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SNOMED Clinical Terms® (SNOMED CT®) International Release – January 2010

The SNOMED CT core terminology provides a common language that enables a consistent way of indexing, storing, retrieving, and aggregating clinical data across specialties and sites of care. The International Health Terminology Standards Development Organisation (IHTSDO®) maintains the SNOMED CT technical design, the core content architecture, the SNOMED CT core content (includes the concepts table, the descriptions table, the relationships table, a history table, and ICD mappings), and related technical documentation.

Concepts

The January 2010 International Release content hierarchy includes more than 291,000 active concepts with formal logic-based definitions, organized into top-level hierarchies:

Body structure (<i>Structure of thyroid</i>)	Event (<i>Flash flood</i>)	Qualifier value (<i>Right</i>)
<ul style="list-style-type: none"> Morphologically abnormal structure (<i>Granuloma</i>) 	Observable entity (<i>Tumor stage</i>)	Record artifact (<i>Death certificate</i>)
Clinical finding	Organism (<i>Mycobacterium tuberculosis</i>)	Situation with explicit content (<i>No nausea</i>)
<ul style="list-style-type: none"> Finding (<i>Swelling of arm</i>) Disease (<i>Pneumonia</i>) 	Pharmaceutical/biologic product (<i>Tamoxifen</i>)	Social context (<i>Organ donor</i>)
Environments/geographical locations (<i>Intensive care unit</i>)	Physical force (<i>Friction</i>)	Special concept (<i>Inactive concept</i>)
	Physical object (<i>Suture needle</i>)	Specimen (<i>Urine specimen</i>)
	Procedure (<i>Biopsy of lung</i>)	Staging and scales (<i>Barthel index</i>)
		Substance (<i>Gastric acid</i>)

Descriptions

Contains more than 758,000 active English-language descriptions for flexibility in expressing clinical concepts.

Relationships

Provides more than 823,000 logically-defining relationships enable consistency of data retrieval and analysis.

Attributes

Body Structure

Laterality

Clinical Finding

Associated With

- After
- Causative Agent
- Due To

Associated Morphology

Clinical Course

Episodicity

Finding Informer

Finding Method

Finding Site

Has Definitional Manifestation

Has Interpretation

Interprets

Occurrence

Pathological Process

Severity

Events

Associated With

- After
 - Causative Agent
 - Due To
- Occurrence

Evaluation Procedure

Component

Has Specimen

Measurement Method

Property

Scale Type

Time Aspect

Pharmaceutical/Biologic

Product

Has Active Ingredient

Has Dose Form

Physical Object

Has Active Ingredient

Procedure

Access

Direct Substance

Has Focus

Has Intent

Method

Priority

Procedure Device

- Direct Device

- Indirect Device

- Using Access Device

- Using Device

Procedure Morphology

- Direct Morphology

- Indirect Morphology

Procedure Site

- Procedure Site – Direct

- Procedure Site – Indirect

Recipient Category

Revision Status

Route of Administration

Surgical Approach

Using Energy

Using Substance

Situation with Explicit Context

Associated Finding

Associated Procedure

Finding Context

Procedure Context

Subject Relationship Context

Temporal Context

Specimen

Specimen Procedure

Specimen Source Identity

Specimen Source Morphology

Specimen Source Topography

Specimen Substance

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1. Implementation of DITA-based Documentation

The IHTSDO has begun to convert documentation for the SNOMED CT International Release into the DITA (Darwin Information Typing Architecture) standard. Once fully implemented, this will improve the process for maintaining and generating these documents, and make it possible to release SNOMED CT documentation in additional formats, such as HTML.

For the January 2010 International Release, three documents have been generated using DITA: one new document, the SNOMED CT Stated Relationships Guide, and two previously released documents, the SNOMED CT User Guide and the SNOMED CT Technical Reference Guide. As a result of this transition, users may notice some changes in the format and presentation of these two documents.

