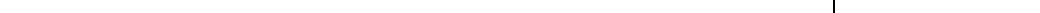


# **SNOMED Clinical Terms<sup>®</sup>**

## **Technical Reference Guide**

January 2008 International Release



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## Document History

<b>Version</b>	<b>Notes</b>
January 2003	<p>The SNOMED CT Technical Reference Guide was first made available with the January 2003 Release and includes updates to the draft of July 2002. The Technical Reference Guide consolidates material from these SNOMED CT specification documents:</p> <ul style="list-style-type: none"> <li>❖ Technical Specification of the Core Structure</li> <li>❖ Subsets Tables and Mechanisms</li> <li>❖ History Tables and Mechanisms</li> <li>❖ Proposed Structures for Cross Mapping Tables</li> <li>❖ Glossary</li> </ul>
July 2003	<ul style="list-style-type: none"> <li>• Supplementary Text Descriptions (Appendix I) was added.</li> <li>• Detailed material for the Word Search Tables and the Canonical Table was moved to separate documentation for the Developer Toolkit and Canonical Table.</li> <li>• Acknowledgements, previously in the separate memo "A Note from the Chair," were added before Section 1.</li> <li>• A subsection for the new PNDS Mapping was added.</li> </ul>
January 2004	<ul style="list-style-type: none"> <li>• References to the new Subset Kit and approval of the SNOMED core table structure as the ANSI standard for healthcare terminology were added.</li> <li>• A subsection for the new NOC Mapping was added.</li> <li>• A new Appendix was added for the SNOMED CT Attributes and Values Allowed by Domain.</li> </ul>
July 2004	<ul style="list-style-type: none"> <li>• A new Clinical Care Classification map was added.</li> <li>• Subsections for CCC and Omaha mappings were added.</li> </ul>
January 2005	<ul style="list-style-type: none"> <li>• Copyright date update</li> <li>• Contacts update</li> <li>• Merged Historical Relationships Table into Relationships Table</li> <li>• Updated Subset Definition File Overview</li> </ul>
January 2007	<ul style="list-style-type: none"> <li>• Copyright date update</li> <li>• Header and Footer changes</li> <li>• Removed reference to Modified Technical Reference Guide</li> <li>• Removed reference to the Technical Reference Guide.</li> <li>• Removed Cross maps from list of components for which the component history is tracked</li> <li>• Updated domain and range for attributes section. It is covered in depth in the User Guide</li> </ul>
July 2007	<ul style="list-style-type: none"> <li>• Updates to reflect transfer of IP to the International Health Terminology Standards Development Organisation</li> <li>• Removal of references to College of American Pathologists (CAP) derivative products</li> </ul>
January 2008	<ul style="list-style-type: none"> <li>• Updated for January 2008 International Release</li> </ul>

## Inventory of Documentation

---

The following documentation is currently available as part of the International Release of SNOMED CT from the International Health Terminology Standards Development Organisation (IHTSDO):

### **SNOMED CT Technical Reference Guide (TRG)**

The TRG is intended for SNOMED CT implementers, such as software developers. The TRG assumes an information technology background. Clinical knowledge is not a prerequisite.

The TRG contains reference material related to the current release of SNOMED CT and includes file layouts, field sizes, required values and their meanings, and high-level data diagrams. It can be used to install and use SNOMED.

### **SNOMED CT Technical Implementation Guide (TIG)**

The TIG is intended for SNOMED CT implementers, such as software designers. The TIG assumes information technology and software development experience. Clinical knowledge is not required, although some background is helpful to understand the application context and needs.

The TIG contains guidelines and advice about the design of applications using SNOMED CT, and covers topics such as terminology services, entering and storing information, and migration of legacy information.

### **SNOMED CT User Guide**

The User Guide is intended for clinical personnel, business directors, software product managers, and project leaders; information technology experience, though not necessary, can be helpful.

The User Guide is intended to explain SNOMED CT's capabilities and uses from a content perspective. It explains the content and the principles used to model the terminology.

## **Additional Documentation**

The following documentation is also included with the International Release of SNOMED CT:

- SNOMED CT Canonical Table Guide
- SNOMED CT Developer Toolkit Guide
- SNOMED CT Namespace Identifier Guide

## **Guiding Principles, Development Process, and Acknowledgements**

---

### **SNOMED CT®: A Comprehensive Terminology for Health Care**

In 1999, the College of American Pathologists (CAP) and the U.K. formed a strategic alliance to create a convergence of SNOMED® Reference Terminology (SNOMED® RT) and Clinical Terms Version 3 (CTV3). The resulting work, SNOMED Clinical Terms® (SNOMED CT®) combines the robust strength of SNOMED RT in the basic sciences, laboratory and specialty medicine with the highly granular primary care content of CTV3 (formerly known as the Read Codes). The result is a comprehensive and precise clinical reference terminology that provides unsurpassed clinical content and expressivity for clinical documentation and reporting. SNOMED terminology enables clinicians, researchers and patients to share comparable data worldwide, across medical specialties and sites of care.

SNOMED CT was founded on four basic principles that have guided development activities related to the distribution table structure and clinical content, and will continue to guide the future directions of SNOMED.

These guiding principles are:

1. Development efforts must encompass broad, inclusive involvement of diverse clinical groups and medical informatics experts.
2. The clinical content must be quality focused and adhere to strict editorial policies.
3. The quality improvement process must be open to public scrutiny and vendor input, to ensure that the terminology is truly useful within healthcare applications.
4. There must be minimal barriers to adoption and use.

The design of SNOMED CT has been driven by the expressed needs of software developers for features that improve their ability to develop useful applications. In response to these needs, the design adds unique numeric identifiers, includes links to legacy codes, supports a sustainable migration and maintenance strategy, permits adaptability for national purposes, and fosters alignment with other terminologies and standards such as HL7, LOINC, and DICOM.

We believe SNOMED CT delivers on a promise of standardized quality clinical terminology that is required for effective collection of clinical data, its retrieval, aggregation and re-use as well as the sharing, linking and exchanging of medical information.

The SNOMED CT structure has been balloted and approved as an ANSI standard.

### **SNOMED CT Quality Development Process**

The SNOMED CT development process incorporates the efforts of a team of internal and external modelers. A documented scientific process is followed which focuses on understandability, reproducibility and usefulness. Content is defined and reviewed by multiple clinician editors. Conflicts between editors are resolved through an iterative process, based on achieving agreement and consensus, before being entered into the terminology. As necessary, additional experts are consulted to review the scientific integrity of the content.

The integration of SNOMED RT and Clinical Terms Version 3 to create the first release, was a three year process that involved several stages of review and quality assurance:

- Description mapping: NHS editors evaluated each SNOMED concept and term and mapped it to the Clinical Terms Version 3 terminology; SNOMED editors performed the same task mapping primarily disorders and procedures from Clinical Terms Version 3 to SNOMED RT.

- Description mapping conflict resolution: Mapping discrepancies that occurred between NHS and SNOMED editors underwent a conflict resolution process to definitively place each concept within the merged hierarchy.
- Auto-classification: The merged database following description mapping conflict resolution underwent a series of quality control checks including auto-classification to identify and eliminate cycle errors (e.g. concept A “is-a” B and concept B “is-a” A) and equivalency errors (e.g. where two defined concepts have the exact same definition).
- Hierarchy review: The reviewed database has undergone auto-classification and further review of inferred hierarchies.
- Ongoing refinement: The quality control process is continuously supplemented by feedback from users involved in adoption of SNOMED Clinical Terms.

## **Extent of Review**

The quality processes used in the development of SNOMED CT were complemented with external review.

- Technical review: The technical specifications for SNOMED CT were published for comment on both the SNOMED and NHS websites.
- Alpha test review: Forty-two organizations in six countries tested the SNOMED CT alpha test file and completed a structured assessment instrument.
- Alpha test feedback: Debriefing sessions were conducted in the U.S., in the U.K. and in Australia, at which time test sites shared their positive experiences and recommendations for improvement.
- Peer review: The methods used in developing SNOMED CT were presented in 6 scientific papers at the 2001 American Medical Informatics Association (AMIA) meeting, the largest association of leaders in medical informatics in the world. SNOMED CT was also part of an additional three papers and six posters at the 2002 AMIA meeting and additional posters for AMIA 2003 and 2004.

SNOMED CT was also the subject of papers in the American Health Information Management Association (AHIMA) Journal in 2001-2003, posters at 2001 and 2002 annual meetings and presentations at the 2003 and 2004 annual meetings. In addition, AHIMA introduced an education program “Introduction to Clinical Terminology” in 2004 with a SNOMED CT component.

Early adopters of SNOMED RT (a structure that mirrored SNOMED CT core tables) were debriefed on their implementation experience in order to identify the key issues to be addressed in the SNOMED CT Technical Implementation Guide.

## **Continuous Quality Improvement**

Continuous improvement is our aim: Updating the breadth and scope of the content to reflect changes in clinical care and advances in medical science; refining the content to deliver greater precision for data collection, retrieval and aggregation; and enhancing the functionality to serve our users better.

## Acknowledgements

### Contributors to SNOMED CT®

SNOMED CT was originally created by the College of American Pathologists.

SNOMED CT has been created by combining SNOMED RT and a computer based nomenclature and classification known as Clinical Terms Version 3, formerly known as the Read Codes Version 3, which was created on behalf of the U.K. Department of Health and is Crown copyright.

The IHTSDO also acknowledges the contributions of:

- The American Academy of Ophthalmology, for the ophthalmology-related portions of this work.
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## 1 Introduction

### 1.1 Purpose

This document describes the existing file structure of SNOMED Clinical Terms® as accepted by the International Health Terminology Standards Development Organisation and released.

### 1.2 Who should read this guide?

The intended audience for this document is any individual or any organization that wishes to develop or use systems that will use SNOMED Clinical Terms. This document is to provide a reference about the SNOMED CT technical structure for:

#### **Software developers**

- ❖ Developers of fully integrated applications
- ❖ Developers of terminology servers
- ❖ Developers of applications that use terminology

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

- ❖ Health informatics specialists analyzing the needs of users and organizations
- ❖ Purchasers of healthcare information systems
- ❖ Healthcare information systems implementers and integrators
- ❖ Standards developers

### 1.3 Scope and format

This document uses material from the SNOMED CT technical specifications that were used to create the work. Additional functions will be added to this document as they are delivered in SNOMED CT. Any functions marked “For Future Use” are not implemented in this release.

### 1.4 Feedback

Further information about SNOMED CT is available on the Internet at:

[www.ihtsdo.org](http://www.ihtsdo.org)

Please send feedback by email to:

[support@ihtsdo.org](mailto:support@ihtsdo.org)

or contact:

IHTSDO

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DK-2300 Copenhagen S  
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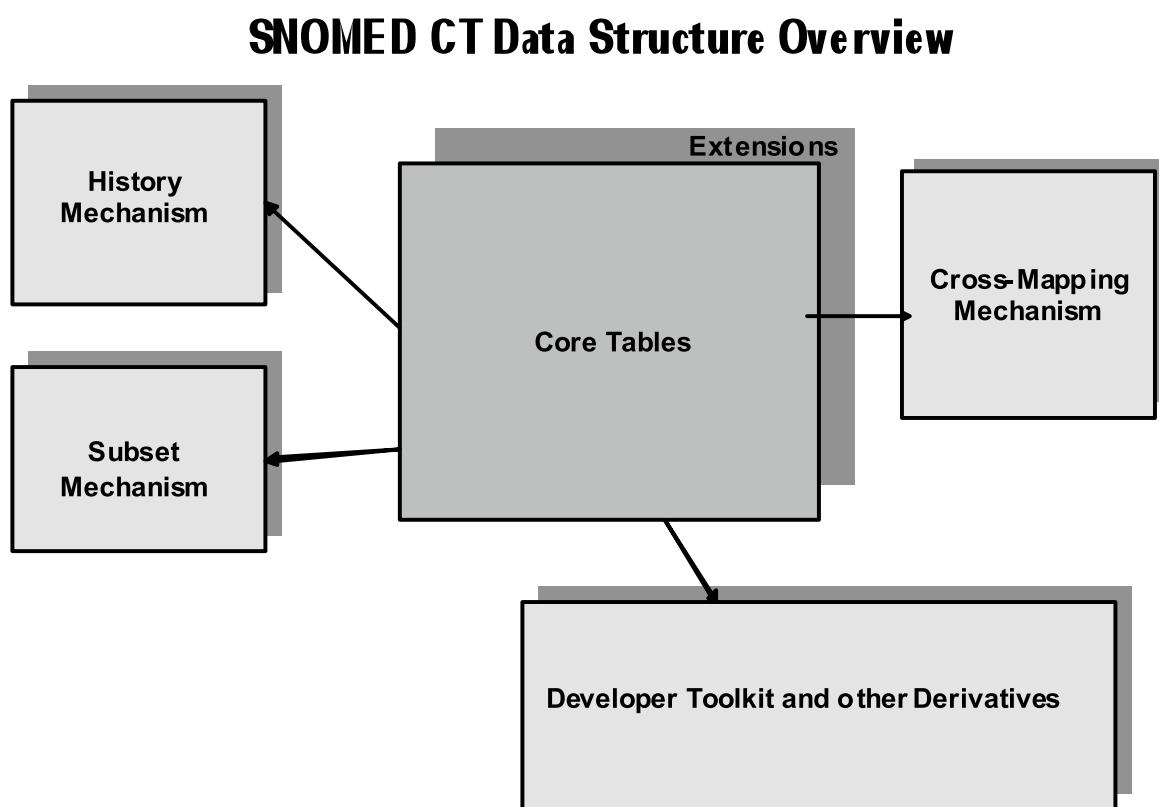
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## 2 Introducing SNOMED CT

### 2.1 Overview

The SNOMED CT structure is composed of several tables and mechanisms as shown below.



