurations remain current with the evolution of approved specifications to remain interoperable across Canada and over time. Implementers who use a particular message specification implementation guide are expected to have the appropriate versions of each artefact incorporated into their implementation. Since each model has a specific scope, the inter-related models specify the particular meaning of all the slots that can be sent in a message instance. Additional information in the message instance is related to the specific interaction and transmission models being used.

IV USING THE MASTER TERMINOLOGY WORKSHEET

4.1 The Master Terminology Worksheet (MTW)

This section of the guide is intended to assist implementers with reading, understanding and using the Master Terminology Worksheet (MTW). Details regarding the individual terminology Code Systems referenced in the MTW are described in more details in subsequent sections of this implementation guide.

MTW is an artifact that specifies the pan-Canadian terminologies developed to support the electronic communication in pan-Canadian standards for the following messaging domains in this release:

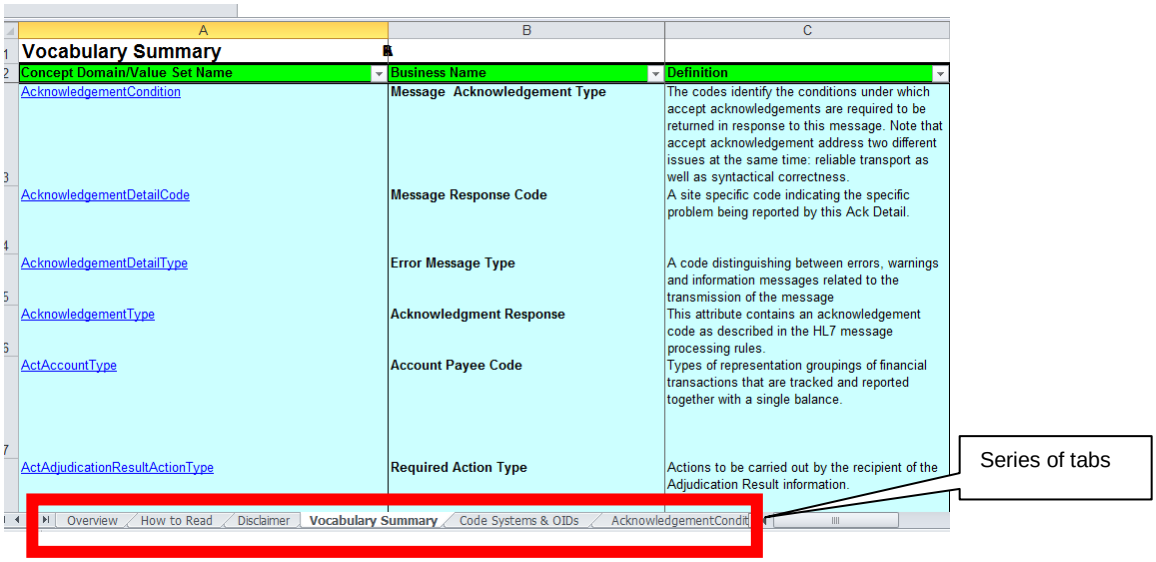
- Infrastructure;
- Shared Interactions;
- Client Registry;
- Provider Registry;
- Location Registry;
- Shared Health Record;
- Pharmacy;
- Laboratory;
- Immunization;
- Claims; and
- Record Access (includes Consent) domains.

Out-of-scope domain areas include:

- Non-Pharmacy Claims, Non-Human Laboratory, and Public Health Surveillance (Non-Immunization).

The MTW is an Excel spreadsheet with a series of tabs along the bottom. (Figure 5)

Figure 5 Tabs in the MTW



The tabs provide everything from general information about the guide (such as the “Overview” and “How to Read” tabs) to specific information about each Concept Domain and/or Value Set. The introductory tabs of the MTW (“Overview”,” How To Read”, “Disclaimer”) provide more detailed information on the MTW and how to understand and use the information found on each tabs in the spreadsheet.

The MTW represents a compilation of all of the vocabulary used in the various pan-Canadian messaging specifications, and is intended to be used (hand-in-hand) with the pan-Canadian messages, and other applicable artifacts. The vocabulary listed in the MTW may be applicable for uses outside of the scope of our pan-Canadian messages as deemed appropriate.

4.1.1 Where to find the MTW

The MTW resides on InfoCentral (https://infocentral.infoway-inforoute.ca/2_Standards) as shown in Figure 6.

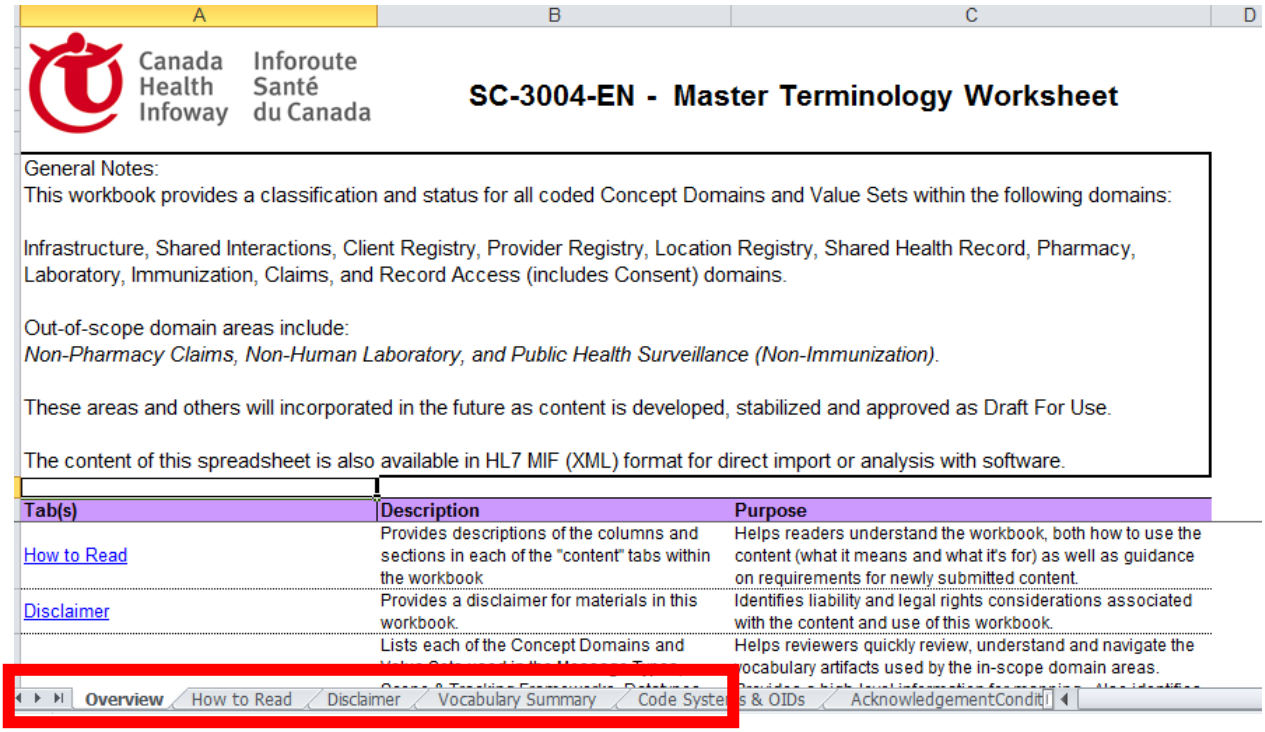
Figure 6 Location of the MTW on InfoCentral

On InfoCentral, users are able to find the most current release of the MTW, past releases of pan-Canadian terminology specifications and all other related and supporting documentation.

4.1.2 How to use the MTW

The MTW is published as an Excel file that contains numerous tabs (see Figure 7):

Figure 7 Tabs in the MTW



- The “Overview Tab” describes all tab types (Vocabulary Summary, Code System and Value Sets) in the MTW. It has a brief description and rationale for each tab in the spreadsheet and provides hyperlinks to allow navigation between tabs
- The “How to Read” tab outlines a colour coding used to describe the properties included in each of the remaining tabs

Users should be familiar with both the “Overview” and “How to Read” tabs before using other tabs in the Worksheet

4.1.2.1 Understanding the Vocabulary Summary Tab

The Vocabulary Summary tab contains all the Concept Domains and Value Sets that are referenced by the pan-Canadian message models.

Figure 8 Vocabulary Summary Tab

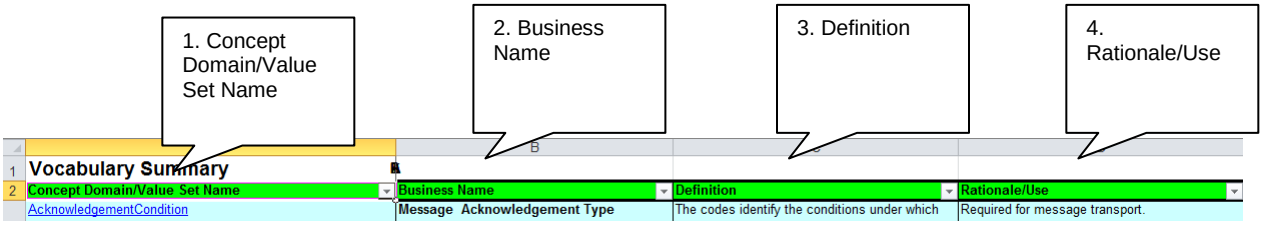
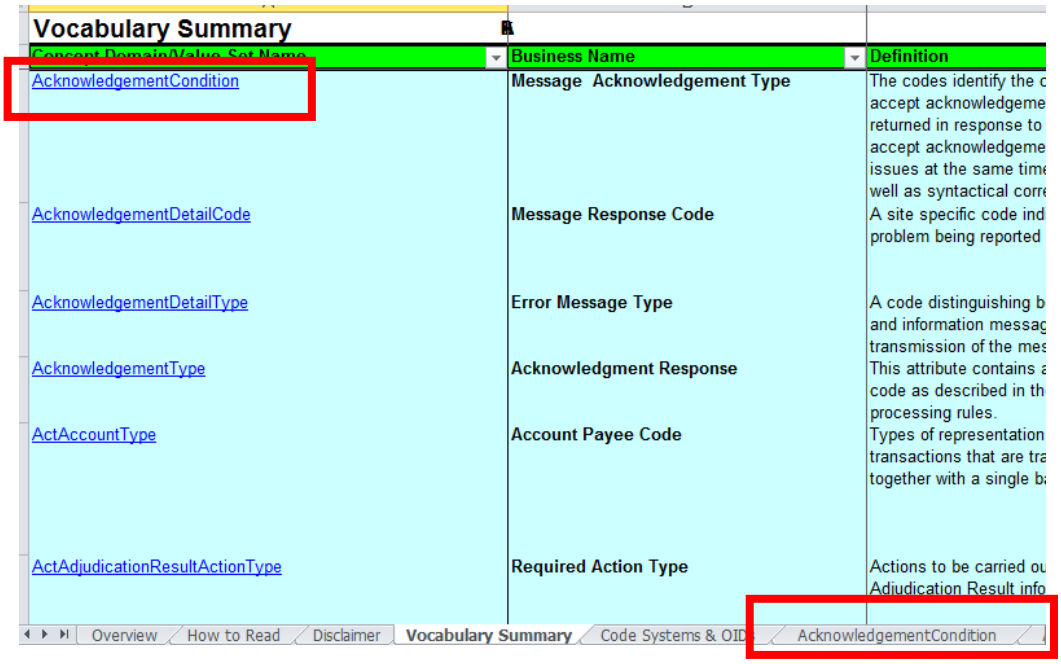


Figure 8 shows the first four (4) fields as they appear in the Vocabulary Summary tab. A more detailed explanation of what can be found in each column is further described below.