2. Expanded Scope for the SNOMED CT User Guide

In previous releases, efforts were made to ensure that the policies documented in the SNOMED CT User Guide were completely implemented in the terminology. It was an unwritten practice that new or incompletely implemented policies were expected to be omitted from the User Guide because informally they had been considered out of scope. Beginning with the January 2010 International Release, this past practice is now explicitly abandoned, and we acknowledge that the scope of the User Guide includes editorial policies that are known not to be fully and correctly implemented in the released data. As soon as feasible, IHTSDO will make available a report that documents the degree of variance for each policy. The metrics reported will be exact when that is possible, and estimated when evaluation requires sampling. In addition, the IHTSDO Committees and Quality Program will be used to guide the prioritization of efforts to bring the data into line with the stated policies.

3. Change to Status 6 (Limited) Concept Codes

Concept codes with a ConceptStatus value of 6 (Limited) have previously been considered to be active concept codes, although they were not recommended for use. However, as of the January 2010 International Release, these concept codes will now be considered inactive and have been moved to the *Inactive concept (inactive concept)* sub-hierarchy.

With respect to the status of a concept code, the terms “active” and “current” will now have the same meaning, and the terms “inactive” and “non-current” will also now have the same meaning.

For the January 2010 International Release, 17,854 Status 6 (Limited) concept codes have been made subtypes of *Limited status concept (inactive concept)*. *Limited status concept (inactive concept)* is a new subtype of *Inactive concept (inactive concept)*. As part of this change, the IS-A relationships of these Status 6 concept codes have been changed to historical WAS-A relationships. Where one Status 6 concept code was

the subtype of another Status 6 concept code, the WAS-A relationship takes the value of the nearest active supertype.

In addition, 3,077 inactive concept codes that had been previously retired as duplicates and given a SAME-AS historical relationship to a Status 6 concept code were also made subtypes of *Limited status concept (inactive concept)* and given Limited status (ConceptStatus=6). These concept codes have been given the same WAS-A historical relationship as the Status 6 concept code for which they were considered to be a duplicate, while those Status 6 concept codes have been given a reciprocal SAME-AS historical relationship.

In order to permit these changes, the range and domain of the SAME-AS historical relationship has been expanded to allow values that include subtypes of *Limited status concept (inactive concept)*.

A number of changes were made to the Technical Reference Guide, including several in the area of handling ConceptStatus changes, to reflect the fact that ConceptStatus 6 is now considered inactive.

4. New Content Additions

1,862 concept codes were added for the January 2010 International Release. This number includes 134 SNOMED CT Model Component metadata concept codes which are included in the Technology Preview but not in the RF1 International Release.

5. Operational Trial of a Division of Labor in Laboratory Test Terminology Development

The objective of this project is to develop laboratory test terminology in SNOMED CT and to work towards harmonization with LOINC and NPU. The trial included 600 concept codes submitted via the IHTSDO or directly to LOINC or NPU. The initial phase, in which the participants modeled 600 concept codes (which will ultimately be added as new observable entity concept codes), has been completed.

For the January 2010 International Release, 160 concept codes, originally submitted to the IHTSDO as requests for new procedures, have been added as procedures. The corresponding observable entity concept codes, modeled as part of the project, will be added in a future release after further review and approval of the new Concept Model for Observables.

6. Subject Relationship Context Values Project

The attribute SUBJECT RELATIONSHIP CONTEXT distinguishes situations that pertain to the subject of a record from those that pertain to someone (or something) else related to the subject of the record (e.g. a member of the subject's family). In particular, it is necessary and useful to distinguish a person in a particular role *related to the subject* from a generic person in that role (e.g. the father *of the subject* versus someone in the role of "father"). For the January 2010 release, as a part of the Subject Relationship Context Values Project, thirty-four new concept codes were added as descendants of *Person with characteristic related to subject of record (person)* in the *Person (person)* hierarchy.

The logic definitions of situation concept codes were revised to change the values of SUBJECT RELATIONSHIP CONTEXT to the new concept codes (e.g. *Person in family of subject (person)*) from the old values (e.g. *Person in the family (person)*). For example, for *Family history of atrial fibrillation (situation)* the SUBJECT RELATIONSHIP CONTEXT was changed from *Person in the family (person)* to *Person in family of subject (person)*.

7. Situation with explicit context (situation) Hierarchy

In keeping with agreed editorial principles, certain types of content belong in the *Situation with explicit context* hierarchy rather than the *Clinical finding and Procedure* hierarchies. In addition, we are examining patterns of expressions that might, in the future, be subject to a general policy that they no longer be pre-coordinated. At least until the Content Committee can develop a clear roadmap for implementing policy in this area, some users have been asked to post-coordinate content that might previously have been pre-coordinated in the *Situation with explicit context* hierarchy (e.g. History of "X" disease, History of "X" procedure).