**Figure 1 – SNOMED CT Data Structure Overview**

- ❖ Core – The Core Tables contain the Concepts, Descriptions, and Relationships of the SNOMED CT terminology. The other structural mechanisms support and enrich the core table structure for terminology implementers. Briefly, these other mechanisms include:
- ❖ History – History files are typically useful for upgrading an implementation of SNOMED to a new SNOMED CT release. History files include a log of Concept and Description additions, inactivations and minor changes. History files also include information about what concepts can be used in place of inactivated (retired) concepts.
- ❖ Subsets – Subsets define a smaller collection of SNOMED CT Concepts, Descriptions, or Relationships.
- ❖ Cross Mappings – Cross-mappings relate SNOMED CT to coding schemes such as ICD-9-CM.
- ❖ Extensions – Extensions consist of terminology developed for a particular geographic or administrative requirement that is not part of the SNOMED CT Core. Examples include the US Drug Extension. These may be developed and maintained by the IHTSDO, a National Release Center or other organization.

- ❖ Developer Toolkit – Tables in the Developer Toolkit can be helpful for software developers directly or as examples that can be customized by installation and include:
  - ✧ Indexes, Word Equivalents, and Duplicate Term files that are helpful for search applications
  - ✧ Sample navigational hierarchies that can be used to manage the display of SNOMED concepts and viewing sequences
- ❖ Canonical Table – The canonical table is useful for determining the logical equivalence of concepts that may be represented in multiple ways.

This guide provides details about the SNOMED CT data structures. This section provides an overview of the structure and answers some of the frequently-asked questions which may be helpful if you are new to SNOMED CT.

## 2.2 SNOMED CT Data Structure – Summary

This diagram shows the SNOMED CT tables and how they are interrelated. Appendix A contains a full-page version of this diagram.

### SNOMED Data Structure Summary

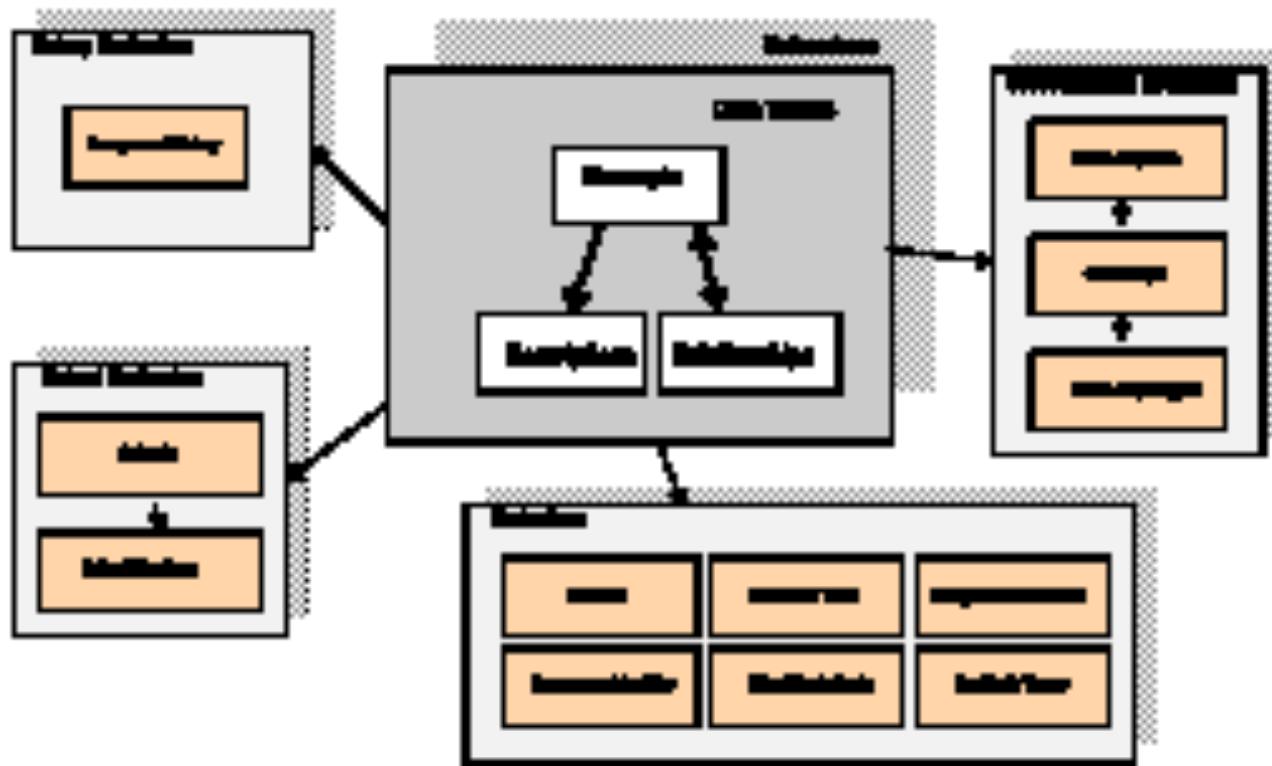


Figure 2 – SNOMED CT Data Structure Summary

## 2.3 Getting Started with SNOMED CT

These questions and answers may be helpful if you are just getting started with SNOMED CT.

### What is SNOMED CT? What is included?

SNOMED CT is a comprehensive clinical terminology that provides clinical content and expressivity for clinical documentation and reporting. It is a concept-based terminology, which means that each medical concept is uniquely identified and can have multiple descriptions. All descriptions for the same concepts are linked together. Concepts are related to each other by hierarchical relationships, and a concept can be in more than one hierarchy. Relationships are also defined to describe additional attributes of concepts. Relationships can then be used by applications to group and classify SNOMED-encoded data as needed.

The International Release of SNOMED CT is maintained by the International Health Terminology Standards Development Organisation (IHTSDO). Each IHTSDO Member country maintains and distributes a National Release of SNOMED CT for use within its territory. See the readme.txt file for a complete list of files included in the International Release. These files can be loaded into the specific file or database system used at your location, and are an ANSI standard format.

SNOMED CT files are UTF-8 encoded to support character sets from around the world. Some database products, such as Oracle, require UTF-8 to be specified in advance; if UTF-8 is not specified, there may be some difficulty with using and displaying the special characters used in some of the terms. Note that these special characters are used occasionally in the SNOMED English language edition, as well as International Editions. Some English language medical terms include the name of an individual which may contain special characters.

### What is the structure of each file?

Refer to the Appendices for an explanation of each file, field, and enumerated value. The readme.txt file lists the size of each file for validation after downloading.

### There are quite a few files. Where should I start?

The best place to start is with the "core tables." These files are in the essential resources directory. The core tables consist of the Concepts, Descriptions, and Relationships tables. You will also need to use the language/dialect Subset tables to determine what descriptions are preferred and synonyms. SNOMED CT concepts are the heart of the terminology. Each concept is in the Concepts Table with a status value. Each concept has two or more descriptions that can be found in the Descriptions Table. Each concept is related to other concepts through relationships that are found in the Relationships Table.

### How can I actually see SNOMED CT?

One way to see SNOMED CT is to use a terminology browser that supports SNOMED CT. Not all terminology browsers display SNOMED CT in its native format due to the fact that they support the display of other terminologies and classifications.

## What's next?

Depending upon your implementation, you may want to review one or more of the sections of this Guide to better understand these capabilities:

- Subset Mechanism – defines a smaller set of SNOMED CT concepts or descriptions.
- Cross Mappings – maps SNOMED CT to coding schemes such as ICD-9-CM.
- History – this mechanism is typically useful for upgrading your implementation of SNOMED to a new SNOMED CT release. It includes a log of concept and description additions, inactivations and minor changes.

You may also get more information from other documents provided by the IHTSDO:

- SNOMED CT Technical Implementation Guide
- SNOMED CT User Guide
- Developer Toolkit – these tools can be helpful for software implementers directly or as models that can be customized for your site as:
  - Indexes, word equivalents, and duplicate term files that are helpful for search applications
  - Sample navigational hierarchies can help manage the display of SNOMED concepts and viewing sequences.
- Canonical Table - the canonical table is helpful for determining the equivalence of concepts that may be expressed in multiple ways.

## How should I use SNOMED CT in my application?

There are many ways to use SNOMED CT effectively. For design guidance, refer to the Technical Implementation Guide.

## How can I understand the SNOMED CT content, relationships, and terminology development principles?

The IHTSDO website, [www.ihtsdo.org](http://www.ihtsdo.org), is a great place to start for an overview.

The SNOMED CT User Guide provides depth on the terminology development approach and the attributes used for the logical definitions (description logic) of concepts. This guide is derived from the guidelines used by the terminology authors themselves.

Other key published materials include:

- Desiderata for Controlled Medical Vocabularies in the Twenty-First Century, Cimino, J.J., Method Inf Med 1998 Nov; 37(4-5) 394-403.

This article explains the goals for modern medical terminology and the supporting rationale. These principles provide the foundation of SNOMED CT's content and technical architectures.

- Normal Forms for Description Logic Expressions of Clinical Concepts in SNOMED RT, Spackman, K.A., Proceedings/AMIA Annual Fall Symposium: 627-31 (2001)

This article explains description logic, normal forms, and types of equivalence.

**How can I contact the IHTSDO?**

You can reach the IHTSDO by email at [support@ihtsdo.org](mailto:support@ihtsdo.org); by telephone at +45 36 44 87 36 or by fax at +45 44 44 87 36.

While brief, we hope this section has helped you get started installing and working with SNOMED CT.

## 3 Introducing the Core Table Structure

### 3.1 Overview

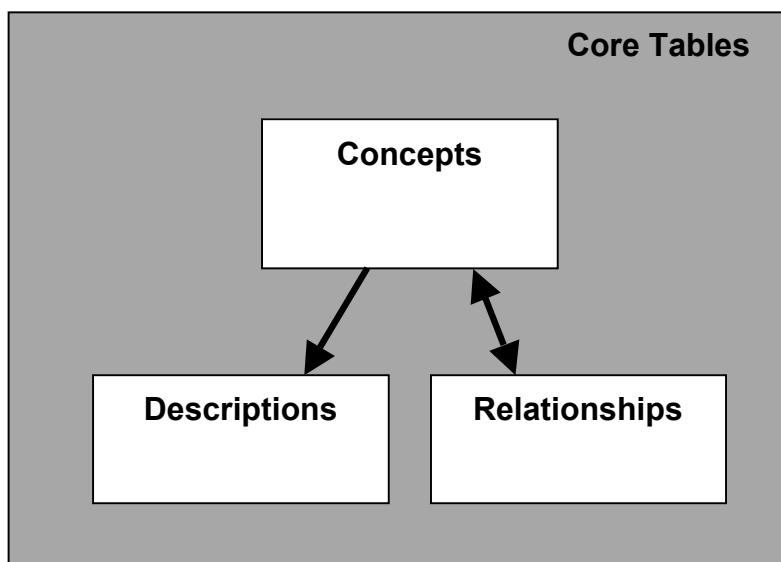
This section focuses upon the three core components of SNOMED Clinical Terms: 1) clinical concepts 2) terms used to describe concepts, and 3) relationships between concepts. This section describes the logical structure of these elements and the physical structure of the files in which they are distributed. See Appendix B for full details.

The core structure of SNOMED Clinical Terms® comprises the following three tables:

Concepts Table	Each row in this table represents a clinical concept.
Descriptions Table	Each row in this table specifies a term that can be applied to describe a single clinical concept.
Relationships Table	Each row in this table specifies a relationship between two clinical concepts. The nature of each relationship is represented using a special kind of clinical concept.

Figure 3 illustrates the relationships between these tables.

## Core Tables



A concept is described by the term in 2-n descriptions

A concept is the source of 1-n relationships (except the root concept)

Each description refers to 1 concept

A concept is the target of 1-n relationships  
A concept represents the type of relationship  
A relationship refers to 3 concepts: a source, a target, and a relationship type

**Figure 3 – SNOMED Clinical Terms Core Structure – Overview**

## 3.2 Core Tables – Summary

### 3.2.1 Concepts Table – Summary

Each row in the Concepts Table represents a clinical concept. Each Concept has a unique identifier and a Fully Specified Name specifying the nature of the concept.

<b>Key Fields</b>	
ConceptId	The unique SNOMED Clinical Terms Identifier for this Concept.
<b>Data Fields</b>	
ConceptStatus	The status of a Concept indicates whether it is in active use and, if not, indicates the reason for withdrawal from current use.
FullySpecifiedName	A unique phrase that describes a Concept in a way that is intended to be unambiguous. The Fully Specified Name is also present in the Descriptions Table. It is not the same as the Preferred Term, which is also in the Descriptions Table. The Fully Specified Name explains the meaning of the concept more fully than the Preferred Term to remove or reduce ambiguity.
CTV3ID	The Read Code for this Concept.
SNOMEDID	The SNOMED identifier for this Concept.
IsPrimitive	Indicates whether a Concept is Primitive or Fully defined by its current set of Defining characteristics.

### 3.2.2 Descriptions Table – Summary

Each row in the Descriptions Table associates a term with a clinical concept, which it can be used to represent. Each Description has its own unique identifier and also contains the text of a Term and the identifier of the Concept it may represent.

<b>Key Fields</b>	
DescriptionId	The unique SNOMED CT Identifier for this Description.
<b>Data Fields</b>	
DescriptionStatus	The status of a Description indicates whether it is in active use and, if not, indicates the reason for withdrawal from current use.
ConceptId	The unique SNOMED CT Identifier of the associated Concept.
Term	The text of a Term used to describe the associated Concept.
InitialCapitalStatus	An indication of whether the capitalization status of the first character of the Term is significant.
DescriptionType	An indication of whether the Term is the Fully Specified Name, Preferred Term or Synonym for the Concept to which this Description applies.
LanguageCode	An indication of a Language or Dialect in which this Description is valid. The language or dialect subset ultimately defines the descriptions for each concept.