1. **Concept Domain/Value Set Name**: This field lists the name of the Concept Domain/Value Set. The Concept Domains and Value Sets listed in this column are linked to another tab within the MTW that bears the name of the Concept Domain/Value Set as shown in Figure 9.

Figure 9 Vocabulary Summary Hyperlinks



The tab that bears the name of the Concept Domain/Value Set provides all of the detailed information required to implement the respective vocabulary including Value Set Definition, and allowable list of concepts supported.

2. **Business name**: The Concept Domain/Value Sets names are technical names and as such, may not be particularly user friendly, and so this field endeavours to provide a user-friendly name for the Concept Domain/Value Set.

3. **Definition**: This field contains the formal definition of the Concept Domain/Value Set as provided by HL7 International or the definition yet to be harmonized with HL7 International.

4. **Rationale/Use**: This field specifies the intended use of the Concept Domain/Value Set in Canadian context.

Figure 10 Fields 1-8 in Vocabulary Summary Tab

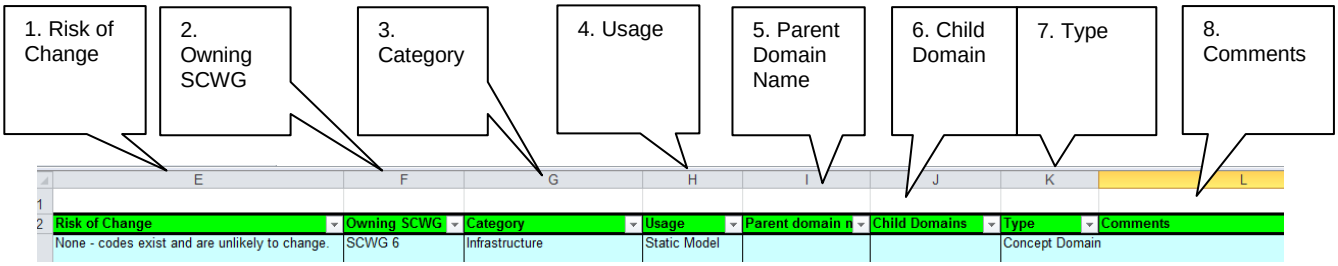


Figure 10 shows the next eight (8) fields as they appear in the Vocabulary Summary tab. A more detailed explanation of what can be found in each column is described below.

1. **Risk of Change**: Some Concept Domains/Value Sets have a greater risk of change than others. This field is provided to help set some level of expectation about the risk of future change as vocabulary requirements evolve over time. If the Concept Domain, Value Set, and/or Code System require

harmonization with HL7 International or another Terminology Organization, the harmonization requirement is also documented here.

2. **Owning SCWG**: The SC has Standards Collaborative Working Groups (SCWG) and for each Concept Domain/Value Set a SCWG responsible for helping to maintain the content of the Value Set has been determined.

3. **Category**: This field helps to group similar Concept Domains/Value Set for anyone interested in using this information for further review and/or analysis.

4. **Usage**: This field indicates where in the messaging artifacts is the Concept Domain used (e.g., message model, Data Type, or Scope and Tracking Framework).

5. **Parent Domain Name**: The parent domain is provided for additional semantic context for this Concept Domain. The parent Concept Domain may not be available within the Master Terminology and maybe provided simply for illustrative purposes.

6. **Child Domains**: This is a list of Concept Domain(s), which are specializations of this Concept Domain. If the Concept Domain bounded Value Set refers to the children Concept Domains, this means the complete Value Set is comprised of content from all child Concept Domains' bounded Value Set. An example is the ControlActReason Concept Domain.

7. **Type**: This file allows implementers to quickly determine whether they are looking at Concept Domain or a Value Set.

8. **Comments**: This field provides any additional information about vocabulary elements that may be of further use to implementers.

4.1.2.2 Understanding the Concept Domain/Value Set Details

Clicking on any of the Concept Domains/Value Sets in the Vocabulary Summary tab will automatically take you to the excel tab that contains the more detailed information as it pertains to that particular Concept Domain/Value Set . This is shown in Figure 11.

Figure 11 Concept Domain/Value Set Name Hyperlinks

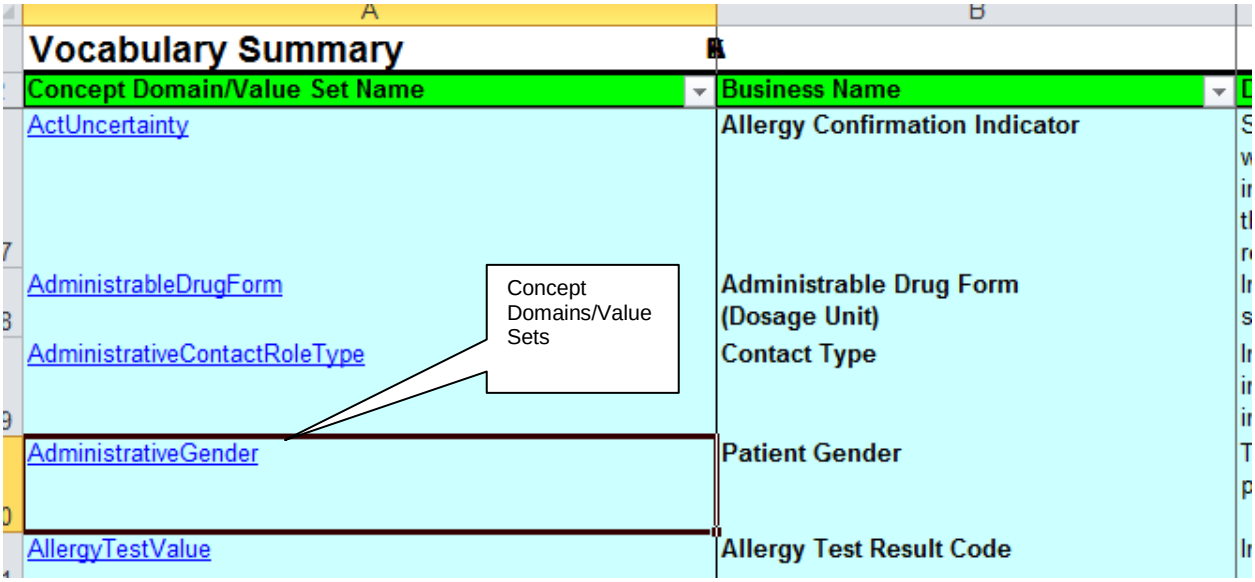


Figure 12 Administrative Gender Metadata

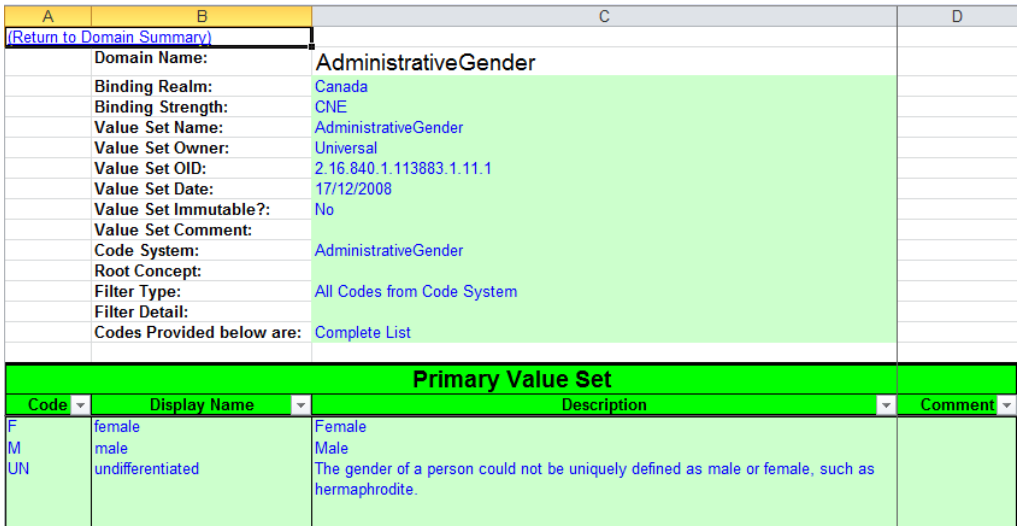


Figure 12 shows the metadata as it appears in the MTW for the Concept Domain of Administrative Gender. The screenshot below is the same, but a series of dialogue boxes (1-18) have been added to annotate the image.