For the January 2010 release, a project was undertaken to review the situation hierarchy so that the logic definitions can be consistently used for both pre- and post-coordination. Over 3,000 concept codes were reviewed and nearly 1,500 concept codes were edited. The focus was on appropriate role grouping and, where possible, sufficiently defining concept codes. For some of the upper level concept codes, changes were also made to the values for FINDING CONTEXT, PROCEDURE CONTEXT, SUBJECT RELATIONSHIP CONTEXT, and TEMPORAL CONTEXT. For many concept codes, the existing values for SUBJECT RELATIONSHIP

CONTEXT were replaced with new values (added this release - see section 5). For example, for *Family history of atrial fibrillation (situation)* the SUBJECT RELATIONSHIP CONTEXT was changed from *Person in the family (person)* to *Person in family of subject (person)*.

8. Addition of New Concept Codes for the NLM CORE Problem List Subset of SNOMED CT

The NLM CORE Problem List Subset of SNOMED CT (CORE stands for Clinical Observations Recording and Encoding) contains codes for documenting and encoding clinical information. There were a small number of concept codes in the NLM CORE Subset that were chosen from the morphologic abnormality hierarchy and did not have corresponding codes in the Clinical Finding (finding/disorder) hierarchy. We recommend against using codes in the morphologic abnormality hierarchy for recording problems in the problem list, and therefore we added corresponding new codes to the Clinical Finding hierarchy. For example, Compression fracture (disorder) was added to replace Compression fracture (morphologic abnormality) in the NLM CORE Problem List Subset.

9. Modeling of Evaluation Findings and Evaluation Procedures

The effort to review and sufficiently define content in these hierarchies (in particular Measurement findings and Measurement procedures) and align logic definitions with new policies continued for the January 2010 International Release. A few areas of focus included:

- 8.1 An editorial policy decision was made to adopt IUPAC's definition of "assay" as synonymous with "measurement". In order to achieve consistent naming across the terminology, many concept codes with the Fully Specified Name (FSN) pattern "X antibody assay (procedure)" had their FSNs changed to "Measurement of X antibody (procedure)". Where possible, Measurement of X antibody (procedure) concept codes were sufficiently defined using METHOD: *Measurement - action (qualifier value)* and COMPONENT: "X" antibody (substance). Over 600 "X antibody assay (procedure)" type concept codes were reviewed. The project also included editing a number of "X" antibody (substance) type concept codes. The project of addressing existing "X antibody assay (procedure)" content is about 60% completed.
- 8.2 Editing CD ("cluster of differentiation" or "cluster designation") concept codes. Based on a decision that the FSN of these concept codes should not rely on a "+" or a "-" (for several reasons, not least of which was that the "-" might be misinterpreted as a dash), the "+" or "-" was removed from the FSNs of over 200 CD concept codes and replaced with "positive" or "negative" (e.g. *CD3-CD19+ Lymphocyte (cell)* was renamed *Lymphocyte negative for CD3 antigen and positive for CD19 antigen (cell)*). (Note: CD was designated as an approved acronym in an FSN, on the basis that few people ever refer to the molecules, antigens or antibodies by the expanded names "cluster of differentiation" or "cluster designation"; also, many clinicians would not know or recognize the expanded phrases; and finally, the acronym "CD" in its own right has become the recognizable and used term.)
- 8.3 Descendants of *Radiology result normal (finding)* were reviewed and, where possible, sufficiently defined.

10. Retiring of Ambiguous Severity Qualifiers

There are several codes in the *Qualifier value* hierarchy that were ambiguous and may have caused confusion:

- *Severity findings (qualifier value)* is ambiguous, MAYBE A *Severities (qualifier value)*, MAYBE A *Symptom severity (finding)*.
- *Severity of illness (qualifier value)* is ambiguous, MAYBE A *Severities (qualifier value)*.
- *Profound (qualifier value)* is ambiguous, MAYBE A *Deep (qualifier value)*, MAYBE A *Severe (severity modifier)(qualifier value)*.