To identify the descriptions for any language edition, the appropriate Language Subset must be used. Do not use the Descriptions Table alone. The descriptions for each language edition (including English) are designated in the Subset.

### 3.2.3 Relationships Table - Summary

Each row in the Relationships Table represents a Relationship between two Concepts. The type of relationship is identified by reference to another Concept.

<b>Key Fields</b>	
RelationshipId	The unique SNOMED CT Identifier of this Relationship.
<b>Data Fields</b>	
ConceptId1	The unique SNOMED CT Identifier of the Concept which is the <i>source</i> of this Relationship.
RelationshipType	The unique SNOMED CT Identifier of the Concept which represents the type of relationship between the related Concepts.
ConceptId2	The unique SNOMED CT Identifier of the Concept which is the <i>target</i> of this Relationship.
CharacteristicType	An indication of whether a Relationship specifies a defining characteristic of the <i>source</i> Concept or a possible qualifying characteristic of that Concept.
Refinability	An indication of whether it is possible to refine the <i>target</i> Concept when this relationship is used as a template for clinical data entry.
RelationshipGroup	An integer value that links together Relationships which are part of a logically associated Relationship group.

The Relationships Table is concerned with definitions, qualifiers and additional facts about a Concept. Although it can also be used to display a hierarchy of subtypes it does not have a specified or natural display order. Ordering is supported by use of a Navigation Subset (see Introducing Subsets).

In 2003-2004, some relationship types were packaged into a separate file called the Historical Relationships Table. These relationship types were merged into the Relationships Table starting with the January 2005 release.

## 4 Introducing the Subset Mechanism

### 4.1 Overview

#### 4.1.1 What is a Subset?

A Subset refers to a set of Concepts, Descriptions, or Relationships that are appropriate to a particular language, dialect, country, specialty, organization, user or context.

In its simplest form, the Subset Mechanism is a list of SNOMED identifiers (SCTIDs). Each SCTID refers to one component of SNOMED CT that is a member of the Subset (called a “Subset Member”). As an analogy, think of SNOMED CT as a book. A Subset is like an index entry pointing to a set of pages relevant to a particular topic

The Subset Mechanism may be used to derive tables that contain only part of SNOMED CT. In some cases, these derived tables may also be centrally distributed (e.g. a release table containing only Descriptions for a particular International Edition). Please refer to the Section 4.3 for a list of subsets now available.

SNOMED CT provides for the Subset Types listed below. Some of these types are not yet in use.

#### 4.1.2 Subset Types

Subset Type	Summary
Language Subset	<p>The Descriptions that contain terms applicable to a Language or Dialect.</p> <ul style="list-style-type: none"> <li>• A language is a vocabulary that has been given an ISO 639 language code.</li> <li>• A dialect is a modification of a language for a particular geography or cultural environment.</li> </ul> <p>Each Description may contain the Preferred Term, Synonym or Fully Specified Name for the associated Concept in that language or dialect. The same description may serve different purposes from one language subset to another – it may be a preferred term in one dialect and a synonym in another.</p>
Realm Concept Subset	<p>The Concepts applicable for a particular <i>Realm</i>.</p> <ul style="list-style-type: none"> <li>• A Realm is an area of expertise, preference or authority. Examples of Realms include: a specialty, a professional discipline, an organization, a country, or a specialty within a country (e.g. US dentists).</li> </ul> <p>A realm concept subset refers specifically to concepts, but it also affects the availability of descriptions and relationships. Only descriptions and relationships associated with the included concepts are allowed. Descriptions and relationships not associated with concepts in the subset are not referenced.</p>
Realm Description Subset	The Descriptions applicable for a particular Realm.
Realm	The Relationships applicable for a particular Realm. This subset is

<b>Subset Type</b>	<b>Summary</b>
Relationship Subset	planned for future use.
Context Concept Subset	<p>The Concepts applicable to a particular context domain.</p> <ul style="list-style-type: none"> <li>• A context is a specified part or field of a patient record, application, protocol, query message, or other communication specification.</li> </ul> <p>A context concept subset refers specifically to concepts, but it also affects the availability of descriptions and relationships. Only descriptions and relationships associated with the included concepts are allowed. Descriptions and relationships not associated with concepts in the subset are not referenced.</p>
Context Description Subset	<p>The <i>Descriptions</i> applicable to a particular <i>Context Domain</i>.</p> <p>A specified set of permitted descriptions implies that concepts associated with the permitted descriptions will also be included in the subset.</p>
Navigation Subset	<p>A set of Navigation Links representing an ordered hierarchy appropriate for display and user Navigation.</p> <p>Navigation Links are specified by the ConceptIds of parent and children Concepts.</p> <p>The Navigation Hierarchy may include SNOMED CT concepts and special SNOMED CT navigation concepts, which exist solely for the purpose of navigation.</p>
Duplicate Terms Subset	A set of descriptions (preferred Terms and synonyms) that have similar or duplicate terms with the definition of the priorities of the terms.

The format of the Subset Members Table appears quite simple, containing only 4 fields: SubsetId, MemberId, MemberStatus and LinkedId. There are some underlying subtleties to this table, however.

- ❖ The field MemberId has a different significance depending on the type of subset specified in the Subset Table.
- ❖ The field MemberStatus has a different significance depending on the type of subset specified in the Subset Table.
- ❖ The LinkedId field is only valid for Navigation Subsets and Duplicate Terms Subsets and has a different significance in both subsets.

#### **4.1.3 How are subsets related to SNOMED CT?**

A Subset is a value-added feature of SNOMED CT. Subsets provide important information for the use and implementation of SNOMED CT. The fact that a SNOMED CT Component belongs to a particular subset provides information above and beyond the Component itself.

#### **4.1.4 How big is a Subset?**

The size of a Subset may range from a single Component to the entire set of Concepts, Descriptions or Relationships.

The number of Components in a Subset depends entirely on its purpose.

For example:

- ❖ A Language Subset may contain at least one Description for each Concept (i.e. hundreds of thousands of members).
- ❖ A Subset of Concepts commonly used in a particular specialty may contain thousands of members.
- ❖ A Subset of Concepts that covers the set of procedures used in a specialty or discipline may contain several hundred members.
- ❖ A Subset of Concepts applicable to fields in a structured message may have less than a hundred members.
- ❖ A Subset of Concepts or Descriptions applicable to a clinical protocol, template or data entry field may contain very few members.

SNOMED CT is a large terminology and subsets can define portions of the terminology for use by specific audiences. For example, a UK dialect subset for English may direct the user to descriptions for UK terms rather than all descriptions for English. Note that it is up to the implementer to determine if a subset is used dynamically or statically, and whether the subset contents are given precedence or used exclusively. Refer to the SNOMED CT Technical Implementation Guide for more information.

Note that Subsets are not necessarily mutually exclusive. The contents of Subsets may overlap.

#### **4.1.5 Are all Subset Members equal?**

The simple view of a Subset as a list of SCTIDs assumes that all Subset Members are equal. However, note that members of a Subset may have different uses or statuses in a Subset.

For example, some Descriptions are Preferred Terms in a particular language while others are Synonyms.

So while all Subset Members are equally part of the Subset, some of the additional information provided in the Subset may indicate a priority that is not equal for all members. Please read any documentation regarding how a subset is intended to be used prior to implementation.

#### **4.1.6 Why specify a common Subset structure?**

Previous experience with large terminologies suggests that their size and breadth of scope can pose a challenge for users and implementers. There are many situations in which it is useful to limit the set of Concepts and/or Descriptions for a given purpose. The multinational, multilingual nature of SNOMED CT increases the size of the terminology and adds further requirements for limiting access to sets of Descriptions and Concepts appropriate to a particular country.

The Subset structure supports many different requirements and enables them to be distributed in a common format.

#### **4.1.7 Who creates, maintains, and distributes subsets?**

The IHTSDO creates, maintains, and distributes Subsets of SNOMED CT using the technical structure described in this document (see Section 4.3 – Released Subsets). Under the IHTSDO's Affiliate License terms, other organizations may develop Subsets using the same Subset technical structure for extension content, or a combination of core and extension content. These Subsets would typically be maintained by the organization that creates them.

The role of different organizations in the creation, maintenance, and distribution of Subsets is subject to editorial and management policy. The IHTSDO is responsible for determining and implementing these policies.

## 4.2 Subset Tables – Summary

### 4.2.1 Introduction

Subsets provide a way for users and implementers to limit the set of SNOMED CT Concepts and Descriptions for a particular purpose. There are several types of subsets already defined for specific goals, and other types will be utilized in the future.

A common file structure is used for all Subsets. This approach simplifies the release structure and installation process for all SNOMED users.

Subsets are released using two tables:

Subsets Table:	Each row in this table describes one release of a Subset.  This table includes SNOMED CT Subsets that are packaged together in the Subset Members table.
Subset Members Table:	Each row in this table represents one member of a Subset.  The member may be a Concept or a Description. One or more Subsets may be packaged together in this table.

### 4.2.2 Subsets Table – Summary

Each row in the Subsets Table describes a Subset and characteristics of that Subset.

<b>Key Fields</b>	
SubsetId	The unique SNOMED CT Identifier for this Subset.
<b>Data Fields</b>	
SubsetOriginalId	The unique SNOMED CT Identifier for the original Subset of which this Subset is a version.
SubsetVersion	An integer incremented for each revised release of a Subset.
SubsetName	A name that describes the purpose or usage of this Subset.
SubsetType	Indicates the nature of the Subset and the type of SNOMED CT Component that may be a member of the Subset.
LanguageCode	Identifies the Language and optionally the Dialect to which the Subset applies (only used for description-based subsets: Language, Realm Description, and Realm Concept).
RealmId	Identifies the Realm to which the Subset applies.
ContextId	May identify the Context Domain to which the Subset applies.

#### 4.2.3 Subset Members Table – Summary

Each row in the Subset Members Table sets the status of a member of an identified Subset.

<b>Key Fields</b>	
SubsetId	The unique SNOMED CT Identifier for this Subset.
MemberId	The SNOMED CT Identifier of this Subset Member. This may be a ConceptId, DescriptionId or RelationshipId.
<b>Data Fields</b>	
MemberStatus	An integer specifying the status, type or order of this member.
LinkId	Valid for Navigation and Duplicate Terms Subsets only. For Navigation Subsets it is the SNOMED CT Identifier for a Concept that is a Navigation child of the Subset Member. For Duplicate Terms Subsets it is the SNOMED CT Identifier for the highest priority Description sharing the Duplicate Term.

#### 4.2.4 Subset Definition File – Summary

The Subset Definition File is an XML document that contains the definition of a subset. The definition consists of a set of “rules” that can be applied to SNOMED CT to determine the membership of the subset, rather than having each member identified separately. The rules are expressed as clauses that contain tests for each concept or description. There are three types of tests:

- Hierarchical Selection

This test identifies concepts that are subtypes (descendants) or supertypes (ancestors) of a specified concept. For example, create a subset that contains ‘infectious disease’ and all its subtypes.

- Relationship Selection

This test identifies concepts that have a specified attribute and value. For example, create a subset that contains all concepts where the Finding Site (attribute) = ‘heart structure’ (value).

- Property Selection

This test identifies concepts that match a property value in the SNOMED CT release tables. For example, create a subset that contains all concepts with a Status = 0 (current concepts) or concepts that contain the text string ‘K deficiency.’

The Subset Definition File allows multiple tests to be used to define a subset, and to use true/false conditions to be specified to determine which tests, and in which sequence, the tests should be used. The tests determine the membership of the subset and the value of the Member Status field.

The Subset Definition File also contains metadata about the subset, such as the Subset Identifier, the Subset Version, the Language Code, and Realm Identifier.

The Subset Definition File can be used to represent concept and description subsets. It cannot be used for navigation subsets, or for duplicate terms subsets.

Future specifications for the Subset Definition File may enable multiple subsets to be specified in one file, and for one subset to be used as the basis for another subset so that only the differences between the subsets need to be specified.

### 4.3 Released Subsets

The following subsets are maintained and licensed by the IHTSDO. The date of first issue and, where appropriate, retirement are noted.

Subset	Type of Subset	Subset Contents
US Dialect Subset	Language/Dialect	<p>Identifies Descriptions that are appropriate for the US dialect of the English Language. This subset applies to the English Language Descriptions Table.</p> <p>This Subset was first available with the First Release US Edition.</p>
UK Dialect Subset	Language/Dialect	<p>Identifies Descriptions that are appropriate for the British dialect of the English Language. This subset applies to the English Language Descriptions Table.</p> <p>This Subset was first available with the First Release UK Edition.</p>
Spanish Subset	Language	<p>Identifies Descriptions that comprise the Spanish Edition of SNOMED CT. This Subset is required to determine the contents of the Spanish release, which includes descriptions both in English and Spanish. This subset applies to the Spanish Edition Descriptions Table.</p> <p>This Subset was first available with the SNOMED CT Spanish Edition April 2002 Release.</p>
German Subset	Language	<p>Identifies Descriptions that comprise the German Edition of SNOMED CT. This Subset is required to determine the contents of the German release, which includes descriptions both in English and German. This subset applies to the German Edition Descriptions Table.</p> <p>This Subset was first available with the SNOMED CT German Edition April 2003 Release. It is not currently maintained or distributed.</p>
SNOMED CT Top Level Navigation Hierarchy	Navigational Subset	<p>Provides an example of a Navigation hierarchy using SNOMED CT's Top Level Concepts. Please refer to the Technical Implementation Guide for more information about how to define and use Navigation Subsets.</p> <p>This Subset was first available with the First Release Developer Toolkit.</p>
CTV3 Navigation Hierarchy	Navigational Subset	<p>Provides an example of a Navigation hierarchy using CTV3's top level concepts. Please refer to the Technical Implementation Guide for more information about how to define and use Navigation Subsets.</p> <p>This Subset was first available with the First Release Developer Toolkit.</p>
Duplicate Terms Subset	Duplicate Terms	<p>Identifies Duplicate Terms and the favored term. Refer to the Developer Toolkit in this guide for more information.</p> <p>This Subset was first available with the July 2002 Developer Toolkit.</p>
US Drug Extension Subsets	Realm Concept and Realm Description Subsets	<p>Identifies Concepts and Descriptions that are currently members of the US Drug Extension.</p> <p>These Subsets were first available with the July 2002 Release.</p>
SNOMED CT Relationship Range Subset	Navigation Subset	<p>Identifies the allowable range for each SNOMED CT RelationshipType concept. For example, the RelationshipType 'Procedure site' receives as values or alternatively has a range of concepts that are descended from Anatomical concepts.</p>
SNOMED CT Relationship Domain Subset	Navigation Subset	<p>Identifies the allowable domain to which each SNOMED CT RelationshipType can be applied. For example, the RelationshipType concept 'Procedure site' can be applied concepts that are descended from 'Procedure.'</p>

## 5 Introducing Cross-Mapping

### 5.1 Overview

The Cross Mapping mechanism enables distribution of Cross Maps from SNOMED Clinical Terms in a common structure.