Figure 13 Metadata Explained

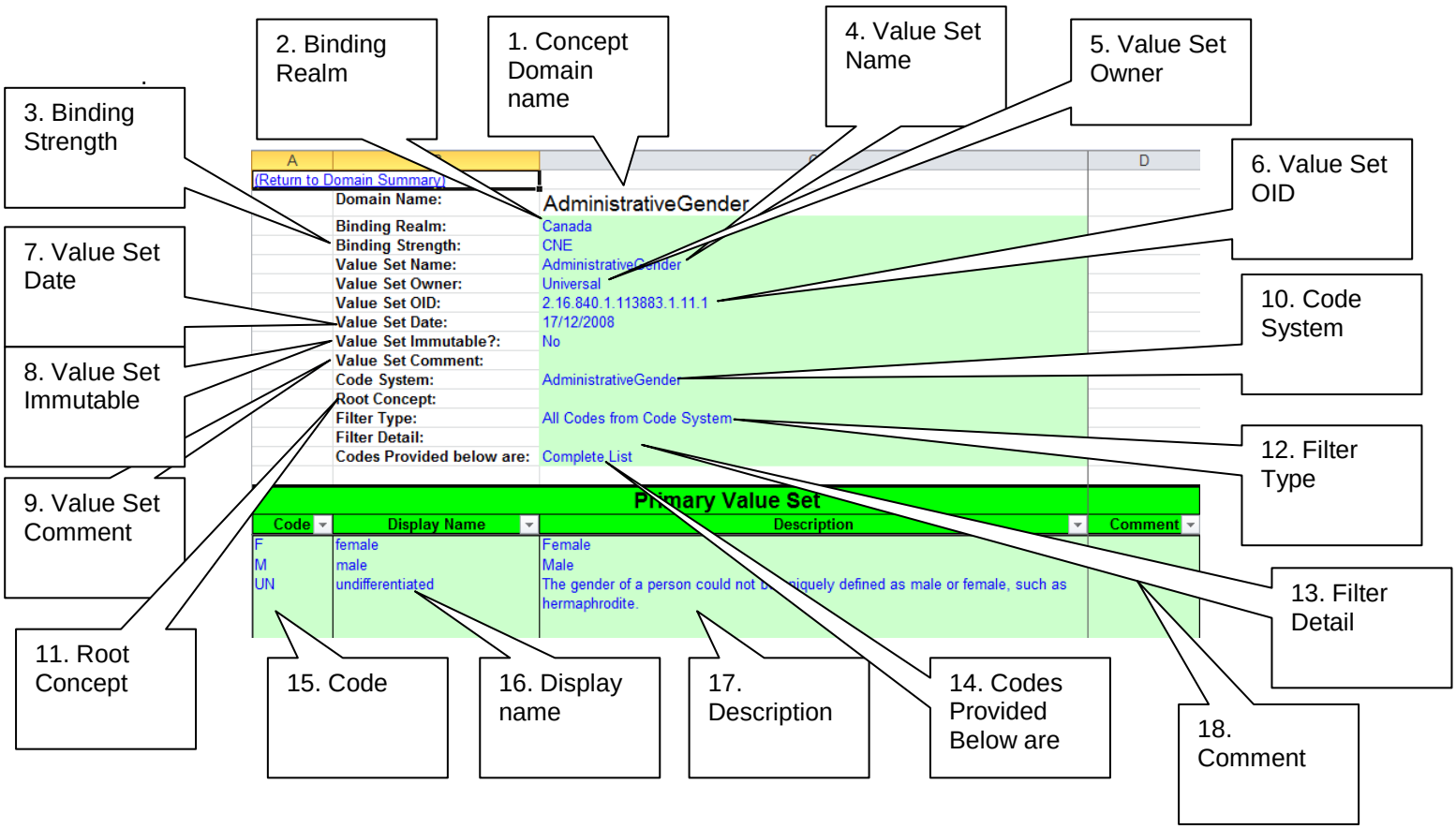


Figure 13 displays annotated boxes that correspond to the detailed descriptions provided below.

The term Value Set Definition is referenced in the following section. It means all the properties indicated below, it does not mean a textual description of the Value Set.

1. **Concept Domain name**: This is the name of the Concept Domain, as it appears on the message models. The codes below (see dialogue box 15) are the codes that are bound to this Concept Domain.

2. **Binding Realm**: The binding realm identifies whether or not the codes are specific to Canada or used in the entire HL7 interoperability space (which is Canada and beyond). In this case, the binding realm is Canada, which indicates that these codes are in use in Canada. If the codes were intended for the entire HL7 interoperability space, the binding realm would be labelled as Universal.

3. **Binding Strength**: The binding strength lets the implementer know whether they are allowed to add additional codes to this Value Set.

- If the binding strength is identified as CNE (Coded, No Extensibility) then the implementer must only use this list of codes. Adding to the list of codes is strictly prohibited and will lead to problems with semantic interoperability with other jurisdictions.
- If the binding strength is listed as CWE (Coded with Extensibility) then the user may add codes required to meet their jurisdictional needs.

For more information on CNE and CWE, please refer to section 2.4.

In this example, users are not permitted to add additional codes to this Value Set for interoperable use.

4. **Value Set Name**: This is the unique name for the Value Set itself. It may be the same as the Concept Domain, but not always.

5. **Value Set Owner**: This piece of data identifies who owns and maintains the Value Set. Value Sets owned by HL7 International are identified as Universal. Value Sets owned and maintained by the Standards Collaborative (SC) are identified as “Canada” in this field.

6. **Value Set OID**: The Value Set OID is used to uniquely identify the Value Set and is primarily used by implementers using a Terminology service to track Value Sets. The Value Set OID is not transmitted in the HL7 v3 message.

It should be noted that as of MR02.05 release, all Value Set OIDs are SC issued OIDs regardless of the Value Set Owner in order to reduce the maintenance burden.

- For example, if HL7 International owns a Value Set and a stakeholder wished to add a value to the Value Set, the Value Set OID would change from the HL7 International OID to a new SC OID. Once the additional requested stakeholder value was accepted and harmonized with HL7, the SC OID would change back to the HL7 OID. Using an SC Value Set OID from the beginning significantly reduces the amount of OID maintenance required.

If an implementer is adding additional concepts to a defined pan-Canadian Value Set in the MTW, this means the Value Set is no longer maintained by either HL7 International or the Standards Collaborative, which means a new OID must be issued and maintained by the implementer. For this and other maintenance considerations, implementers are strongly encouraged to adopt the pan-Canadian Value Sets in the MTW.

7. **Value Set Date**: The Value Set date is used as the mechanism to version the Value Set. This date indicates the last time the Value Set was published. In this example, the Value Set was last changed on September 30, 2013 as shown in the image above.

8. **Value Set Immutable**: This piece of metadata indicates to the implementer whether the definition of the Value Set can ever be changed. If *Value Set Immutable* is set to “Yes”, then the Value Set definition is not changeable. It is important to note if only the Value Set definition is set to immutable and not the Code System, the underlying list of concept may continue to evolve. Therefore, to make a Value Set truly immutable, the Code System version of the Value Set must also be specified to ensure the definition and the list of concepts are static and cannot change. If *Value Set Immutable* is set to “No”, then the definition of the Value Set (e.g., filters, expansion based on the filters, codes) may change.

9. **Value Set Comment**: This field is used by the SC to communicate additional information about the Value Set.

- For example, if a Value Set is under review or the content has high likelihood to change, a comment is provided to encourage contacting SC as part of implementation consideration.

10. **Code System**: This indicates the Code System from which the Value Set is drawn. This could be SNOMED CT, LOINC®, HL7 or other Code Systems. A Value Set may be drawn from one or more Code Systems.

- In this example, the Code System is drawn from the HL7 Code System by the same name: AdminstrativeGender.

11. **Root Concept**: This is the “top level” code from the Code System that the Value Set filter should draw concepts from in order to obtain the fully enumerated list of concepts intended for the Value Set. Additional refinement of the root concept filter is indicated under Filter Type property (see below).

12. **Filter Type**: This field will have a filter identified if the SC is unable to provide a complete Value Set.

Reasons for which the SC would not include a complete value include:

- Lack of IP rights to distribute the Value Set;
- The list of values in the Value Set would be too long to be enumerated in the MTW; or
- The Value Sets are updated more frequently by the Value Set provider than the SC can publish updates.

Filter types are identified in the MTW as follows:

- **All codes from Code System**: This means that the Value Set is drawing from all active codes that exist in this Code System.
- **Root Concept and Specializations**: Includes the code specified as the root concept and all active codes in the Code System subsumed by the root concept.
- **Specializations of Root Concept**: Includes all active codes in the Code System subsumed by the root concept code but exclude the code specified as the root concept.
- **Subset Listed Below**: Includes active codes from this Code System based on discrete concept selection and are provided in the list of enumeration of codes below.
- **See Filter at Right**: The Value Set is a complex definition, using unions and/or exclusions and/or intersections, based on Code System properties or relationships. Refer to the "Filter" table to the right of the Value Set definitions (explained in the " **Filter Table on the right** " section below).
- **See Filter Detail**: Indicates the filter information is documented in the Filter Detail property.
- **Child Value Sets Only**: The Value Set is determined solely by the "child domain" Value Sets. This means the allowable list of concepts is comprised of all the active codes derived from the child Value Sets. In this case, the Value Set tab is included only to define Value Set metadata such as the Value Set name and OID. An example of such a Value Set is ControlActReason.

13. **Filter Detail**: The Value Set is expressed using textual language rather than a formal expression, potentially due to the lack of appropriate metadata within the Code System to allow a formal filter to be expressed. Implementers will need to make subjective decisions to determine what codes from the Code System qualify for use.

14. **Codes provided below are:** This field is used to let the implementer know whether the codes provided in the Value Set is a complete set or otherwise.

- In the past, the SC provided examples Value Sets, but due to possible patient safety risks, the SC will now only be providing complete Value Sets. If a complete Value Set cannot be provided, the SC will use this field to guide the user as to how to arrive at a complete Value Set.

15. **Code**: This is the actual concept representation captured, stored and transmitted inside an HL7 v3 message. Codes may be alphabetical as in the case of our example. They may also be numeric or alphanumeric depending on the Code System.

16. **Display name**: This is the actual text behind the coded value.

- For concepts using SNOMED CT, the Display Name field lists the Fully Specified Name (FSN) of the coded value.
- For concepts using LOINC, the display name is the LOINC long common name.
- For concepts using UCUM, the display name is the name as listed in UCUM specification.
- For concepts using other Code Systems, the display name is the formal name as released by the terminology authority.