11. Review of *Clinical finding* Concept Codes with Identical Attributes in a Role Group

Sometimes the same attribute (e.g. two FINDING SITE attributes) is used twice in a single role group in a logic definition. However, the same attribute used twice with different values within a role group is not equivalent to a single attribute with a single value.

For example, the body structure "Peripheral nerve of face (body structure)" does not exist. A logic definition which includes FINDING SITE: *Facial nerve structure (body structure)* and FINDING SITE: *Peripheral nerve structure (body structure)* is not equivalent to a logic definition with one FINDING SITE: *Peripheral nerve of face structure (body structure)*.

Currently there is not an actual body structure called “Peripheral nerve of face”. Often, a decision must be made about the appropriateness of adding a new body structure concept code (e.g. Peripheral nerve of face) to act as a grouper for other body structures in order to sufficiently define a finding or procedure concept code that will act as a grouper for other concept codes (e.g. *Benign neoplasm of peripheral nerves of face (disorder)*). In addition to adding the new body structure code, it would be necessary to determine which existing body structure concept codes would be subsumed by it.

As a first step towards addressing this issue, nearly 600 sufficiently defined descendants of *Clinical finding* with the same attribute used twice within a role group (e.g. two FINDING SITE attributes or two ASSOCIATED MORPHOLOGY attributes) were made primitive. Where necessary, any concept codes which were correctly inferred descendants of the previously sufficiently defined concept codes were added as stated descendants. Next steps will rely on the anatomy redesign to properly define regional parts of tree-structured anatomical structures such as nerves, arteries, and veins; and also to clarify the meanings (e.g. are peripheral nerves of the face those entire peripheral nerves, from the brain outwards, that supply the face? Or are they only the trunks and branches of peripheral nerves that are regionally located in the face?)

12. Retiring *Communicable disease contact (finding)* Concept Codes

“X contact (finding)” concept codes where X represented an infectious disease (e.g. *Rabies contact (finding)*) were retired as ambiguous. These concept codes are ambiguous because they could be used to represent the event of being exposed to an infectious disease or, to identify the individual who is the contact or index case for an infection that has spread to others.

Communicable disease contact (finding) was retired as ambiguous MAY BE A: *Exposure to communicable disease (event)*. In a later release, the retired concept code will also receive a MAY BE A to yet to be added concept code that may be defined as a person in the role “Communicable disease contact (role)”.

Where possible, “X contact (finding)” concept codes were retired as ambiguous MAY BE A: *Exposure to X organism (event)*. (For example, *Streptococcus contact (finding)* was retired as ambiguous MAY BE A: *Exposure to Streptococcus (event)*).

13. Retirement of *Assessment regimes (regime/therapy)* and Relocation of Descendants to the *Evaluation procedure (procedure)* Hierarchy

Evaluation procedure (procedure) has the following text definition: Determination of a value, conclusion, or inference by evaluating evidence. Based on this definition, there is not a reproducible distinction between assessment and evaluation. Therefore, *Assessment regimes (regime/therapy)* was retired as ambiguous MAY BE A: *Evaluation procedure (procedure)*. Over 300 descendants of *Assessment regimes (regime/therapy)* were made subtypes of *Evaluation procedure (procedure)* and their hierarchy tags were changed from (regime/therapy) to (procedure).

14. Addition of a Description to Concept Codes with FSNs Containing Possessive Eponyms

Several medical journals and other publications recommend that the nonpossessive form of medical eponyms (one without an apostrophe “s”) should be used in preference to the possessive form (see, for example, *BMC Medical Research Methodology* 2009, 9:18 doi:10.1186/1471-2288-9-18). The evidence shows that this recommendation is increasingly followed in the U.S., and lack of a nonpossessive Description is considered an error by some. We observed that some active concept codes have a possessive eponym in the FSN but did not have any Descriptions containing the nonpossessive form. For *Clinical findings* and *Procedures*, at least one Description containing the nonpossessive eponym has been added (e.g. the description *Dupuytren contracture* was added to *Dupuytren's contracture (disorder)*). Over 1,300 concept codes had an additional description added.