Cross Mappings ensure that SNOMED CT can be used to effectively reference other terminologies and classifications. Each cross map matches SNOMED concepts with another coding scheme that is called the “target scheme.”

The cross mapping structure enables:

- ❖ Automatic mapping from one SNOMED CT Concept to a single appropriate matching code in the Target Scheme.
- ❖ Automatic mapping from one SNOMED CT Concept to a single collection of codes in a Target Scheme that together represent the same Concept.
- ❖ Manual choice from a set of options for mapping a SNOMED CT Concept to a Target Scheme with several possible ways of representing the same or similar Concepts.

The cross mapping structure does **not** enable:

- ❖ Mapping from post-coordinated collections of SNOMED CT Concepts to a single Target Code or a specific collection of Target Codes (e.g. mapping a combination of a disorder qualified by severity or a procedure qualified by urgency).
- ❖ Mapping from multiple fields in a patient record to a specific Target Code that represents a combination of characteristics (e.g. mapping a combination of a disorder, procedure and the age and sex of the patient to a single grouper code).

This structure is based on the practical experience of the Cross Mapping tables of Clinical Terms Version 3 (CTV3), which is one of SNOMED CT’s source terminologies.

The Cross Mapping Mechanism function is designed to be flexible in its support of:

- ❖ The number of source concepts mapped
  - ✧ A Target Scheme may include codes for:
    - A single SNOMED CT Concept
      - Example: A disorder Concept may map directly to an ICD classification code.
    - A single statement consisting of a post-coordinated set of Concepts
      - Example: A procedure Concept qualified by an urgency Concept may map to a target procedure code.
    - Several separate statements each represented using SNOMED CT Concepts.
      - Example: A diagnosis Concept plus a procedure Concept may map to a grouper code.
    - One or more statements represented using SNOMED CT Concepts combined with additional information that is not represented as a SNOMED CT Concept.
      - Example: A disorder Concept plus the age and sex of the person may map to an ICD classification code.

- ❖ Current support is for mapping from a single SNOMED CT Concept. Additional functions may be considered in the future.
- ❖ The number of Target Codes
  - ❖ A Target Scheme may represent a mapped Concept as:
    - a single code
    - as a combination of codes
    - a choice of several possible mappings consisting of one or more codes
  - ❖ Current support is for a single Target Code, multiple Target Codes, and a choice of single or multiple Target Codes.
- ❖ The accuracy of mapping
  - ❖ A target mapping may represent a Concept
    - precisely
    - imprecisely
      - target more specific than source
      - target less specific than source
      - imprecise but neither more nor less specific
  - ❖ An indication of accuracy can be associated with each Cross Map.

Practical requirements for mapping from SNOMED CT to other terminologies or classifications (Target Schemes) are not limited to mapping single Concepts in SNOMED CT to single Target Codes. The more general problem is to map information in a patient record that has been encoded using SNOMED CT Concepts into an appropriate Target Code or set of Target Codes.

It will be impossible to map some Concepts to any Target Codes in some Target Schemes.

A SNOMED CT Concept may be unmappable for one of several reasons:

- ❖ It expresses a concept that is outside the domain covered by the Target Scheme
- ❖ It is insufficiently detailed to provide a meaningful cross mapping
  - ❖ In this case a mappable code may be found by refining the SNOMED CT Concept (i.e. selecting an "ISA" descendant).
- ❖ It is too detailed and information will be lost in the mapping
  - ❖ If this loss of detail is unimportant with respect to the purpose of the mapping, it is possible to map the most proximal more generalized Concept that is mappable, or to create the map but indicate that the match is not 1:1.
- ❖ It is inappropriate to map the concept
  - ❖ For example, disorders that do not apply to humans need not be mapped to ICD-9-CM.

## 5.2 Cross Mapping Tables – Summary

The SNOMED CT structure for supporting Cross Mapping includes three tables:

Cross Map Sets Table	Each row in this table represents a Target Scheme for which Cross Maps are available.
Cross Maps Table	Each row in this table represents one option for mapping a SNOMED CT Concept to a target code or set of codes in the Target Scheme.
Cross Map Targets Table	Each row in this table represents a code or set of codes in the Target Scheme, which provides a mapping for one or more SNOMED CT Concepts.

The relationships of these tables to one another and to the core tables of SNOMED CT are described below. See Appendix B for details about the tables and Appendix H for information about available mappings.

### 5.2.1 Cross Maps Sets Table – Summary

Each row in the Cross Map Sets Table identifies a Target Scheme to which SNOMED CT is mapped and specifies characteristics of the associated mapping.

<b>Key Fields</b>	
MapSetId	The unique SNOMED CT Identifier for this Cross Map Set.
<b>Data Fields</b>	
MapSetName	A name that describes this Cross Map Set.
MapSetType	Indicates the nature of the Cross Maps associated with this scheme. CrossMapType is used to indicate the inclusion of one to one, one to many and choices of maps.
MapSetSchemeId	A standard identifier for the Target Scheme.
MapSetSchemeName	The full name of the Target Scheme.
MapSetSchemeVersion	The version number of the Target Scheme as published by the issuing organization.
MapSetRealmId	The identifier of the Realm within which this mapping table is applicable. This is only used in cases where Realm specific business rules or guidelines alter the acceptable mappings.
MapSetSeparator	The character used as a separator between the individual codes in the Target Codes field of the Cross Map Targets.
MapSetRuleType	An indication of the types of rules used in the Cross Maps and Cross Map Targets.

### 5.2.2 Cross Maps Table – Summary

Each row in the Cross Maps Table represents one option for mapping a Concept to a Cross Map Target.

There may be several Cross Map options for a Concept. If so, each option is represented by a row in the Cross Maps Table. Each row may include rules for choosing that option and these rules may be expressed in machine-readable form and/or as textual advice to support manual coding.

<b>Key Fields</b>	
MapSetId	The unique SNOMED CT Identifier for the Cross Map Set of which this Cross Map is a member.
MapConceptId	The SNOMED CT Identifier of the mapped Concept.
MapOption	An integer that distinguishes between alternative mappings for a single Concept.
<b>Data Fields</b>	
MapPriority	Indication of the suggested order in which to present a series of options for mapping a Concept for manual assessment. The first of these is the default option for mapping the Concept.
MapTargetId	The unique SNOMED CT Identifier for a CrossMapTarget to which this Concept can be mapped.
MapRule	A machine processable expression of rules that determine whether this is an appropriate Cross Map.
MapAdvice	Textual advice to support manual mapping decisions between this Cross Map and other options for mapping the same Concept.

### 5.2.3 Cross Map Targets Table – Summary

Each row in this table represents a code or set of codes in the Target Scheme, which provides a mapping for one or more SNOMED CT Concepts. A Cross Map Target may include a rule indicating the conditions in which it applies (For Future Use).

<b>Key Fields</b>	
TargetId	The unique SNOMED CT Identifier for this Cross Map Target.
<b>Data Fields</b>	
TargetSchemeld	A standard identifier for the Target Scheme from which the MapTargetCodes are derived.
TargetCodes	A code or list of codes in the Target Scheme that represent an appropriate mapping for one or more Concepts.
TargetRule	A machine processable expression of rules that determine the combinations of conditions to which this Cross Map Target applies (future use).
TargetAdvice	Textual advice expressing the combinations of conditions to which this Cross Map Target applies.

### 5.2.4 SNOMED CT – LOINC® Integration Table – Summary

LOINC is a trademark of the Regenstrief Institute. Copyright 1995-2008, Regenstrief Institute and the Logical Observation Identifier Names and Codes (LOINC®) Committee. All rights reserved.

The Laboratory LOINC database provides a standardized set of names and codes for identifying laboratory test results. Created by the Regenstrief Institute, the purpose of LOINC is to facilitate the exchange and pooling of results for outcomes management and research. Each LOINC code represents a unique laboratory test distinguished by six main parts that include the analyte measured, the property observed, the time aspect involved, the sample or system type, the scale of measurement, and where relevant the method of measurement. Taken together, these six components define a single laboratory test result. Additional details about LOINC, including access to the LOINC database files, is available from [www.regenstrief.org/loinc/loinc.htm](http://www.regenstrief.org/loinc/loinc.htm).

SNOMED CT is a clinical reference terminology. SNOMED CT concepts are explicitly represented in a multi-hierarchical structure. Each of the six distinguishing parts of a given LOINC test result are found in SNOMED CT and assigned in a hierarchy.

The integration exists as a table containing 11 columns. The first nine columns of the table are taken directly from the Laboratory LOINC version 11 database. The last two columns contain concept identifiers from SNOMED CT that relate a specific component of the LOINC test to the SNOMED CT hierarchy.

See Appendix B (B.5.4) for details of the SNOMED CT – LOINC® Integration Table.

## 5.3 Released Cross Mappings

### Released Cross Mappings

The following cross mappings are currently included in the International Release available from the IHTSDO.

- ❖ ICD-9-CM (Clinical Findings)
- ❖ ICD-O
- ❖ LOINC Integration Table

## 6 Introducing History

### 6.1 Overview

The content of SNOMED CT evolves with each release. The types of changes may include new Concepts, new Descriptions, and new Relationships between Concepts, new Cross-maps, new Subsets, as well as updates and retirement of any of these Components. These changes are driven by changes in understanding of health and disease processes; introduction of new drugs, investigations, therapies and procedures; new threats to health; as well as proposals and work provided by SNOMED partners and licensees.

To achieve the goals stated in the widely-accepted paper on the desiderata for clinical terminologies,<sup>1</sup> the evolution of SNOMED follows these principles:

- ❖ Graceful evolution rather than radical change
- ❖ The meaning of a Concept does not change. If the Concept's meaning changes because it is found to be ambiguous, redundant or otherwise incorrect, the Concept is made inactive. One or more new Concepts are usually added to better represent the meaning of the old Concept.
- ❖ Concepts may become inactive but are never deleted. Concept identifiers are persistent over time and are never reused.
- ❖ The link between a Description and a Concept is persistent. If a Description is no longer pertinent for a Concept, the Description is inactivated. A new corrected Description for the Concept may be added.
- ❖ Recognition of redundancy
  - ✧ The same information can be stated two or more different ways. SNOMED recognizes this possibility and facilitates recognition of equivalent statements.
  - ✧ When a Concept is inactivated as a result of duplication, SNOMED provides a reference to the continuing, active representation of that Concept.

A SNOMED CT Component is a Concept, Description or Subset. Changes to these components are included in the Component History. "Significant" changes generally require the component to be retired and replacement component(s) are added. The retirement and addition are recorded in the history records. Some changes have been designated as minor and only require a history record to record the change.

Why is this history important? These Components may have been used directly in healthcare applications, or to define the terms used.

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<sup>1</sup> Desiderata for Controlled Medical Vocabularies in the Twenty-First Century, J.J. Cimino, Methods of Information in Medicine 1998;37:394-403

For example, an inactive Description or Concept may have been used in:

- ❖ Patient records
- ❖ Data entry templates
- ❖ Decision support protocols
- ❖ Reusable searches, queries or analyses

A change in a Relationship may alter the interpretation of stored information by protocols, queries and Subsets that include clauses which propagate across these Relationships. The history of Relationship changes may be computed by comparing different releases of the Relationships File; the IHTSDO does not provide this type of history file. Note that the Relationships File contains data about the history of Concepts evolution and supporting information.

Therefore, an SCT-enabled application may want to modify searches, software, or update data convention tables as the terminology evolves. The SNOMED CT History Mechanism provides not only a history of changes, but also references to the current components that may be used instead.

These references may be used in different ways.

- ❖ To map legacy data to a current equivalent Concept
- ❖ To enable a query or protocol to include information represented using Inactive Concepts

The History Mechanism is also used to track when the maintenance responsibility for one or more concepts is transferred between organizations. This requires the concept to be transferred from the SNOMED CT Core to an Extension, from an Extension to the Core, or between Extensions. See “Introducing Extensions” for more information.

## 6.2 History Mechanism

### 6.2.1 Introduction

The history mechanism involves these tables:

- ❖ Component History Table
- ❖ Component History References Table (Future use)

All SNOMED CT Components have a unique SNOMED CT Identifier. The structure of these identifiers is discussed in detail in Appendix C.

When a Component is first added, it is allocated an identifier, which is unique, permanent and cannot be changed. A Component that is no longer required can be inactivated, and its identifier will never be reused.

A limited set of permitted minor changes may be made to a Component as specified by the Component History Rules.

A Component may be replaced by another Component to allow more significant changes. “Replace” means the original Component is inactivated and one or more replacement Components are added.