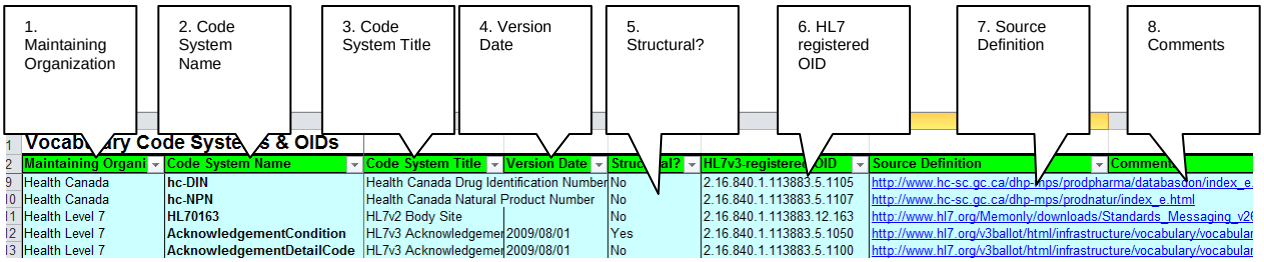
17. **Description:** This field contains the definition or description of the code if required. This does not apply to most Code Systems except HL7 and SCPQUAL and SCPTYPE Code Systems.

18. **Comment**: This field provides additional usage notes about the concept if required. This may include change history, deprecations or linkages to similar content etc.

Should you have any questions about the MTW, please do not hesitate to contact our InfoDesk (Standards@infoway-inforoute.ca) for further assistance.

4.1.2.3 Using the Code System and OIDs Tab

Figure 14 Overview of Vocabulary Code Systems and OIDs Tab



Maintaining Organi	Code System Name	Code System Title	Version Date	Stru...al?	HL7v3-registere...OID	Source Definition	Comment
Health Canada	**hc-DIN**	Health Canada Drug Identification Number		No	2.16.840.1.113883.5.1105	http://www.hc-sc.gc.ca/dhp-mps/prodpharma/databasdon/index_e.	
Health Canada	**hc-NPN**	Health Canada Natural Product Number		No	2.16.840.1.113883.5.1107	http://www.hc-sc.gc.ca/dhp-mps/prodnatur/index_e.html	
Health Level 7	**HL70163**	HL7v2 Body Site		No	2.16.840.1.113883.12.163	http://www.hl7.org/Memonly/downloads/Standards_Messaging_v2(	
Health Level 7	**AcknowledgementCondition**	HL7v3 Acknowledgemer	2009/08/01	Yes	2.16.840.1.113883.5.1050	http://www.hl7.org/v3ballot/html/infrastructure/vocabulary/vocabular	
Health Level 7	**AcknowledgementDetailCode**	HL7v3 Acknowledgemer	2009/08/01	No	2.16.840.1.113883.5.1100	http://www.hl7.org/v3ballot/html/infrastructure/vocabulary/vocabular	

Clicking on the Code Systems & OID tab at the bottom of the spreadsheet will take implementers to a page that looks like Figure 14. In this tab, one will find eight (8) column headings. Below is a description of how to use and leverage the information found on this page.

1. **Maintaining Organization**: The maintaining organization is the Standards Development Organization that is responsible for all of the maintenance (updates, requests for change etc) for the particular Code System listed in Column B*: Code System Name*.

2. **Code System Name**: This is the formal name of the Code System as registered with HL7 International. For example: For LOINC, this is listed as LN.

3. **Code System Title**: This is the descriptive label for the Code System name. Using LOINC® as the example, LN is the Code System Name and the Code System Title is Logical Observation Identifiers Names and Codes.

4. **Version date**: Date is used as the mechanism to indicate the version of the Code System a Value Set draws from. The date is indicated within the terminology content released by the terminology authority. Some Code Systems contains a date as well as a version number such as LOINC® or HL7, however within the context of pan-Canadian usage, the date is used as the mechanism to indicate the version of the Code System. The format of the date shall be YYYYMMDD where YYYY is the four numeric digit of the year, MM is the two numeric digit of the month, and DD is the two numeric digit of the month.

- If a version date is not listed, then implementers are strongly encouraged to use the most recent version of the Code System.
- If a version is specified however, then users are expected to use only that version of the Code System and any changes made to that Code System since the date of publication cannot be used.

From the context of SNOMED CT and version management and for the purposes of understanding it in the context of these HL7 specifications:

- The date indicated in the Code System tab provides stakeholders with the specific version that was used in the Value Set definition. This includes using the code and descriptions either as a filter in a dynamic Value Set, root concept, or a member of a Value Set.
    - For example, the version of SNOMED CT Code System indicated for MR02.05 release is 20130113.
- For SNOMED CT, there is an additional version to consider. This is the version of the Canadian English Extension, which is not published at the same time as the International SNOMED CT version.
    - For example; the version of SNOMED CT English extension indicated for MR02.05 release is December 2012

- In some cases, where a request from a stakeholder for addition of a new concept has been received and accepted, the content will not yet be present in the SNOMED CT Canadian English Extension. It will however, be published in the Value Set.

5. **Structural**? If the answer to this question is listed as "Yes" in the MTW, then it indicates that the Code System uses the CS data type and will not require the use of an OID.

- It also indicates that the Value Set can only be drawn from that Code System and implementers may not add local or temporary codes to the Code System.

6. **HL7 v3-registered OID**: This column lists the actual OID for the Code System as registered with HL7 International in their OID registry (http://www.hl7.org/oid/index.cfm). This OID must be transmitted in all HL7 v3 messages.

7. **Source Definition**: This field contains a hyperlink to the source definition of the Code System, which may include items such as licensing and terms of use if applicable.

8. **Comments**: The comments field provides any other additional information about the Code System that may assist the implementer. As an example, the SC is the maintaining organization for the pCLOCD, which provides XCA codes for LOINC® codes used in Canada as found in the pCLOCD.

For some Value Sets, there is a comment that tells stakeholders they should refer to the Reference Sets for the content. The Reference Sets typically evolve more dynamically and therefore the Version may be more recent than the Value Set published in the MTW. New implementers are always encouraged to use the most recent version of any subset or Code System. Existing implementers should migrate to newer versions when it is feasible for them.

4.1.2.3.1 Filters in the MTW

In some cases, in order to arrive at the values in the Value Set, one must apply filters to the Code System.

This is indicated when one sees "Filter Table on the right".

Filter Table on the right: This field provides additional information on how to apply the appropriate filters in your system in order to arrive at the correct Value Set. The information provided is based on the properties and concepts available within the indicated Code System.

- It should be noted that the application of the filters is intended for machine applications and is very difficult to arrive at using standard terminology tools.

Please see Figure 15 for an example of a filter table on the right hand side of a Value Set (e.g., DiagnosisValue Value Set).

Figure 15 Example of "Filter Table on the Right"

Filter for DiagnosisValue, snomed-CT				
Level	**Operation**	**Filter Type**	**Code/Property**	**Description**
0	Include	With Property	Namespace = SNOMED CT International	
0	Intersect	With Property	Namespace = SNOMED CT English Canadian Extension	
0	Intersect	With Property	Status=Current	
0	Intersect	With Property	Status=Pending move	
0	Intersect	Content Below		
1	Include	Specializations of Code	404684003	clinical finding (finding)
1	Exclude	Code and Specializations	307824009	administrative statuses (finding)

1	Exclude	Code and Specializations	405533003	adverse incident outcome categories (finding)
1	Exclude	Code and Specializations	420134006	propensity to adverse reactions (disorder)
1	Exclude	Code and Specializations	365858006	prognosis/outlook finding (finding)
1	Exclude	Code and Specializations	285153007	sequelae of external causes and disorders (finding)
1	Include	Specializations of Code	272379006	event (event)
1	Include	Specializations of Code	413350009	finding with explicit context (situation)
1	Include	Specializations of Code	57177007	family history with explicit context (situation)
1	Exclude	With Property	Non-Human Subset=https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/pan-Canadian_Subset_Library/Non-Human_Subset/Redirect_to_Non-Human_Subset	

See section 4.1.2.3.2 and 4.1.2.3.3 for filter instructions when using SNOMED CT or pCLOCD/LOINC respectively as the Code System.

4.1.2.3.2 Filters using SNOMED CT as the Code System

The SNOMED CT code system, including the International and all extensions use the same OID and therefore should be thought of as “one” Code System when an implementer wishes to enumerate a set of concepts from the Value Set definition (and specifically using the filter detail). This is specified in the filter details by indicating the specific namespaces (as shown above). In addition, in some cases an additional filter is provided in the filter details to remove the non-human SNOMED CT content (as shown above).Please contact the SC at standards@infoway-inforoute.ca to learn more.

4.1.2.3.3 Filters using pCLOCD/LOINC as the Code System

Filters are provided for any Value Set that uses LOINC/pCLOCD when there is no enumerated list to use. If there is only one filter recommendation, as in the case of ObservationIssueTriggerMeasuredObservationType, then it is based on using the full LOINC release as published by Regenstrief.

If there are two filter recommendations, then it is expected that the filters are applied against the pan-Canadian LOINC Observation Code Database (pCLOCD) to determine the appropriate LOINC codes that can be included in the Value Set as well as the Canadian Extension Codes (or XCA Codes) from pCLOCD that can be included in the Value Set. Each set of codes should use the appropriate OID; see Section 2.12.1 for more information on OID’s.

An example of a filter that uses both LOINC and pCLOCD is CultureObservationType (see Figure 16).

Applying filters to pCLOCD can be done manually by filtering the excel version. The filters are applied in two steps in the order recommended in the filters. The first step identifies all the LOINC Codes in the Value Set. Using the information provided in the “Code/Property” attribute from the image below, the pCLOCD attributes to filter would include:

- LOINC/pCLOCD Code
- LN Class
- B/R/O

Figure 16 Filters that use LOINC and SNOMED CT

Filter for CultureObservationType, LN				
Level	**Operation**	**Filter Type**	**Code/Property**	**Description**
0	Include	With Property	LOINC/pCLOCD Code=Does not contain XCA	LOINC codes in pCLOCD only
0	Include	With Property	CLASS=MICRO	Micro-organism
0	Intersect	Content Below		
1	Include	With Property	B/R/O=O	Orderable
1	Include	With Property	B/R/O=B	Orderable and Resultable
1	Include	With Property	B/R/O=R	Resultable

The second step identifies all the Canadian Extension Codes (or XCA Codes) in the Value Set. Using the information provided in the "Code/Property" attribute as shown in Figure 17 and the same pCLOCD attributes as above, run the filters.