15. Populating the HAS DOSE FORM Attribute

The HAS DOSE FORM attribute is used for products that have a dose form specified in the FSN. Progress in populating this attribute and sufficiently defining concept codes with the HAS DOSE FORM attribute continues as a background low-priority activity. As part of the preparation for the substance hierarchy redesign project, the HAS DOSE FORM attribute was added or edited for about 800 concept codes.

16. Updates to the Organism Hierarchy

Updates were made to concept codes in the *Subphylum Vertebrata (organism)* hierarchy for consistency with current ITIS (Integrated Taxonomic Information System) designations.

17. Advance Notice of Future Changes – Addition of the Metadata Hierarchy

In preparation for adoption of the new “RF2” release format, it will be necessary to add a new concept hierarchy, consisting of metadata concept codes, to the Concepts table. These metadata concept codes are not part of the clinical content of SNOMED CT, but will be needed in order for SNOMED CT clinical content to be distributed using the RF2 format.

These changes do not affect the official January 2010 International Release, but have been included in the January 2010 Technology Previews. These previews provide both RF1 and RF2 versions of the January 2010 release content, along with the metadata changes described below. Based on feedback from the Community of Practice, IHTSDO will soon make a determination of the release date at which these changes will be incorporated into the official SNOMED CT International Release. That date had not yet been set, as of the distribution of this release note.

The new metadata hierarchy is a second, distinct hierarchy of concept codes within the Concept table. Previously, all SNOMED CT concept codes have descended from a single “root” concept code, *SNOMED CT Concept (SNOMED RT + CTV3) | 138875005*. However, all concept codes in the metadata hierarchy are descended from a second (new) root concept code, *SNOMED CT Model Component (metadata) | 900000000000441003*. These two root concept codes are independent of each other, and all other SNOMED CT concept codes descend from one these two root concept codes.

With the creation of the metadata hierarchy, two sub-hierarchies that were previously part of the SNOMED CT content hierarchy (descended from *SNOMED CT Concept*) will be moved to the metadata hierarchy:

- **Linkage concept (linkage concept) | 106237007** was previously a child of the root concept code, *SNOMED CT Concept*, forming one of the “top-level” content sub-hierarchies. For the January 2010 Technology Preview, *Linkage concept (linkage concept)* and all concept codes descended from it – including the entire *Attribute (attribute)* sub-hierarchy – have been moved to the metadata hierarchy, where it forms a top-level metadata sub-hierarchy under the *SNOMED CT Model Component (metadata)* root concept code.
- **Namespace concept (namespace concept) | 370136006** was previously a child of *Special concept (special concept)*. For the January 2010 Technology Preview, *Namespace concept (namespace concept)* and all concept codes descended from it have been moved to the metadata hierarchy, where it forms a top-level metadata sub-hierarchy under the *SNOMED CT Model Component (metadata)* root concept code.

NOTE: Neither the ConceptIds nor the Fully Specified Names of these concept codes have been affected by this change.

At this time, four concept codes are descended directly from the *SNOMED CT Model Component (metadata)* root concept code, forming four top-level metadata sub-hierarchies. These are described in the table below:

Top-Level Metadata Sub-Hierarchies	
<i>Core metadata concept (core metadata concept)</i>	These concept codes provide structural information necessary to support the core SNOMED CT tables defined by the RF2 specification. This metadata hierarchy should not affect users of the current (“RF1”) release format.
<i>Foundation metadata concept (foundation metadata concept)</i>	These concept codes provide structural information necessary to support the extensibility mechanism, including RefSets, defined by the RF2 specification. This metadata hierarchy should not affect users of the current (“RF1”) release format.
<i>Linkage concept (linkage concept)</i>	These concept codes are intended to link two or more other concept codes together to express compositional meanings and include all concept codes that may be used as a Relationship type. In previous releases of SNOMED CT, this sub-hierarchy was a top-level sub-hierarchy under the <i>SNOMED CT Concept</i> root.
<i>Namespace concept (namespace concept)</i>	These concept codes have integer valued names that correspond to all assigned extension Namespace Identifiers. In previous releases of SNOMED CT, this sub-hierarchy was descended from the <i>Special concept (special concept)</i> sub-hierarchy of the <i>SNOMED CT Concept</i> root.

NOTE: Please refer to the *Technical Reference Guide* for more information about these upcoming changes.