## 6.2.2 Component History Table – Summary

The Component History Table identifies each change in the status of a Component and the Release Version in which the change was made.

<b>Key Fields</b>	
ComponentId	The unique SNOMED CT Identifier for the changed Component.
ReleaseVersion	The version of SNOMED CT in which this change was made.
<b>Data Fields</b>	
ChangeType	An indication of the nature of the change.
Status	The status of this Component after the change.
Reason	An optional text Description of the reason for the change.

Note that the Relationships file shows the Relationships between inactive concepts to other equivalent or related Concepts.

## 6.2.3 References Table – Summary (For Future Use)

The References Table contains References from inactive Components to other equivalent or related Components that were current in the Release Version in which that Component was inactivated. Each Reference indicates the nature of the relationship between the inactive and persistent component.

<b>Key Fields</b>	
ComponentId	The unique SNOMED CT Identifier for the inactive Component
ReferenceType	An indication of the nature of the relationship between the inactive Component and the referenced Component.
ReferencedId	The unique SNOMED CT Identifier for the referenced Component.

Note that there are no References Table entries for Concepts. For Concepts, this historical functionality is already included in the Relationships Table.

## 6.3 Component History Rules

### 6.3.1 History Rules Introduction

These are the rules used to create the Component History Table when Components are added or changed. Components are never removed, but their status may change from active to inactive.

Special considerations for the SNOMED CT First Release are described in the last subsection.

### 6.3.2 Adding a Component

A newly added Component is distributed as:

- a) A row in the Component History Table with:
  - i) ChangeType value *Added*;
  - ii) ComponentId referring to the new Component;
  - iii) Status value for the Component (usually *Current*).
- b) A row in the appropriate distribution table for the new Component.

### 6.3.3 Changing the status of a Component

All SNOMED CT Components have an active or inactive Status.

When the Status of a Component is changed, this is distributed as:

- a) A row in the Component History Table with:
  - i) ChangeType value *Status Change*;
  - ii) ComponentId referring to the changed Component;
  - iii) Status value of the Component (usually one of the non-current status values)
- b) If the Component is a Concept or Description, a row in the appropriate distribution table for the Component with its updated Status (usually one of the non-current status values).

Components other than Concepts and Descriptions are only distributed when they are “current”. Therefore, there is no status field in the distributed Relationships, Subsets, Cross Map Sets or Cross Map Targets Tables. Note that the Relationships table contains Relationship Types that describe Relationships between inactive and active Concepts.

Inactive Concepts and Descriptions are included in the distributed tables to support data recorded when these Components were active. Therefore, the status of these Components is represented explicitly in the ConceptStatus and DescriptionStatus fields of the distributed tables. The reason for inactivation of a Concept or Description may vary and is represented by a range of status values.

### 6.3.4 Making minor changes to Component

Most changes to a Component require it to be inactivated and replaced by a new Component with a new SNOMED CT identifier. However, a specified set of minor changes is permitted without inactivating the Component.

A minor change to a Component is distributed as:

- a) A row in the Component History Table with:
  - i) ChangeType value *Minor Change*;
  - ii) ComponentId referring to the changed Component;
  - iii) Status value for the Component (usually *Current*).
- b) A row in the appropriate distribution table for the changed Component.
- c) Minor changes to Components are:

Table	Field	Permitted minor changes
Concepts	FullySpecifiedName	Changes in presentation such as changed capitalization, punctuation, spelling or revision due to changes in agreed presentation style are permitted as long as they do not change the specified meaning of the Concept. Some changes to the semantic type shown in parentheses at the end of the FullySpecifiedName may also be considered minor changes if the change in hierarchy does not alter the Concept's meaning.
Descriptions	Term	If DescriptionType is FullySpecifiedName Changes as permitted for Fully Specified Name in Concepts Table.
Descriptions	Term	If DescriptionType is <b>not</b> FullySpecifiedName Capitalization changes only
Descriptions	DescriptionType	If DescriptionType is <b>not</b> FullySpecifiedName Changes to any value except FullySpecifiedName.
Relationships	Refinability	Any change permitted
Subsets	SubsetName	Changes that alter the presentation or more clearly indicate the purpose of a Subset are permitted.
Cross Map Sets	MapSetName	Changes that alter the presentation or more clearly indicate the purpose of a Cross Map Set are permitted.

### 6.3.5 Making significant changes to a Component

All changes other than those explicitly listed in the table of minor changes are regarded as significant changes.

A significant change to a Component is distributed as:

- a) The Component is inactivated. See “Changing the status of a Component” above.
- b) A new Component with the changed information is added. See “Adding a Component” above.
- c) If the Component is a Description, a Subset or a Cross Map Set, there will also be a row in the Component History References Table indicating the Relationship between the inactive and active Components (Future Use).
- d) If the Component is a Concept, there will also be a row in the Relationships Table indicating the relationship between the Inactive Concept and its active replacement Concept.

### 6.3.6 Disambiguation of a Component

If a Concept is found to be ambiguous it may be replaced by one or more new Components. These replacements are distributed in the same way as other significant changes. However, one or more new, active Components are added to replace the Component that was ambiguous.

### 6.3.7 Retiring, Inactivating, or removing a component

A retired Concept or Description is given an inactive status. The inactive status may describe the reason for the inactivation, such as duplicate. See “Changing the status of a Component.” Inactive Concepts and Descriptions continue to be released with SNOMED CT.

A Relationship that is no longer valid is archived and no longer provided in the next SNOMED CT release. The Relationship Identifier will never be reused. Some “IS A” relationships that are no longer valid may become “WAS A” relationships (Future Use).

### 6.3.8 Concept Status changes

#### *Introduction*

This section is concerned with the way in which Relationships and Descriptions are affected by changes in the status of their associated Concepts. These changes are necessary because:

- ❖ An Inactive Concept cannot have any active Descriptions.
- ❖ There are constraints on the Relationships of an Inactive Concept.

There are three distinct aspects:

- ❖ Changes to Descriptions - These changes are reflected in the Descriptions Table.
- ❖ Retirement of or replacement of Relationships.
- ❖ Addition of Relationships that link an Inactive Concept to one or more active Concepts – These entries are added to the Relationships Table.

#### *Impact on Descriptions*

Table 1 shows the permitted DescriptionStatus values according to the ConceptStatus of the associated Concept.

**Table 1 – Permitted DescriptionStatus values for possible ConceptStatus values**

Permitted DescriptionStatus values	Permitted with Concept Status
0 – Current ( <i>default value</i> )	0 – Current
6 – Limited ( <i>default value</i> )	6 – Limited
8 – Concept inactive ( <i>default value</i> )	1 – Retired without stated reason 2 – Duplicate 3 – Outdated 4 – Ambiguous 5 – Erroneous
1 – Retired without a stated reason 2 – Duplicate 3 – Outdated 5 – Erroneous 7 – Inappropriate	Any value
10 – Moved elsewhere ( <i>default value</i> )	10 – Moved elsewhere
11 – Pending move ( <i>default value</i> )	11 – Pending move

When the Status of a Concept changes, the DescriptionStatus of all associated Descriptions is checked:

- ❖ If it is in the list of permitted values for the new ConceptStatus it is not changed.
- ❖ If it is **not** in the list of permitted values for the new ConceptStatus, it is changed to the default value listed for that ConceptStatus.

Note that Descriptions that are already inactive at the time that a Concept is inactivated are left unchanged, while active Descriptions are changed to the value “Concept inactivated”. Thus Descriptions that were current at the time a Concept is inactivated have *DescriptionStatus* = 8. Valid Descriptions of a limited Concept are marked as limited (*DescriptionStatus* = 6).

#### *Impact on Relationships – General issues*

When a Concept is inactivated its Relationships are reassessed to avoid anomalies in the structures of SNOMED CT. The required and permitted Relationships following a change in ConceptStatus of one of the Concepts involved in the Relationship are summarized below.

**Table 2 – Relationships depending on Concept Status**

ConceptId1 Concept Status	Relationship Type	ConceptId2 Concept Status	Constraints
1 – Retired without stated reason 3 – Outdated 5 – Erroneous	WAS A	0 – Current 1 – Retired without stated reason 3 – Outdated 4 – Ambiguous 5 – Erroneous 6 – Limited	No constraints
2 – Duplicate	SAME AS	0 – Current	One and only one Relationship of this type is required.
4 – Ambiguous	MAY BE A	0 – Current	One or more Relationships of this type are required.
5 – Erroneous	REPLACED BY	0 – Current	One and only one Relationship of this type is permitted (optional). Must have at least one WAS A or one REPLACED BY.
1 – Retired without stated reason 3 – Outdated	REPLACED BY	0 – Current	One and only one Relationship of this type is permitted (optional).
10 – Moved elsewhere 11 – Pending move	MOVED TO	0 – Current	One or more Relationships of this type are required and must refer to a Namespace Concept.
Any value	MOVED FROM	10 – Moved elsewhere 11 – Pending move	Any number of these Relationships may exist (it is possible identical Concepts from more than one source were moved to this Namespace). ConceptId2 must be in a different Namespace from ConceptId1.

**Table 3 – Defining and qualifying Relationships depending on Concept Status**

<b>ConceptId1 Concept Status</b>	<b>Relationship Type</b>	<b>ConceptId2 Concept Status</b>	<b>Constraints</b>
0 – Current 11 – Pending move	IS A	0 – Current 11 – Pending move	No constraints
6 – Limited	IS A	0 – Current 6 – Limited 11 – Pending move	No constraints
1 – Retired without stated reason 2 – Duplicate 3 – Outdated 4 – Ambiguous 5 – Erroneous 10 – Moved elsewhere	IS A	0 – Current	One and only one Relationship of this type if required and it must refer to the appropriate subtype of “Inactive concept”.
0 – Current 11 – Pending move	Other defining Relationships	0 – Current 11 – Pending move	Any value appropriate to the Relationship Type.
0 – Current 6 – Limited 11 – Pending move	Qualifying Relationships	0 – Current 11 – Pending move	Any value appropriate to the Relationship Type.
6 – Limited	Other defining Relationships	0 – Current 6 – Limited 11 – Pending move	Any value appropriate to the Relationship Type.
1 – Retired without stated reason 2 – Duplicate 3 – Outdated 4 – Ambiguous 5 – Erroneous 10 – Moved elsewhere	Other defining or qualifying Relationships	NONE PERMITTED	NONE PERMITTED

#### *Impact on Relationships – ConceptID1 status change*

When a Concept is changed from being active to inactive, all of its defining and qualifying Relationships are inactivated. The “IS A” subtype Relationships associated with Concepts that are inactivated without a stated reason or are stated to be outdated or erroneous may be converted to “WAS A” relationships to retain any significant semantics related to legacy data encoded using these Concepts.

The effects of this type of change may be wide reaching and have a significant impact on data files as well as software. Please refer to the Technical Implementation Guide for more information.

Changes in status from current (ConceptStatus = 0) to limited (ConceptStatus = 6) do not require any changes in “IS A” Relationships.

The full set of changes is summarized in Table 4.

**Table 4 – Changes to Relationships when the status of ConceptId1 changes**

ConceptStatus		Relationships in which this is ConceptId1			
Befor e	After	IS A subtype	Other Defining	Qualifiers	Relationships Added
0 or 6	1	Retire or change to WAS A	Retire	Retire	IS A “Retired Concept” (1) REPLACED BY (0 or 1)
	2	Retire	Retire	Retire	IS A “Duplicate Concept” (1) SAME AS (1)
	3	Retire or change to WAS A	Retire	Retire	IS A “Outdated Concept” (1) REPLACED BY (0 or 1)
	4	Retire	Retire	Retire	IS A “Ambiguous Concept” (1) MAY BE A (1+)
	5	Retire or change to WAS A	Retire	Retire	IS A “Erroneous Concept” (1) REPLACE BY (0 or 1)
0	6	No change	No change	No change	None
0 or 6	10	Retire	Retire	Retire	IS A “Moved elsewhere Concept” MOVED TO → Namespace (1+)
0 or 6	11	No change	No change	No change	IS A “Pending move Concept” MOVED TO → Namespace (1+)
11	10	Retire	Retire	Retire	IS A “Moved elsewhere Concept” MOVED TO → Namespace (unchanged)
11	0 or 6	No change	No change	No change	<i>Retire:</i> IS A “Pending move Concept” <i>Retire:</i> MOVED TO → Namespace

#### *Impact on Relationships –ConceptID2 changes*

When a Concept is changed from being active to inactive, all the Relationships for which it provides the value (ConceptId2) must be inactivated or replaced. In the case of a duplicate Concept, the value is replaced by a new similar Relationship with the current Concept that has the same meaning. In the case of an ambiguous Concept, the value may be replaced by a new similar Relationship with one of the disambiguated Concepts referred to by the ambiguous Concept. All inactive concepts can be found under the “Special Concept” hierarchy.

The effects of this type of change may be wide reaching and have a significant impact on data files as well as software. Please refer to the Technical Implementation Guide for more information.

Changes in status from current (ConceptStatus = 0) to limited (ConceptStatus = 6) do not require any changes in "IS A" if the defined Concept is a limited Concept. However, a limited Concept cannot be the defining or qualifying value for a current Concept. Any such Relationships are inactivated.

The full set of such changes is summarized in Table 5.

**Table 5 – Changes to Relationships when the status of ConceptId2 changes**

ConceptStatus		Status of Concept1	IS A Relationships in which this Concept is ConceptId2	Other Relationships for which this Concept is ConceptId2
Before	After			
0, 6 or 11	1	0, 6 or 11	Retire	Retire
		1 to 5 or 10	Retire or change to WAS A	Retire
	2	Any	Retire and replace with equivalent relationship to the duplicated Concept.	Retire and replace with equivalent relationship to the duplicated Concept
	3	0, 6 or 11	Retire	Retire
		1 to 5 or 10	Retire or change to WAS A	Retire
	4	Any	Retire and optionally replace with one of the disambiguated Concepts.	Retire and optionally replace with one of the disambiguated Concepts.
	5	Any	Retire or change to WAS A	Retire
	10	Any	Retire and optionally replace by the Concept in the new target namespace.	Retire and optionally replace by the Concept in the new target namespace.
0, 6	11	Any	No change	No change
11	0 or 6	Any	No change	No change
0 or 11	6	0	Retire	Retire
		6	No change	Retire

#### *Changes to Relationships when status of the RelationshipType Concept changes*

If a Concept that provides the RelationshipType for any Relationships is inactivated, all Relationships that refer to that Concept are inactivated and replaced.