Figure 17 Using Code/Property Attribute

Filter for CultureObservationType, pclocd				
Level	**Operation**	**Filter Type**	**Code/Property**	**Description**
0	Include	With Property	LOINC/pCLOCD Code=Contains XCA	LOINC Canadian Extension codes
0	Include	With Property	CLASS=MICRO	Micro-organism
0	Intersect	Content Below		
1	Include	With Property	B/R/O=O	Orderable
1	Include	With Property	B/R/O=B	Orderable and Resultable
1	Include	With Property	B/R/O=R	Resultable

The complete Value Set for CultureObservationType, including all LOINC and XCA Codes, is created when both filters are run and the results are combined.

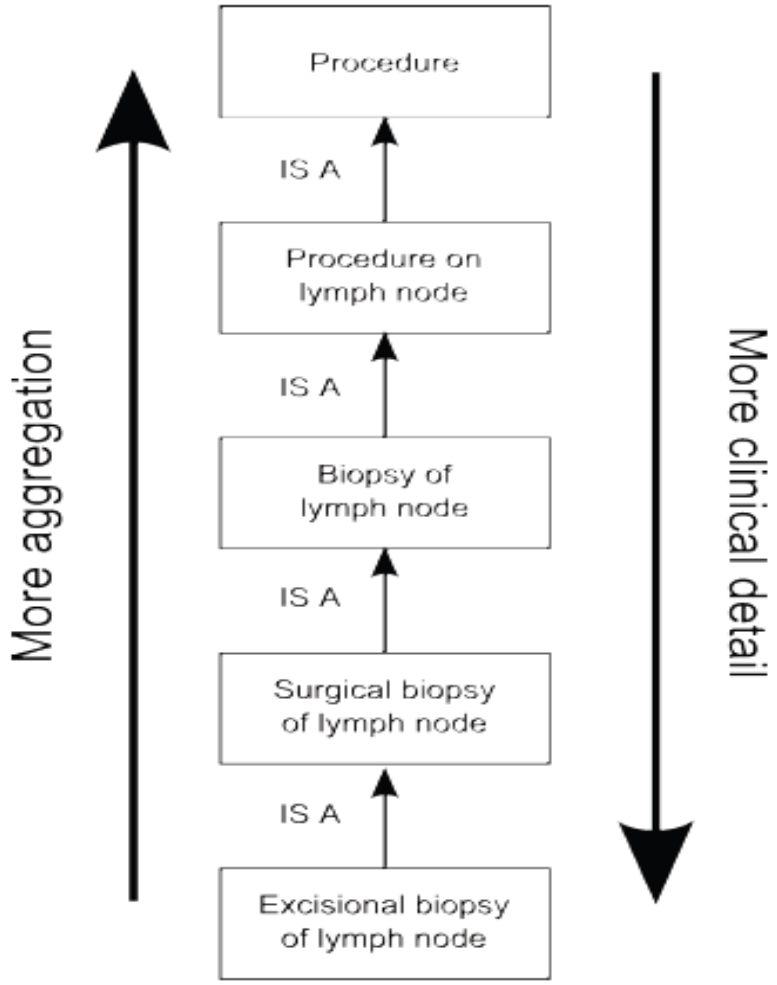
V SNOMED CT®

5.1 Background

The Systematized NOmenclature of MEDicine Clinical Terms (SNOMED CT) standard, is a clinical reference terminology that facilitates the interoperability of Electronic Health Records.

The terminology is comprised of concepts; descriptions, which provide the terms that explain the concepts; and relationships, which define the type of the association between two related concepts. The relationships, which differentiate SNOMED CT from other reference terminologies, enable aggregation and subsumption of data. A concept is subsumed by another if it implies that the other concept is also true. For example, using Figure 18: if "surgical biopsy of lymph node" is present, it always implies that a "procedure on lymph node" is present. Thus, "surgical biopsy of lymph node" is subsumed by "procedure on lymph node". Subsumption testing is important for retrieval to support decision support and aggregation.

Figure 18 Concept Subsumed by Another



SNOMED CT International Core content is developed and published in semi-annual releases by the International Health Terminology Standards Development Organisation (IHTSDO) and made available to the SC. The international SNOMED CT release includes content necessary for international use and interoperability.

The SC has developed two Canadian extensions of SNOMED CT and they can be found here: https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/1_SNOMED_CT

One extension is used for managing the French descriptions and is referred to as the SNOMED CT French CA extension.

The other extension, SNOMED CT English CA Extension, includes components (concepts, descriptions and relationships) submitted by stakeholders to the SC that have been approved for pan-Canadian use.

If the SNOMED CT English CA Extension content is thought to have international applicability, the Standards Collaborative will submit the components to IHTSDO for potential inclusion in international core content. The IHTSDO determines, at their discretion, IF and WHEN submissions will be accepted to the core.

The SNOMED CT English CA Extension includes only active content that has been harmonized with the most current SNOMED CT International Release. As the content of the SNOMED CT English CA Extension evolves and undergoes review and alignment with the International Release, users should expect changes to be made.

The SC publishes international SC maintained extension content here: https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/1_SNOMED_CT.

When sending SNOMED CT concept identifiers in an HL7 message, the OID is the same whether the concept is from SNOMED CT International or from any other extension.

5.2 The International Health Terminology Standards Development Organization (IHTSDO)

5.2.1 Purpose and Mission

The International Health Terminology Standards Development Organisation (IHTSDO) is an association and not-for-profit corporation under Danish Law, based in Copenhagen Denmark. Canada is one of the countries with charter membership. In early 2007, as part of its standards collaboration and coordination mandate, *Infoway* contributed Canada's "share" to the acquisition of the member countries purchase of the SNOMED CT intellectual property. Therefore, in accordance with the Standards Collaborative Steering Committee (SCSC) recommendations, *Infoway* has now secured a national license for the SNOMED CT standard for Canada. This license (https://infocentral.infoway-inforoute.ca/8_UserReferencesAndSupports/Terms_And_License_Agreements/License_Agreements/SNOMED_CT_Licenses_and_Terms_of_Use) is available to all members of Standards Collaborative. More information about the IHTSDO can be found here https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/1_SNOMED_CT .

The purpose of the IHTSDO is to:

- Acquire, own and administer the rights to SNOMED CT, other health terminologies and/or related standards and other relevant assets, (collectively known as "Terminology Products");
- Develop, maintain, promote and enable the uptake and correct use of its Terminology Products in health systems, services and/or products, around the world; and
- Undertake all related incidental activities conducive to achieving this purpose.

5.2.2 IHTSDO's Governance

The IHTSDO's high-level governance bodies include the General Assembly (GA) and Management Board (MB), of which Canada is a member of both. The advisory bodies include the Member Forum (MF), Affiliate Forum (AF) and four standing committees 1) Content Committee; 2) Implementation and Innovation Committee; 3) Quality Assurance Committee; and 4) Technical Committee.

Currently there are two types of Working Groups within the IHTSDO: Project Groups (PGs) and Special Interest Groups (SIGs). PGs are focused on one task and are driven by a use case deemed to be a priority, which was either generated from the field, the IHTSDO or both. The task has a start date and an end date; one or more milestones; and measurable end points or outcomes.

SIGs are either topic based (e.g., education, mapping, translation) or profession specialty based (e.g., nursing, dental). SIGs are potentially a rich source of use cases and suggestions for the 'bottom-up' improvement of SNOMED CT.

Membership in four standing committees, PGs and in SIGs is open to any interested party. Further information regarding the governance of IHTSDO can be found at http://www.ihtsdo.org/about-ihtsdo/governance-and-advisory/.

Anyone who would like to monitor the work of any of the IHTSDO® Working Groups can contact the Standards Collaborative at: standards@infoway-inforoute.ca for more information. The most recent version of the list of IHTSDO's Working Groups is available upon request.

VI LOINC®

6.1 Logical Observation Identifiers Names and Codes (LOINC)

The Regenstrief Institute, Inc. is an international health care and informatics research organization that maintains the LOINC database and supporting documentation, including the RELMA® mapping program. The LOINC database, supporting documentation and the RELMA mapping program are available through the Regenstrief Institute web site. (http://www.LOINC.org). The LOINC Users' Guide is available and contains explanations on the structure of the database, its rationale, and the rules used for naming test results.

6.1.1 Purpose of LOINC

The purpose of LOINC is to facilitate the exchange and pooling of clinical results for clinical care, outcomes management, and research, by providing a set of universal codes and names to identify laboratory and other clinical observations. The purpose is to facilitate the exchange and pooling of results, such as blood hemoglobin, serum potassium, or vital signs, for clinical care, outcomes management, and research.

The LOINC codes are not intended to transmit all possible information about a test or observation. They are only intended to identify the test observation or clinical observation. Other fields in the message can transmit the identity of the source laboratory and special details about the sample. The level of detail in the LOINC definitions is intended to distinguish tests that are usually characterized as separate test results within the file of existing laboratory systems.

The LOINC database consists, among other things, of a series of records intended to identify the test observation, clinical observation or test requests.

There are several attributes or fields that define each LOINC record and contribute to the LOINC Fully Specified Name. LOINC codes can represent a single test or panel.

Each LOINC record includes fields for specifying:

1. Component (analyte) — e.g., potassium, hemoglobin, hepatitis C antigen.
2. Property measured — e.g., a mass concentration, enzyme activity (catalytic rate).
3. Timing — i.e., whether the measurement is an observation at a moment of time, or an observation integrated over an extended duration of time — e.g., 24-hour urine. The type of sample — e.g., urine; blood.
4. The type of scale — e.g., whether the measurement is quantitative (a true measurement) ordinal (a ranked set of options), nominal (e.g., E. coli; Staphylococcus aureus), or narrative (e.g., dictation results from pathology).
5. Where relevant, the method used to produce the result or other observation.
6. It also contains information about the amount, route, and timing of physiologic or pharmacologic challenges (e.g., oral glucose tolerance test, which would be expressed in LOINC as Glucose^1H post 100 g Glucose PO).

In addition, the LOINC database includes other fields such as short names; related names, which facilitate searches for laboratory tests; long common names; example units and answer lists.

There were many sources used for constructing the database, including the Silver Book from the International Union of Pure and Applied Chemistry (IUPAC) and the International Federation of Clinical Chemistry (IFCC), textbooks of Clinical Pathology (e.g., Henry[3] and Tietz[4]), and the expertise and work of the LOINC members. The master test files of seven sources (Indiana University/Regenstrief, University of

[3] Henry JB. Clinical Diagnosis and Management by Laboratory Methods. Philadelphia: W.B. Saunders; 1994.
[4] Tietz – Burtis, CA, Ashwood ER (Editors). Tietz Textbook of Clinical Chemistry, 2nd ed. Philadelphia: W.B. Saunders; 1994.

Utah, Association of Regional and University Pathologists (ARUP), Mayo Medical Laboratories, LDS Hospital in Salt Lake City, the Department of Veterans Affairs, Quest Diagnostics, and University of Washington) were also reviewed as part of an empirical effort. The goal is to provide codes that correspond to the concepts in real world laboratories and clinical departments' master files.

The Regenstrief Institute maintains the LOINC® database. Supporting documentation and the RELMA mapping program are all available through the Regenstrief Institute web site. (http://www.LOINC.org/). Guidelines have been established for users who wish to request additions and changes to LOINC (See the pCLOCD Maintenance document on InfoCentral for further information about requesting additions and changes to LOINC, reader must be logged in to access). The database has been copyrighted to assure that multiple variants of the codes do not emerge. Having many variants would defeat the purpose of a universal identifier for test results.

6.1.2 Pan-Canadian LOINC Observation Code Database (pCLOCD)

The pan-Canadian LOINC Observation Code Database (pCLOCD) Nomenclature Standard is based on LOINC and is customized to meet the needs of Canadian stakeholders. This nomenclature supports the use of electronic data exchange.

The pCLOCD uses the LOINC records and attributes that specifically meet Canadian messaging requirements. There are gaps in LOINC that created an opportunity to generate new codes to meet Canadian requirements. Records required by Canadian stakeholders and not present in LOINC are assigned a Canadian code (prefaced by "XCA") and denoted by a distinct Code System OID. Canadian codes are submitted to Regenstrief for consideration and approval on a regular basis.

The pCLOCD standard is published as an Excel file that contains multiple tabs. The 'Overview' tab provides an overview of the tabs in the entire nomenclature workbook. The 'How to Read' tab outlines the color-coding used for column headings and clearly describes the various columns in the Nomenclature tab. The codes are on the 'Nomenclature' tab. Users should be familiar with both the Overview and How to Read tabs before using the Nomenclature tab.

The standard is also published as a Microsoft Access database. The Access file includes the LOINC copyright information and "Nomenclature" tab content found in the Excel file. It is conceptually identical although various columns may be expressed in a more specific data type (e.g., A "Yes/No" column in Excel may be expressed as a formal Boolean attribute in the MS-Access version; calculated fields may be translated to direct value fields).The pCLOCD is compliant with the LOINC terms of use and as required by copyright when a subset of LOINC is used. The LOINC notice regarding terms of use is available in the notices tab and in a table in the access database. The pCLOCD is available to Standards Collaborative members here. (https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/2_pan_Canadian_LOINC_Observation_Code_Database_pCLOCD)

6.1.3 LOINC® and SNOMED CT Usage

In general terms, LOINC is very suited to and used in the pan-Canadian Standards Specifications for laboratory observations, some clinical observations and to identify document types.

SNOMED CT is used, in some cases, in the laboratory domain for the results value, pertaining for example, to Pathology results and Organisms Identification results for Microbiology. For the latter, SNOMED CT has an exhaustive comprehensive database that offers a multitude of possibilities for resulting/matching organisms (Bacteria, Fungi, Viruses, Mycobacteria and Parasites) and organism-related findings.

Stakeholders should consult the Implementation Guide Volume 9 Laboratory (Sections 2.10, 2.12) for comprehensive details on specific usage of LOINC and SNOMED CT not duplicated in this guide.

VII UCUM [5]

7.1 Unified Code for Units of Measure (UCUM)

The Unified Code for Units of Measure is a Code System intended to include all units of measures being contemporarily used in international science, engineering, and business. The purpose is to facilitate unambiguous electronic communication of quantities together with their units. The focus is on electronic communication, as opposed to communication between humans. A typical application of UCUM is electronic data interchange (EDI) protocols, but there is nothing that prevents it from being used in other types of machine communication. UCUM provides a single coding system for units that is complete, free of all ambiguities, and that assigns to each defined unit concise semantics. It consists of a basic set of symbols for units, called atomic unit symbols or unit atoms and multiplier prefixes. It also consists of an expression syntax by which these symbols can be combined to yield valid unit expressions.

Implementers may map the units value set to their local units or adopt the UCUM Code System for expressing units. Moreover, consistent with the two levels of conformance documented within UCUM, senders and receivers may simply treat units as a display string; although proper mathematical interpretation of mathematically equivalent unit strings is encouraged, particularly for those systems offering special analytical capabilities pertaining to laboratory results (e.g., trending, alerting, *etc.*).

For more information, please refer to http://unitsofmeasure.org/trac/ for the most current version of this publication.

UCUM is the valid Code System for several Concept Domains such as x_BasicUnitsofMeasure, x_DrugUnitsofMeasure etc. Please refer to the data type specification for more information.

7.2 UCUM Atomic Unit Symbols

UCUM provides both case sensitive and case insensitive atomic symbols. The pan-Canadian Messaging specifications use the case sensitive symbols. Table 7 provides examples of those differences.

Table 7 Valid UCUM Case Sensitive Symbols

Description	Valid UCUM Case Sensitive symbols	Valid UCUM Case Insensitive Symbols
Hour	h	HR, hr, Hr
Pascal	Pa	PAL, pal, Pal

The International System of Units (abbreviated SI from the French Le Système International d'Unités) prescribes specific case usage. Table 8 provides examples of how implementers may apply SI case sensitive terms with UCUM atomic unit symbols.

Table 8 Comparisons of SI Symbols to UCUM Atomic Unit Symbols

Description	SI Symbol	UCUM atomic unit symbols
Meter	m	m
Gram	g	g
Degree Celcius	°C	Cel

[5] http://unitsofmeasure.org/ucum.html

Description	SI Symbol	UCUM atomic unit symbols
Day	d	d
Minute	min	min
Hour	h	h (do not use hr)
Second	s	s
Litre	L	L
Mole	mol	mol
International Unit	IU	[IU]
pH	pH	pH
High power field	n/a	/[HPF]
Low power field	n/a	/[LPF]
Percent	%	%
Pascal	Pa	Pa (not Pal)

7.3 Prefixes

Prefix symbols defined in UCUM are used to precede the “atomic unit”. Examples of prefixes include; kilo (k), milli (m), micro (u). Examples of how they can be used with atomic units include; mmol (where “mol” is the atomic unit), ug (where “g” is the atomic unit).

Prefix symbols will be communicated in the same manner as prescribed for SI use. Lower case should be used for all but the following prefixes, which must be expressed in upper case:

Yotta (Y)
Zeta (Z)
Exa (E)
Peta (P)
Tera (T)
Giga (G)
Mega (M)

7.4 Unit Expression Rules

The UCUM web site provides a full list of expression rules and as a reminder; it should be consulted for the most recent information:

http://unitsofmeasure.org/trac/

The key rules that apply to units include the following:

1. All expressions of UCUM shall be built from characters of the 7-bit US-ASCII character set exclusively. Unit symbols can consist of all ASCII characters in the range of 33–126 (0x21–0x7E) excluding the following:

a) double quotes (‘"’),
b) parentheses (‘(’ and ‘)’),
c) plus sign (‘+’),
d) minus sign (‘-’),

e) period (‘.’’),
f) solidus (‘/’’),
g) equal sign (‘=’’),
h) square brackets (‘[’ and ‘]’), and
i) curly braces (‘{’ and ‘}’).

All of the above (a-i) have special meaning and rules of use in a unit expression.

2. Curly braces are used for “annotations”. Curly braces provide a standard means to communicate supporting information where stakeholders wish to provide additional information/ annotations with units, such as %{vol}, mol{creatinine}, etc. Although upper or lower case can be used, it is recommended to express terms in curly braces in lower case except for the following:
    - {G} – so as not to confuse with “g” for gram
    - {M} - so as not to confuse with “m” for meter

- In addition, users may provide the annotation in French or English and in a shortened form of the word: {creat} or {creatinine} are both acceptable. The use of annotations within formal unit expressions appears to be frequent in traditional practice. It should be noted that UCUM enables this formal annotation syntax in order to support the traditional practice, while ensuring that such annotation text can be predictably segregated from the formal portion of the unit. However, the use of annotations is strongly discouraged for message instances where the annotation cannot be unambiguously determined from other message content such as the observation. For example, the unit for a “Oxalate/Creatinine” result value should be umol/mmol rather than umol/mmol{creatinine}.
- In these situations, implementers should give serious consideration to limiting their use of annotations.

3. Square brackets (‘[’ and ‘]’) may be part of a unit atom at any place but only as matched pairs. Square brackets are lexical elements and not separate syntactical tokens. Within a matching pair of square brackets, the full range of characters 33–126 can be used. Square brackets do not determine the boundary between prefix and unit atom, but they never span the boundary of unit atoms. Square brackets must not be nested. See section 7.4.1 for further information on using square brackets.
   For example % “[abc+ef]”, “ab[c+ef]”, “[abc+]ef”, and “ab[c+ef]” % could all be valid symbols if defined in the tables. In “ab[c+ef]” either “a” or “ab” could be defined as a prefix, but not “ab[c”.
4. All units can be combined in an algebraic term using the operators for multiplication (period ‘. ‘) and division (solidus ‘/’). The use of the period instead of the asterisk (‘*’) as a multiplication operator continues a tradition codified in ISO 1000 and maintained in ISO 2955. Because floating point numbers may not occur in unit terms the period is not ambiguous. A period in a unit term has no other meaning than to be the multiplication operator. A leading “/” will invert the unit that directly follows it.
5. Exponents - Simple units may be raised to a power (i.e. power of 10). The exponent is an integer number and is written immediately behind the unit term. Negative exponents must be preceded by a minus sign (‘-’) positive exponents may be preceded by an optional plus sign (‘+’). Although UCUM has provided implementers with a choice in using “*”, or “^” for indicating the power of ten, the use of “*” is the only symbol allowable in the pCLMN to minimize confusion for V2 implementers (i.e. 10*6/L).

7.4.1 Style:

1. Curly braces may be used to enclose annotations that are often written in place of units or behind units but that do not have a proper meaning of a unit and do not change the meaning of a unit. Annotations have no semantic value.
    - For example one can write “%{vol}”, “kg{total}”, or “{RBC}” (for “red blood cells”) as pseudo-units. However, these annotations do not have any effect on the semantics, which is why these example expressions are equivalent to “%”, “kg”, and “1” respectively.