#### *Impact on Data Retrieval – Inactivation due to duplication*

When a Concept is inactivated because it is found to be a duplicate of another Concept a new "SAME-AS" Relationship is created to link the Inactive Concept to the duplicate Concept.

This Relationship can be:

- ❖ Selectively included or excluded in data retrieval criteria to enable access to relevant information recorded using the inactive equivalent ConceptId.
- ❖ Used to allow legacy data to be upgraded to include the retained equivalent ConceptId.

*Impact on Data Retrieval – Inactivation due to error*

When a Concept is inactivated and replaced because it requires a significant change a new “REPLACED-BY” Relationship is created to link the Inactive Concept to the replacement Concept.

This Relationship can be:

- ❖ Selectively included or excluded in data retrieval criteria to enable access to relevant information recorded using the replaced version of the ConceptId.
- ❖ Used to allow legacy data to be upgraded to include the replacement ConceptId.

*Impact on Data Retrieval – Inactivation due to ambiguity*

When a Concept is inactivated and replaced because it was found to be ambiguous, new “MAY-BE-A” Relationships are created to link the Inactive Concept to the Concepts that represent each of its possible meanings.

This Relationship can be:

- ❖ Selectively included or excluded in data retrieval criteria to enable access to relevant information recorded using the ambiguous ConceptId.
- ❖ If these Relationships are included the ambiguous Concept can be included in the results of a search for either of the possible meanings.
- ❖ Used to allow ambiguous data to be linked to the ConceptIds associated with either or both potential meanings.

*Impact on Data Retrieval – Moves between namespaces*

When a Concept is moved to another Namespace, a new “MOVED TO” Relationship is created pointing from the original Concept to the target Namespace Concept.

When a Concept is moved in from another Namespace, a new “MOVED FROM” Relationship is created pointing from the new Concept to the original Concept in the other Namespace.

When a Concept is moved in from an Extension Namespace into the SNOMED CT Core Namespace, the “MOVED FROM” Relationship is stored in the Extension relationships table and not the SNOMED CT Core relationships table.

These Relationships can be used to allow a check for the replacement Concept in the new target Namespace.

- ❖ The “MOVED TO” Relationship identifies the target Namespace to be searched.
- ❖ The “MOVED FROM” Relationship, in material distributed by the organization responsible for the target Namespace, allows identification of the replacement Concept.

The “MOVED TO” Relationships exist for Concepts with the ConceptStatus values Moved Elsewhere (10) and Pending Move (11). The difference between these Status values is significant.

- ❖ Moved Elsewhere
  - ❖ The original organization is no longer supporting this as an Active Concept.
    - It has no Active Descriptions
    - The only Relationships that it has are:
  - ❖ “IS A” “Moved elsewhere Concept”

❖ “MOVED TO”

Therefore, without the replacement from the other Namespace this Concept cannot be processed or retrieved in any meaningful way.

❖ Pending Move

❖ The original organization is still supporting this as an Active Concept.

- Its Descriptions remain active (also marked with the same Status value)
- Its Relationships include:

❖ Its pre-existing Relationships (or those deemed to be appropriate)

❖ “IS A” “Pending move Concept”

❖ “MOVED TO”

The original Concept can still be used, retrieved and processed pending the availability of a replacement in the other Namespace. In some cases, a Concept marked as Pending Move may be rejected for inclusion in the other Namespace and its Status in the original Namespace may revert to “Current”.

#### 6.4 Representation of material in the SNOMED CT First Release

This section details the initial settings in the Component History Table for the SNOMED CT First Release. These settings apply to Components that were in SNOMED RT or Clinical Terms Version 3 prior to the merger of these two terminologies. They also apply to Components added to SNOMED CT prior to the First Release.

All Concepts in the First Release were regarded as having been added to SNOMED CT on or before the first release date (31 January 2002). Thus each has row in the Component History Table with ChangeType=“Added” and ReleaseVersion determined as follows:

- ❖ Concepts in releases of SNOMED RT (including those also present in CTV3):
  - ❖ ReleaseVersion= YYYYMMDD (ISO format of date previously recorded in RT release files).
- ❖ Concepts released in Clinical Terms Version 3 before 31 January 2002 (excluding those also present in RT):
  - ❖ ReleaseVersion= “20020129”
- ❖ New Concepts in SNOMED CT First Release but not in either SNOMED RT or Clinical Terms Version 3 before 31 January 2002:
  - ❖ ReleaseVersion= “20020131”
- ❖ New Concepts in any subsequent release of SNOMED CT (whether or not released in CTV3 between SNOMED CT releases)
  - ❖ ReleaseVersion= YYYYMMDD (ISO date of the SNOMED CT release)

Some Concepts had a ConceptStatus other than current in the SNOMED CT First Release. This occurred if the Concept:

- ❖ was non-current in the source terminology

or

- ❖ was rendered non-current during the merge of the two terminologies.

In either case there will be a row in Component History Table with the values ChangeType=“Status change”, Status= ConceptStatus (with a status consistent with the First Release) and ReleaseVersion determined as follows:

- ❖ Concepts released in Clinical Terms Version 3 before 31 January 2002 (excluding those also present in SNOMED RT) which were not current in Clinical Terms Version 3 and were thus released in a non-current state in SNOMED CT.
  - ✧ ReleaseVersion= “20020130”
- ❖ Concepts released in SNOMED RT before 31 January 2002 which were retired in SNOMED RT and are thus released in a non-current state in SNOMED CT.
  - ✧ ReleaseVersion= YYYYMMDD (ISO format of date of change recorded in the RT release files).
- ❖ Concepts released in CTV3 or SNOMED RT before 31 January 2002 that were rendered inactive prior to release of SNOMED CT.
  - ✧ ReleaseVersion= “20020131”

The consequences of these rules are shown below.

#### New Concepts added in SNOMED CT with current status

<b>ComponentId</b>	<b>ReleaseVersion</b>	<b>ChangeType</b>	<b>Status</b>
ConceptId	20020131	0 (added)	0 (current)

#### New Concepts added in SNOMED CT with limited status

<b>ComponentId</b>	<b>ReleaseVersion</b>	<b>ChangeType</b>	<b>Status</b>
ConceptId	20020131	0 (added)	6 (limited)

SNOMED RT-sourced (or dual sourced) Concepts that were current in SNOMED CT First Release.

<b>ComponentId</b>	<b>ReleaseVersion</b>	<b>ChangeType</b>	<b>Status</b>
ConceptId	RT-release-date	0 (added)	0 (current)

SNOMED RT-sourced (or dual sourced) Concepts that were current in RT prior to 31 January 2002 but were non-current in SNOMED CT First Release. The date 31 January 2002 indicates retirement occurred in First Release.

<b>ComponentId</b>	<b>ReleaseVersion</b>	<b>ChangeType</b>	<b>Status</b>
ConceptId	RT-release-date	0 (added)	0 (current)
ConceptId	20020131	1 (status change)	ConceptStatus

SNOMED RT-sourced (or dual sourced) Concepts that were retired in RT prior to 31 January 2002 and were non-current in SNOMED CT First Release.

<b>ComponentId</b>	<b>ReleaseVersion</b>	<b>ChangeType</b>	<b>Status</b>
ConceptId	RT-release-date	0 (added)	0 (current)
ConceptId	RT-retired-date	1 (status change)	ConceptStatus

Clinical Terms Version 3-sourced Concepts that were current in SNOMED CT First Release.

<b>ComponentId</b>	<b>ReleaseVersion</b>	<b>ChangeType</b>	<b>Status</b>
<i>ConceptId</i>	20020129	0 (added)	0 (current)

Clinical Terms Version 3-sourced Concepts that were current in CTV3 prior to January 2002 but were non-current in SNOMED CT First Release. The date 31 January 2002 indicates retirement occurred in first release.

<b>ComponentId</b>	<b>ReleaseVersion</b>	<b>ChangeType</b>	<b>Status</b>
<i>ConceptId</i>	20020129	0 (added)	0 (current)
<i>ConceptId</i>	20020131	1 (status change)	<i>ConceptStatus</i>

Clinical Terms Version 3-sourced Concepts that were not current in CTV3 prior to January 2002 and were non-current in SNOMED CT First Release. The date 30 January 2002 indicates retirement prior to first release.

<b>ComponentId</b>	<b>ReleaseVersion</b>	<b>ChangeType</b>	<b>Status</b>
<i>ConceptId</i>	20020129	0 (added)	0 (current)
<i>ConceptId</i>	20020130	1 (status change)	<i>ConceptStatus</i>

Descriptions, Relationships, Cross Maps and Subsets in the First Release are treated as having been added as at 20020131 (31 January 2002). No history information is provided for these Components prior to the First Release.

Note that the use of the dates 29, 30 and 31 of January 2002 is somewhat arbitrary. However, the chronological order of these dates is significant as it ensures that if Component History Table rows are applied in ReleaseVersion (i.e. date) order, the most recent change will be applied last. It also allows a distinction between items rendered inactive by the process of developing the SNOMED CT First Release and those that were already non-current in the source terminologies.

## 7 Introducing Canonical Forms

### 7.1 Overview

***This section describes the released “canonical table”. Although this form is useful, it is now recognized that there are other, more completely normalized or optimized forms that have greater value for computing subsumption of post-coordinated expressions.***

***These alternative forms and the transforms between them are the subject of two draft documents under discussion within the IHTSDO. Implementers seeking a more complete, detailed and up to date understanding of alternative forms, transformations and comparisons are advised to refer to these draft documents.***

The Canonical Table contains the short canonical form of SNOMED CT Concepts. The short canonical form is the most concise logical definition of a Concept. It consists of the location of that concept in a hierarchy plus the defining relationships that distinguish that concept from other concepts. Therefore, the short canonical form of a concept is represented by a collection of relationships: one or more IS A relationships and one or more defining relationships.

The short canonical form is derived from the Relationships Table.

The short canonical form enables testing for equivalence between pre-coordinated and post-coordinated representations of the same Concept. Please refer to the Technical Implementation Guide discussions of “Supporting post-coordination” and “Selective Retrieval of post-coordinated concepts,” as well as the illustration that follows.

### 7.2 Canonical Table Summary

Each row in the Canonical Table represents a Relationship between two Concepts. The Canonical Table differs from the Relationships Table in that it only contains those Relationships required to specify the short canonical form. The short canonical form is the shortest most finely granular complete and accurate statement of the logical semantics of a concept. It contains the following:

- ❖ "IS A" subtype Relationships to the most proximal primitive supertype Concept (s).
  - ✧ Excludes more proximal "IS A" subtype Relationships with fully defined Concepts.
  - ✧ Includes additional direct "IS A" subtype Relationships to primitive supertypes of these intervening fully defined concepts are added.
- ❖ The set of Relationships representing Defining characteristics of the Concept which differentiates it from its primitive supertype(s) as specified by (a).
  - ✧ Excludes any defining characteristics shared with a primitive supertype.
  - ✧ Excludes all qualifying characteristics and context-specific characteristics.

The short canonical form is computable using data already present in the Concepts Table and Relationships Table. The Canonical Table is distributed as an additional resource to:

- ❖ Emphasize its value as a tool for computing equivalence between pre-coordinated and post-coordinated representations of the same Concept.
- ❖ Provide a point of reference for related implementation guidance
- ❖ Reduce duplication of effort and inconsistencies that may be introduced by canonical form computations by individual developers or users.

The Canonical Table structure differs from that of the Relationships Table in the following ways:

- ❖ There is no RelationshipId field
  - ✧ The algorithm that generates this table creates some new Relationships. These are strictly for describing the Canonical form and are not in themselves new defining relationships. Therefore, they are not in the Relationships Table and do not have valid RelationshipIds.
- ❖ ConceptId1, RelationshipType, ConceptId2 form the key for this table
  - ✧ A unique RelationshipId is not assigned.
- ❖ There are no CharacteristicType or Refinability fields
  - ✧ Not relevant since all Relationships in this table are Defining characteristics.
  - ✧

<b>Key Fields</b>	
ConceptId1	The unique SNOMED Clinical Terms identifier of the Concept which is the <i>source</i> of this Relationship.
RelationshipType	The unique SNOMED Clinical Terms identifier of the Concept which represents the type of relationship between the related Concepts.
ConceptId2	The unique SNOMED Clinical Terms identifier of the Concept which is the <i>target</i> of this Relationship.
RelationshipGroup	An integer value that links together Relationships which are part of a logically associated Relationship group.
<b>Data Fields</b>	

## 8 Introducing Index and Search Support Tables

### 8.1 Overview

Effective implementation of SNOMED CT depends on the ease and speed with which users can locate the terms and Concepts that they wish to use. An essential contribution to meeting this requirement is the ability to perform rapid and flexible text searches.

A set of word search tables (indexes) are included in the Developer Toolkit. These tables are designed to facilitate development of effective search facilities while reducing duplication of effort. However, neither these tables, nor indices derived from them, are sufficient to meet the full range of search requirements. Meeting the needs of different users for appropriate methods for locating particular Concepts is an area in which competitive development is expected and welcomed. Developers may choose to use some or all of the word search tables distributed with SNOMED CT or may develop their own solutions independent of these tables.