2. An underscore ('_') is used to separate the subscript from the stem of the unit symbol when a unit would have a subscript in print. The subscript is part of the unit atom. Subscripts are used to disambiguate the two units with the same name but different meanings.
    - For example, when distinguishing the International Table calorie from the thermochemical calorie, we would use 1 cal_{IT} or 1 cal_{th} in print. UCUM defines the symbols "cal_IT" and "cal_th" with the underscore signifying that "IT" and "th" are subscripts. Other examples are the distinctions between the Julian and Gregorian calendar year from the tropical year or the British imperial gallon from the U.S. gallon.
3. Square brackets enclose suffixes of unit symbols that change the meaning of a unit stem. All customary units shall be enclosed completely by square brackets. Other unit atoms shall be enclosed in square brackets if they are very rare, if they will conflict with other units, or if they are normally not used as a unit symbol but do have a proper meaning as a unit in UCUM. Square brackets are part of the unit atom.
    a. For example, 1 m H2O is written as "m[H2O]" in UCUM because the suffix H2O changes the meaning of the unit atom for meter (length) to a unit of pressure.
    b. Customary units are defined in UCUM in order to accommodate practical needs. However, metric units are still preferred and the customary symbols should not interfere with metric symbols in any way. Thus, customary units are "stigmatized" by enclosing them into square brackets.
    c. If unit symbols for the purpose of display and print are derived from UCUM units, the square brackets can be removed. However, display units are out of scope of UCUM.
4. The apostrophe ('') is used to separate words or abbreviated words in a multi-word unit symbol. Since units are mathematically defined symbols and not abbreviations of words, multi-word unit symbols should be defined only to reflect existing habits, not in order to create new ones. Multi-word units should always be enclosed in square brackets.
    a. For example, such legacy units called "Bodansky unit" or "Todd unit" have the unit symbols "[bdsk'U]" and "[todd'U]" respectively.

Table 9 provides examples of UCUM Unit expressions.

Table 9 Valid UCUM Expression Examples

Valid UCUM Expressions
/mL
{Copies}/mL
[cfu]mL
/L
10*12/L
10*9/L
ng/mL
ng/g
%
mL/72.h
umol/L
fL

VIII INTERNATIONAL STATISTICAL CLASSIFICATION OF DISEASES AND RELATED HEALTH PROBLEMS

8.1 Background and the Canadian Institute for Health Information[6]

The International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10) is an international standard for reporting clinical diagnoses developed by the World Health Organization. ICD-10-CA is an enhanced version of ICD-10 developed by the Canadian Institute for Health Information (CIHI) for morbidity classification in Canada.

CIHI collects, analyzes and publishes data and information in a standardized way that allows every jurisdiction to understand, compare and *use* the data and information effectively to make the decisions that lead to healthier Canadians.

ICD-10-CA classifies diseases, injuries and causes of death, as well as external causes of injury and poisoning. The classification has 23 chapters with alphanumeric categories and subcategories. Unlike ICD-9, ICD-10-CA applies beyond acute hospital care. ICD-10-CA also includes conditions and situations that are not diseases but represent risk factors to health, such as occupational and environmental factors, lifestyle and psycho-social circumstances.

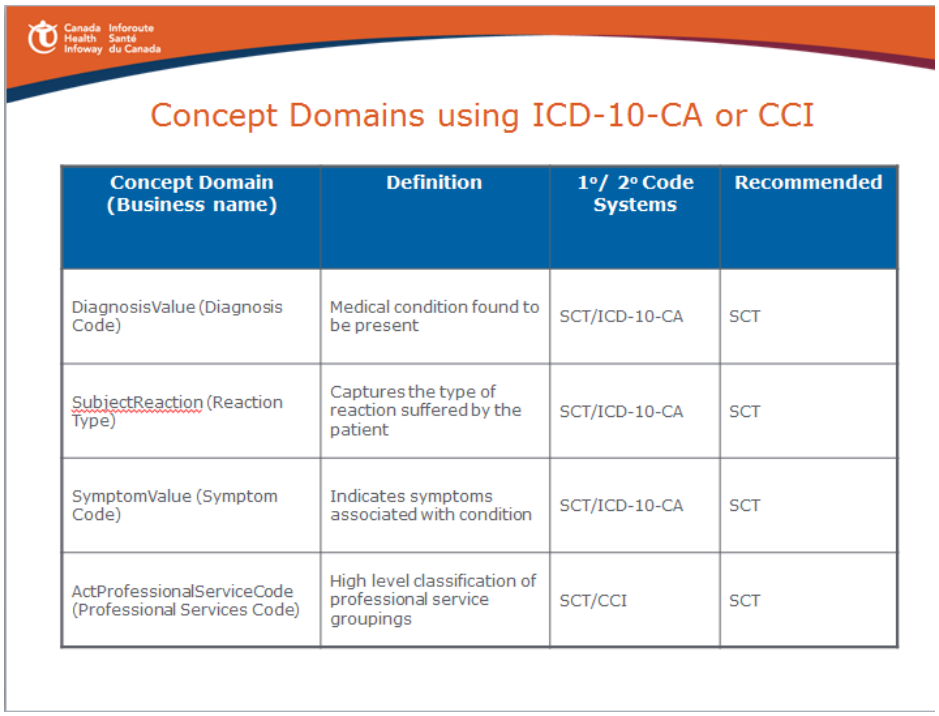
More information on ICD can be found on the CIHI website (http://www.cihi.ca/cihi-ext-portal/internet/en/document/standards+and+data+submission/standards/classification+and+coding/codingclass_icd10) or by contacting CIHI (icd10cci@cihi.ca) for further assistance.

8.2 The use of ICD-10 and CCI in the pan-Canadian messages and the Master Terminology Worksheet (MTW)

Past iterations of the Master Terminology Worksheet recommended the use of either ICD-10-CA/CCI or SNOMED CT as Value Set options for the four (4) Concept Domains shown in Figure 19.

[6] Source: http://www.cihi.ca/cihi-ext-portal/internet/en/document/standards+and+data+submission/standards/classification+and+coding/codingclass_icd10

Figure 19 ICD-10-CA or CCI



Concept Domains using ICD-10-CA or CCI

Concept Domain (Business name)	Definition	1°/ 2° Code Systems	Recommended
DiagnosisValue (Diagnosis Code)	Medical condition found to be present	SCT/ICD-10-CA	SCT
SubjectReaction (Reaction Type)	Captures the type of reaction suffered by the patient	SCT/ICD-10-CA	SCT
SymptomValue (Symptom Code)	Indicates symptoms associated with condition	SCT/ICD-10-CA	SCT
ActProfessionalServiceCode (Professional Services Code)	High level classification of professional service groupings	SCT/CCI	SCT

In early, 2013, the SCWGs endorsed the migration to one Value Set for these Concept Domains and recommended that the Value Set use SNOMED CT as the Code System of choice. This change is reflected on the MR02.05 release of our pan-Canadian specifications.

Any jurisdiction that may have implemented either ICD-10 and/or CCI and now wishes to migrate to SNOMED CT is encouraged to contact the SC (standards@infoway-inforoute.ca) for further assistance.

IX COMPUTABLE VOCABULARY

In addition to the "Human-readable" MTW, the SC publishes two additional sets of artifacts that expose terminology information in a format more amenable to direct use by software. These formats are the MIF and the vocabulary schema.

9.1 MIF (Model Interchange Format)

MIF is a syntax defined by HL7 to allow representation of all HL7 artifacts, including message types (wrappers, CMETs, payloads), interactions, data types and vocabulary. The syntax is defined using a set of schemas and serves to define a standardized exchange and persistence format as well as detailed documentation of the HL7 metamodel including constraints and documentation. It is intended for use in both the development and implementation of HL7 v3 specifications.

MIF provides a tooling-friendly XML syntax to formally represent all vocabulary artifacts, including Concept Domains, Code Systems, Value Sets and Terminology Bindings. The content can be parsed and validated by tools. It enables vocabulary to be represented consistently, regardless of source.

The MR02.05 terminology release is represented using MIF version 2.1.4. To validate the MIF, go to the HL7 GForge Site and download the corresponding MIF schemas (http://gforge.hl7.org/gf/project/mif-schemas/frs/?action=FrsReleaseBrowse&frs_package_id=14). The MIF schemas are broken into multiple files, each supporting different aspects, such as "markup", "static models", "vocabulary", etc. The file used to validate vocabulary MIF is mif-model-vocabulary.xsd.

In MR02.05, two MIF files are provided. The first represents content maintained by HL7 International, including all Concept Domains, UV Code Systems, realm definitions, HL7 International owned Value Sets and universal Value Set bindings. The second represents content maintained by the Standards Collaborative. This includes SC-maintained Code Systems and Value Set definitions, supplements defining Canadian documentation on UV Code Systems, Concept Domains and Value Sets and Canadian bindings.

In MR02.05, the MIF files are generated from the pan-Canadian Master Terminology Worksheet. This is because some changes approved by HL7 have not yet been applied and several Concept Domains have not yet been approved. Because the MIF is generated from the spreadsheet, representations of many Code Systems are incomplete – they only contain the codes included in the spreadsheet. For HL7 and SCPQUAL, SCPTYPE, and SCTEMP Code Systems, all codes used in Canada have been included, but for non-HL7 Code Systems such as LOINC and SNOMED CT, only a subset of those codes (those used as example codes or fully enumerated Value Sets in the spreadsheets) appear in the MIF.

9.2 Vocabulary Schemas

Just as the pan-Canadian message type designs are based on data types and schemas, the message schemas published to help validate instances created against those specifications also need to validate the data types and vocabulary. A separate schema file for vocabulary called "voc.xsd" is referenced by the other schema files. In MR02.05, the voc.xsd file is a Canadian-generated version that contains only vocabulary used by Canada.

Due to the way vocabulary is conveyed in HL7, schemas can only be of limited use in validating vocabulary, it is not intended to extract content from within for implementation. There are several issues:

- Some Concept Domains have more than one Value Set binding, making constraint to a single set of codes impossible;
- Several Value Sets are drawn from multiple Code Systems. Because schema can only validate codes based on enumerations, it is not possible to enforce that code and Code System are correctly matched;

- The CE and CD data types allow a code and multiple translations to be sent. There is no guarantee that the desired code will be in a specific location within the CD datatype, making schema validation impossible; and

- Many Value Set definitions are “dynamic”, meaning the set of allowed codes changes as the underlying Code System changes. For Code Systems such as Health Canada DIN, this means code changes on a weekly basis, which is not reasonable to enforce with schemas.