The intention of the word search tables is to identify candidate matches among the Descriptions (or Concepts) of SNOMED CT. An application or coding engine will apply further filtering to these candidate matches to identify the matches to be selected or displayed. A balance must be made between specificity and completeness of a search. The keyword algorithm is intended to maximize the likelihood that the required Concept will be included in the candidate matches rather than to achieve precision.

Applications may filter candidate matches using techniques that are many and varied. Some may take account of non-textual characteristics (e.g. Subsets, subtype Relationships or Relationships) while others use more complex textual techniques (e.g. word order dependence, case dependence, complete phrase matching, regular pattern recognition, Soundex). These extended text search techniques are beyond the scope of the keyword generation algorithm.

The algorithm for keyword generation is only applicable for English and other western European languages. It is not intended to apply to Russian, Greek, Slavic or to any non-European languages.

Please refer to the Technical Implementation Guide for additional search implementation guidance.

#### 8.1.1 Search Requirements

Development of user-interfaces that facilitate rapid and appropriate access to SNOMED CT is a legitimate area for competition between application suppliers. However, user perceptions of the quality, usability and value of a terminology depend in a large measure upon the nature and performance of the user interface. Therefore, the IHTSDO has an interest in guiding and facilitating this development.

Rapid and appropriate access to SNOMED CT is not simply a matter of providing indices of the type specified in this document. The following aspects of functionality also need to be addressed in ways that are appropriate to the anticipated users of a SNOMED CT enabled application:

- ❖ Support for searches by keywords, phrases and patterns including:
  - ❖ Word-form and word-order variants
  - ❖ Abbreviations

- ❖ ◊ Word equivalents
- ❖ ◊ User acronyms for commonly used Terms.
- ❖ Integration of word and phrase searches with sub-type and part-of hierarchies:
  - ◊ Hierarchy navigation to narrow or broaden a Concept found by a search
  - ◊ Restricting searches to particular descendants of chosen Concepts
  - ◊ Limiting "double hits" caused by synonyms and multiple siblings with identical word matches
- ❖ Integration of word and phrase searches with Defining characteristic and Qualifying characteristics
  - ◊ Generating a post-coordinated SNOMED CT representation from a phrase.
  - ◊ Restricting searches to appropriate qualifiers of a selected Concept.
- ❖ Integration of word and phrase searches with Subsets:
  - ◊ Restricting searches to specified Subsets of Descriptions or Concepts used in:
    - A language or dialect;
    - A country, organization, specialty or user;
    - A particular context in a record or protocol.
  - ◊ Prioritizing matches according to memberships of one or more Subsets.

The Technical Implementation Guide offers detailed advice on searching and related user-interface issues. The Developer Toolkit provides the details of the keyword generation algorithms.

## **8.2 Word Search Tables – Summary**

The following five tables are included in the Developer Toolkit of SNOMED CT. These tables are derived from the SNOMED CT Descriptions Table. The LanguageCode of the Descriptions Table is used to choose only descriptions for a language.

Excluded Words Table	Each row in this table is a word excluded from the list of possible keywords and dualkeys. Words are excluded if they are frequently used and are so limited in semantic specificity that they impair rather than enhance searches.
DescWordKey Table	Each row in this table is a word followed by a reference to a Description in which this word appears.
ConcWordKey Table	Each row in this table is a word followed by a reference to a Concept. A Concept is referenced if the word appears anywhere in the combination of the Fully Specified Name with the current valid Preferred Term and Synonyms.
DescDualKey Table	Each row in this table is a six-character string representing the first three letters of a pair of words followed by a reference to a Description in which these two words appear.
ConcDualKey Table	Each row in this table is a six-character string representing the first three letters of a pair of words followed by a reference to a Concept. A Concept is referenced if both words appear anywhere in the combination of the Fully Specified Name with the current valid Preferred Term and Synonyms.

All keywords are regarded as case independent and are presented in the word search tables in upper case. Case dependent searching can be applied by appropriately filtering the candidate matches.

## 8.3 Word Equivalents

### 8.3.1 Introduction

The Word Equivalent Table is included in the Developer Toolkit of SNOMED CT. It supports enhanced searches that take into account semantically similar words such as KIDNEY and RENAL. It also provides commonly used abbreviations. This table can be used by implementers to offer additional search capability in applications without greatly increasing the volume of synonyms. It is not intended as a comprehensive dictionary of words. Many searches can be completed without using this table; like the other word search tables, it is completely optional and can be used as an example of a capability that may be customized and extended by SNOMED implementers.

### 8.3.2 Word Equivalents Tables – Summary

<b>Key Fields</b>	
WordBlockNumber	A 32-bit integer shared by a set of equivalent words or phrases. The WordBlockNumber links together several rows that have an identical or similar meaning.
WordText	A word, phrase, acronym or abbreviation that is equivalent to the WordText of other rows that share the same WordBlockId.
<b>Data Fields</b>	
WordType	An integer indicating the type of equivalence
WordRole	An integer indicating the usual role of this word. This should be considered if attempting to find a post-coordinated combination of Concepts that matches a phrase.

## 9 Introducing Extensions

### 9.1 Overview

SNOMED CT is a deep and detailed clinical terminology with a broad scope. However, some groups of users will need additional Concepts, Descriptions or Subsets to support national, local or organizational needs.

This section explains the structures that enable authorized organizations to add Concepts, Descriptions, Relationships and Subsets to complement the core content of SNOMED CT.

One possible example of the Extension mechanism is for extensibility of SNOMED CT for the specialized terminology needs of an organization. A goal is to provide a structure where these Extensions maintain unique identification across organizations for data transmission and sharing but share a common structure for ease in application development and so that subsets can be constructed over a combination of core and extension content.

Another critical goal is to define a structure so that it is easy to submit, include, use, and migrate terminology developed as part of an extension into the core content. When content overlaps the scope of SNOMED CT, it should be submitted to your IHTSDO National Release Center for consideration, so that other SNOMED CT users can also take advantage of this work.

Using the extension structure can also help organizations transfer responsibility for terminology to the IHTSDO or to another organization, subject to the terms of the Affiliate License.

### 9.2 Extension Requirements

An Extension mechanism offers many advantages to developers, vendors, terminologists, national bodies and users.

- ❖ Such a mechanism allows:
  - ✧ **Users** to access SNOMED CT core content and Extensions through a single user interface.
  - ✧ **Developers** to implement SNOMED Extensions without developing specialized software.
  - ✧ **Vendors** to develop and sell products to take advantage of both core content and Extensions.
  - ✧ **Organizations** to develop and share terminology that meet their business needs, without procuring software.
  - ✧ **SNOMED CT Affiliates** to develop terminology that can be shared with other organizations and considered for addition to the core content.
  - ✧ **SNOMED CT Affiliates** to use locally-developed terminology without potential overlap with the work of other organizations.
- ❖ This structure also enables specialized Concepts and Descriptions within an Extension to be related to Concepts and Descriptions distributed as part of SNOMED CT. Components in an Extension will be referred to with the prefix “Extra-”.
  - ✧ An Extra-Concept may be:
    - A national or organizational definition of a concept, which is more rigorous or specific than that generally applied to the SCT-Concept.

- An experimental procedure that is not established sufficiently to merit the inclusion in the main body of SNOMED CT but which may be in a local controlled study.
- ❖ Extra-Descriptions may be colloquial synonyms for a SCT-Concept or descriptions for a Extra-Concept.
- ❖ Extra-Relationships may be required to allow analysis packages or decision-support protocols to access additional information about a SCT-Concept or to describe relationships between Extra-Concepts.
  - Links between local procedures and relevant administrative actions.
  - Links between local procedures and SNOMED CT Procedures.
- ❖ Extra-Subsets may group SCT-Concepts in ways that are specific to data entry contexts of a particular application or communication specification.

The Concepts, Descriptions, Relationship and Subsets that form an Extension must be:

- ❖ Distinguishable from the main body of SNOMED CT, not only in the thesaurus, but also when stored in a patient record, query or decision support protocol.
- ❖ Distinguishable from other Extensions, in the same way as they are distinguishable from the main body of SNOMED CT.
- ❖ Able to be distributed and processed in the same way as equivalent components from the main body of SNOMED CT without requiring specific adaptations of SNOMED-enabled applications.

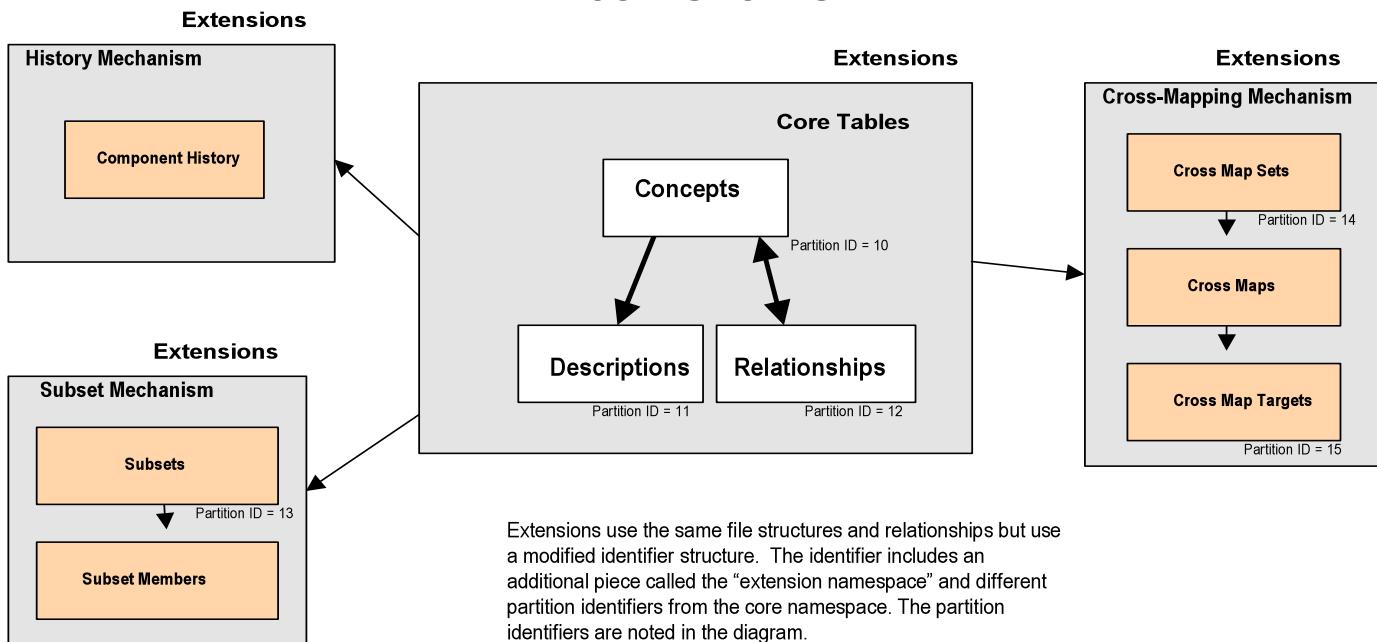
The requirements for Extensions can be summarized as follows:

- ❖ Support for extra terminology components including Concepts, Descriptions, Relationships and Subsets.
  - ❖ These extra Components should behave as though they were components of SNOMED CT but they should be distinguishable from the core of SNOMED CT.
- ❖ Globally unique identification of any terminology component that may be used outside the scope of a limited local environment.
  - ❖ The mechanism must allow several organizations to issue mutually exclusive identifiers for components of their Extensions.
  - ❖ To avoid the risk of misinterpretation, this mechanism must be effective in various contexts including:
    - Within the thesaurus
    - In patient records
    - In queries, decision-support protocols or knowledge bases.
  - ❖ Designation in the terminology when Concepts have moved or are moving between an Extension and the core, or from one Extension to another.
  - ❖ A shared understanding of the responsibility of an organization that creates an Extension and provides it for the use of other organizations. These responsibilities include:
    - Maintenance of the Concept, Descriptions, Relationships, and Subsets.
    - Inactivation of these Components as appropriate (duplication, ambiguous, outdated, etc.)
    - Submission to an IHTSDO Member National Release Center for core content.

### 9.3 Extension Tables – Structure

Extensions use the same table structure as the Concepts, Descriptions, Relationships, and Subsets Tables defined in those respective sections of this manual. These tables have the same structure or schema as the core tables but are in separate files.

# Extensions



**Figure 4 – Extensions**

When packaged, extension file names should use the convention:

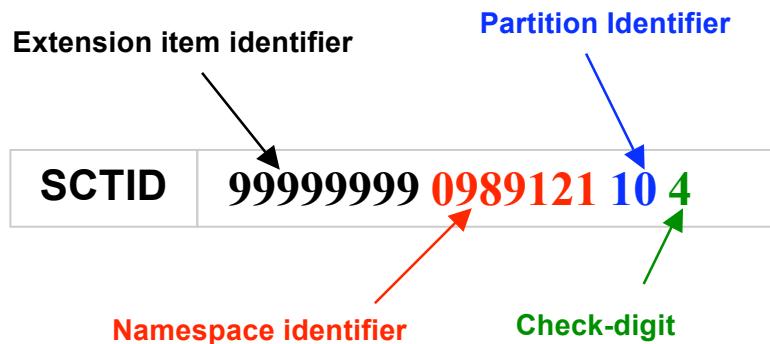
Sct\_concepts\_name of extension\_date.txt

For example:

Sct\_concepts\_usdrug\_20020131.txt

#### 9.4 Specification for Namespace within the SCTID

In order for Extension components to be distinguished from the core components and from other Extensions, the SCTID for all rows in the extension tables should be defined using the convention specified for the SCTID which is Appendix A of this guide. In summary, the SCTID is defined as follows:



**Figure 5 – SCTID for components in an Extension**

All Extension components (rows) developed by an organization should use the organization's assigned Namespace Identifier. Namespace Identifiers are issued by the IHTSDO so that the Namespaces remain unique between organizations. The Namespaces are entered as Concepts under the "special concepts" hierarchy when they are issued to an organization.