For all of these reasons, the vocabulary schemas are limited to enforcing HL7 “structural” vocabularies – those codes bound to CS attributes such as classCode and moodCode. Because the CS is constrained to a single Code System and the set of codes is “frozen” for the release, schema validation of these attributes will work. All other vocabulary validation will need to occur using software validation or terminology services.

X TERMINOLOGY MAINTENANCE

The Standards Collaborative is responsible for the coordination of development, implementation support, maintenance, education and conformance of standards within its scope. Maintenance of standards is required to ensure standards continue to meet clinical, technical, business, and operating requirements.

10.1 Introduction

The SC is responsible for the on-going maintenance of the following standards:

- EN and FR extensions of SNOMED CT (https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/1_SNOMED_CT);
- pCLOCD (https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/2_pan_Canadian_LOINC_Observation_Code_Database_pCLOCD);
- SCPQUAL (https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/3_pan-Canadian_Terminology_Artifacts);
- SCPTYPE (https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/3_pan-Canadian_Terminology_Artifacts);
- SCPTEMP (https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/3_pan-Canadian_Terminology_Artifacts); and for
- providing updates to HL7 vocabularies (https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/3_pan-Canadian_Terminology_Artifacts) where content has changed

10.2 SC Maintenance Dashboards and Release Cycles

New terminology requirements continue to evolve as medicine and associated clinical and business requirements continue to evolve, thus, once a terminology is implemented, it requires that it be maintained on a regular basis.

The SC publishes Standards Maintenance Dashboards (https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/y_Standards_Maintenance_Dashboards) which provide an easy way for implementers to find up-to-date information on our Pan-Canadian Standards and related activities. The Standards Release Dashboard in particular provides quick access to both the pan-Canadian standard and its corresponding release cycle.

10.3 Requests for Change (RFC)

As part of our maintenance responsibilities, the SC does provide Canadian stakeholders with the opportunity to request additions, changes and/or depreciations to any of our pan-Canadian terminologies.

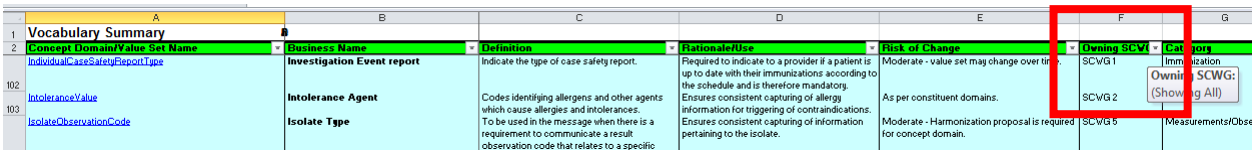
Additional information on the RFC process for SNOMED CT can be found here.
(https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/1_SNOMED_CT/5_Request_For_Change_(RFC)_to_SNOMED_CT)

Additional information on the RFC process for the LOINC/pCLOCD can be found here.
(https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/2_pan_Canadian_LOINC_Observation_Code_Database_pCLOCD/pCLOCD_Maintenance_and_Request_For_Change)

RFCs for any HL7 Concept Domains or Value Sets must go through the owning Standards Collaborative Working Group (SCWG) as in the MTW as shown in Figure 20 as outlined on the MTW maintenance page found here.

(https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards/Terminology/3_pan-Canadian_Terminology_Artifacts/MTW_Request_For_Change)

Figure 20 Owning SCWGs



It should be noted that after the SCWG has approved the change, for Code Systems other than SCPQUAL and SCPTYPE, the SC will need to submit a harmonization proposal to HL7 in order to have this new requirement added to the appropriate Concept Domain and/or Value Set.

HL7 harmonization takes place three (3) times a year and this cycle is published on the HL7 International website (http://www.hl7.org/events/harmonization/). Implementers who know that their implementation will require vocabulary that needs to be harmonized with HL7 are encouraged to enter into this process very early in their project in order to lessen the likelihood that their implementation will need to proceed with a temporary code (SCTEMP) provided by the SC. For more information on SCTEMP, HL7 harmonization, the process and timelines, please contact the SC (standards@infoway-inforoute.ca) for further assistance.

10.4 Pre-adoption guidance

There may come a time when an implementation project will need to pre-adopt vocabulary changes before they have been approved by the governing SDO. The SC has drafted a document to provide some additional pre-adoption guidance for SNOMED CT and pCLOCD which is available here: https://infocentral.infoway-inforoute.ca/@api/deki/files/7387/=Terminology_Standards_Pre-Adoption_Guiding_Principles_pCLOCD_and_SCT.pdf.

For assistance with pre-adoption for HL7 Code Systems, SNOMED CT and/or pCLOCD, please contact the SC (standards@infoway-inforoute.ca) for further assistance.

10.5 Managing Terminology Considerations

Implementations are expected to keep installed application terminologies in sync with the evolving standard terminologies. Since Value Set definitions can be resolved to an enumerated list of encoded concepts, each associated with a particular Code System at a particular point in time, such a list may be downloaded to the Point-of-Service application and used for interfacing to the user, populating messages and validating received messages.

Receiving systems that receive a code that is not recognized may raise an error condition only if:

- The downloaded table version of a Value Set matches the terminology version indicated in the message for message structure Value Sets; or
- For the current published standard version for dynamically defined Value Sets based on external Code Systems.

Since well-managed terminologies do not delete but instead, deprecate obsolete codes, historical records may be communicated with encoded concepts that are currently deprecated. Therefore, a deprecated

coded concept must not be considered an error because it cannot be known whether the code was deprecated at the time the record was created.

Queries specified with current encoded concepts as parameters, may return records with deprecated codes because links are maintained from preferred codes to their historical versions. They may even search historical records based on deprecated codes. The same mechanism is used to retrieve formally defined codes when a synonym is specified. The capability of a Code System to track updates to the encoded concepts and to manage synonyms, is one of the features of a well-managed Code System.

Terminology Services may simplify this process through mechanisms such as a subscription service. Even if such a service is not available, the responsibility of the implementer is to ensure Value Sets used within an application include the most recent codes for dynamically defined Value Sets.

10.5.1 Standards Collaborative Temporary Code System

When a new code is accepted by the sponsoring Standards Collaborative Work Group (SCWG) or by the Standards Collaborative (SC) through the change request mechanism, a code is issued under a Standards Collaborative-managed "temporary" or "transitional" Code System (SCTEMP), if the implementation cannot wait for the code to be harmonized with the international terminology authority, or the code must be published prior to harmonization with the international terminology authority. The content of this Code System is maintained within the SC's source control mechanism. The Code System also serves as a source for tracking submissions that need to be made to the various terminology authorities.

Implementers will need to have broad support for multi-Code System Value Sets, with the ability to appropriately populate and recognize the OID[7] and the code, rather than the code alone. This requirement already exists for some Concept Domains such as ClinicalDrug. However, the introduction of a distinct Code System for all temporary codes means that multi-Code System Value Sets needs to be supported across the iEHR.

In addition, the use of a "temporary" Code System will require implementers to migrate from the temporary code to the approved code in future maintenance releases or delta releases, should they desire to be conformant with the new release. Due to this dramatic change required for migration, implementations are encouraged to hold off on implementing the temporary code if possible until the code is harmonized with the terminology authority. To minimize the likelihood of implementing a temporary code, implementations are also encouraged to bring forward new concepts for additions as soon as they have been identified so that they can be harmonized with the terminology authority at the earliest opportunity.

1) The SC change request process must include timely engagement with the terminology authority to minimize the requirement for managing a change in concept codes from a "temporary code" to a formal code.
    a) Issues with pre-adoption of codes are minimized if there is early engagement with the terminology authority. If all of the desired codes already exist in the target Code System before the Draft for Use, Maintenance Release or other specification is published, then there's no impact on implementers from the use of a "temporary" Code System because no "temporary Code System" needs to be used.
    b) The Change Management Process describing SCTEMP will ensure that once a code mnemonic has been issued in the SCTEMP Code System, it will never be reused for a different concept.
    c) The SCTEMP Code System will not issue duplicate codes by ensuring good practice in a well-defined Change Management Process, a clearly controlled space and timeline, including good communication with Stakeholders.
2) The SCTEMP would not be used for the following Code Systems:
    a) Unified Code for Units of Measure (UCUM)

[7] OID: Object Identifier.

i) There currently exists a mechanism with the UCUM syntax to use curly braces “{}” around non-core unit symbols.

b) LOINC/pCLOCD

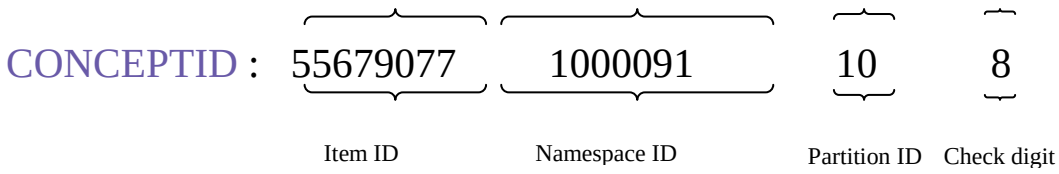
i) Implementers may use the “XCA” codes within the pCLOCD as the temporary coded concept.

c) SNOMED CT

i) Implementers who have access to an Extension Namespace can use their NamespaceIDs (one per organization) to create their ConceptIDs as the temporary concepts. This will ensure the identifiers remain unique to the organization and prevent any collision with other identifiers from other organizations.

Figure 21 shows the ConceptID structure in an Extension:

Figure 21 ConceptID Structure in an Extension



3) The SCTEMP would apply to HL7 and any other coding systems (non-SNOMED CT and non-LOINC/pCLOCD) used within pan-Canadian specifications. The ‘temporary’ Code System is supported, monitored on a continuous basis and published with each new maintenance release.

XI APPENDIX A: REFERENCES

Note: The references listed below are in no particular order and most are referenced as footnotes in the document.

1. Rosenbloom et al, Interface Terminologies: Facilitating Direct Entry of Clinical Data into Electronic Health Records, JAMIA, Vol 13 #3 May/Jun 2006
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