Namespaces serve three roles:

- ❖ Preventing collision or reuse of SNOMED CT identifiers.
- ❖ Indicating maintenance responsibility – avoiding potential risk of two organizations updating or changing the ConceptStatus of the same Concept.
- ❖ Indicating the source for information about a concept – relevant for Extension Concepts that are not directly available in a particular system.

All Extension components (rows) should use the appropriate partition identifiers for Extensions. This ensures that Components of the SNOMED CT core content can be distinguished from Components that are part of an Extension.

Note that all Components from the "core namespace" do not have a namespace field and use the core partition IDs to distinguish these Components from Extension components.

Note that each organization can assign the "Item Identifier" portion of the SCTID in any way for Extension Namespaces. If there is a need to sub-divide the SCTIDs for sub-organizations, this may be done using the Item Identifier portion of the SCTID.

#### 9.5 Component Guidelines

Descriptions that are part of an Extension can refer to either a Concept that is part of that Extension, a Concept that is part of another Extension, or a SNOMED CT core Concept.

Relationships that are part of an Extension can relate two Concepts in the Extension or two Concepts in different Extensions. The relationship can also relate the extension Concept to a

core Concept -- that is, ConceptID1 is in the extension and ConceptID2 is in the core. If the extension Concept has been moved to the core, then the Moved From relationship will have a Conceptid1 that is in the core and a ConceptID2 that is in the extension.

The SNOMED CT core release tables will not contain Descriptions or Relationships for Extension Concepts since all SNOMED licensees may not have access to all Extensions. If a core Component is moved to an Extension, it will use the conventions in the next subsection.

## 9.6 Transfer of Responsibility between Organizations

When the need arises to transfer Components (Concepts, Descriptions, Relationships, Subsets) from the core content to an Extension, from an Extension to the core, or from one Extension to another, conversation and coordination between the sending and receiving organizations is needed. In some cases, entire tables may be transferred – not just individual components. Examples of transfers include:

- ❖ From the SNOMED CT core to an organization responsible for an Extension.
  - ✧ This occurs if a decision is made that some Concepts in the SNOMED CT core are specific to a Realm or domain or interest for which another organization has been allocated responsibility.
    - For example, this applies to UK specific drugs and UK specific administrative Concepts which are maintained by the UK NHS.
- ❖ From an organization responsible for an Extension to the SNOMED CT core.
  - ✧ This occurs if an organization recognizes that some of its Extension content belongs in the SNOMED CT core as it has general applicability.
  - ✧ It also occurs if an organization hands over responsibility for its entire Extension to the IHTSDO.
- ❖ From one organization responsible for an Extension to another organization.
  - ✧ This occurs if one organization recognizes that some of its Extension content belongs in a domain managed by another organization.
  - ✧ It also occurs if an organization hands over responsibility for its entire Extension to another organization.

There are two types of transfer of responsibility:

- ❖ Transfer of an entire Extension (i.e. all Components ever issued with an SCTID in a given Namespace, from one organization to another organization).
  - ✧ This is a straight forward process. All that happens is that another organization assumes responsibility for the original Namespace-identifier. There is no need for detailed tracking of individual Components.
- ❖ Transfer of one or more Components:
  - ✧ In this case, the Namespace is not transferred and thus, to fulfill the roles of the Namespace-identifier, the Component must be assigned new SCTIDs in the Namespace of the newly responsible organization.
    - The previous instances of these Components are withdrawn from current use with the Status value Moved Elsewhere.
    - Appropriate Relationships point to replacement Components in the new Namespace.

The transfer of responsibility depends on the release schedules of the organizations involved. Often the original source organization will be aware of an intended move before the target organization has accepted responsibility and released the Component. To facilitate this an interim Status value Pending Move is applied to Components that are being moved to another Namespace but are intended for active use until their replacements are found in the target Namespace.

To provide continuity for a Concept if responsibility is transferred, the Concept Status and history are coordinated as follows:

	<b>Sending Organization</b>	<b>Receiving Organization</b> (Assume assigned namespace = 999)
Start State	Concept A  Concept Status = Current	
Agreement to transfer responsibility	Concept A  Concept Status = Move Pending	
Responsibility Transferred	Concept A  Concept Status = Moved Elsewhere  History Files = Concept A "Status Change" to "Moved Elsewhere"  History Files = Concept A "Moved to" Namespace 999 in this release  Note: Namespace 999 is recorded as a "Special Concept" in the SNOMED CT Concepts File. Therefore, the Sending Organization can track the organization to which the concept has moved, even if the new ConceptID is not yet assigned.	Concept B (Concept B is a new ConceptID using namespace = 999)  Concept Status = Current  History Files = Concept B "Added"  History Files = Concept B "Moved from" Concept A  Note: The Receiving Organization can record the ConceptID previously used for the concept.  Note: If the Receiving Organization is the IHTSDO, the namespace would be the core namespace rather than the example used of namespace = 999
End State	Concept A is Inactive  Concept Status = Moved Elsewhere  History relates Concept A to the Receiving Organization by use of the Namespace Identifier	Concept B is Active  Concept Status = Current  History relates Concept B back to Concept A

## 9.7 Released Extensions

The following extensions are included in the International Release of SNOMED CT from the IHTSDO.

Extension	Distribution	Extension Contents
U.S. Drug Extension	International Release	<p>Actual manufactured drugs approved for distribution in the United States at the “actual medicinal product” (AMP) level. The AMP is a syntactic normal form consisting of:</p> <ul style="list-style-type: none"><li>• Name (Proprietary)</li><li>• Strength</li><li>• Dosage Form</li></ul> <p>All AMPs relate to “virtual medicinal product” (VMP) concepts in the SNOMED CT Core. All AMPs include the “has active ingredient” relationship where the active ingredient is a substance in the SNOMED CT Core.</p>

## Appendices

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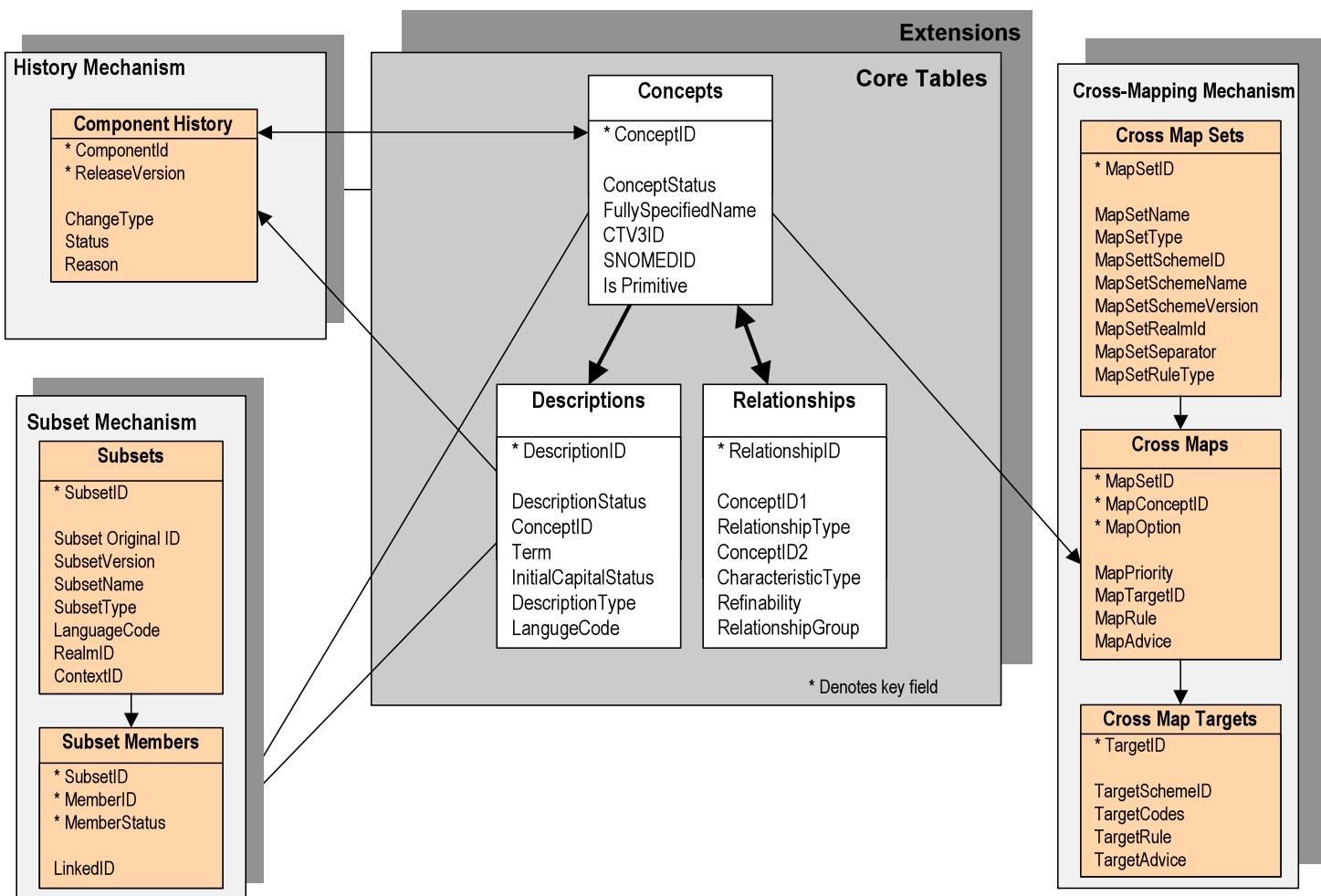
- Appendix A      SNOMED CT Data Structures
- Appendix B      Table Structure Details
- Appendix C      The SNOMED Clinical Terms Identifier (SCTID)
- Appendix D      Distribution Files
- Appendix E      Unicode UTF-8 encoding
- Appendix F      Check-digit computation
- Appendix G      Top-Level and Special Concepts
- Appendix H      Cross Mappings Guide
- Appendix I      Supplementary Text Descriptions
- Appendix J      SNOMED CT Attributes and Values Allowed by Domain

## Appendix A. SNOMED CT Data Structures

### A.1 Data Structures

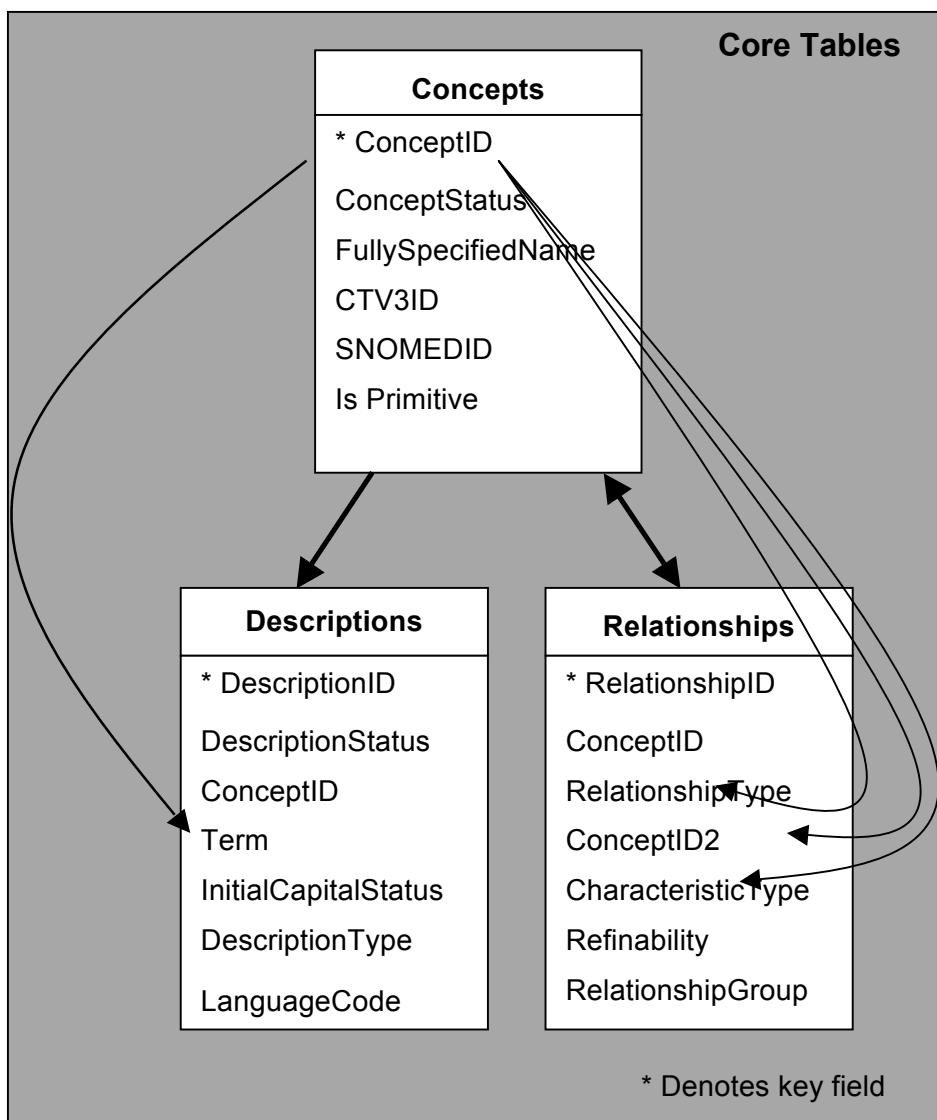
Refer to the Technical Implementation Guide for data diagrams with UML notation.

# SNOMED CT Data Structure Detail



### A.1.1 Core Tables – Details

## Core Tables



A Concept is described by the term in 2-n descriptions.

Each description refers to 1 concept.

A concept is the source of 1-n relationships (except the root concept).

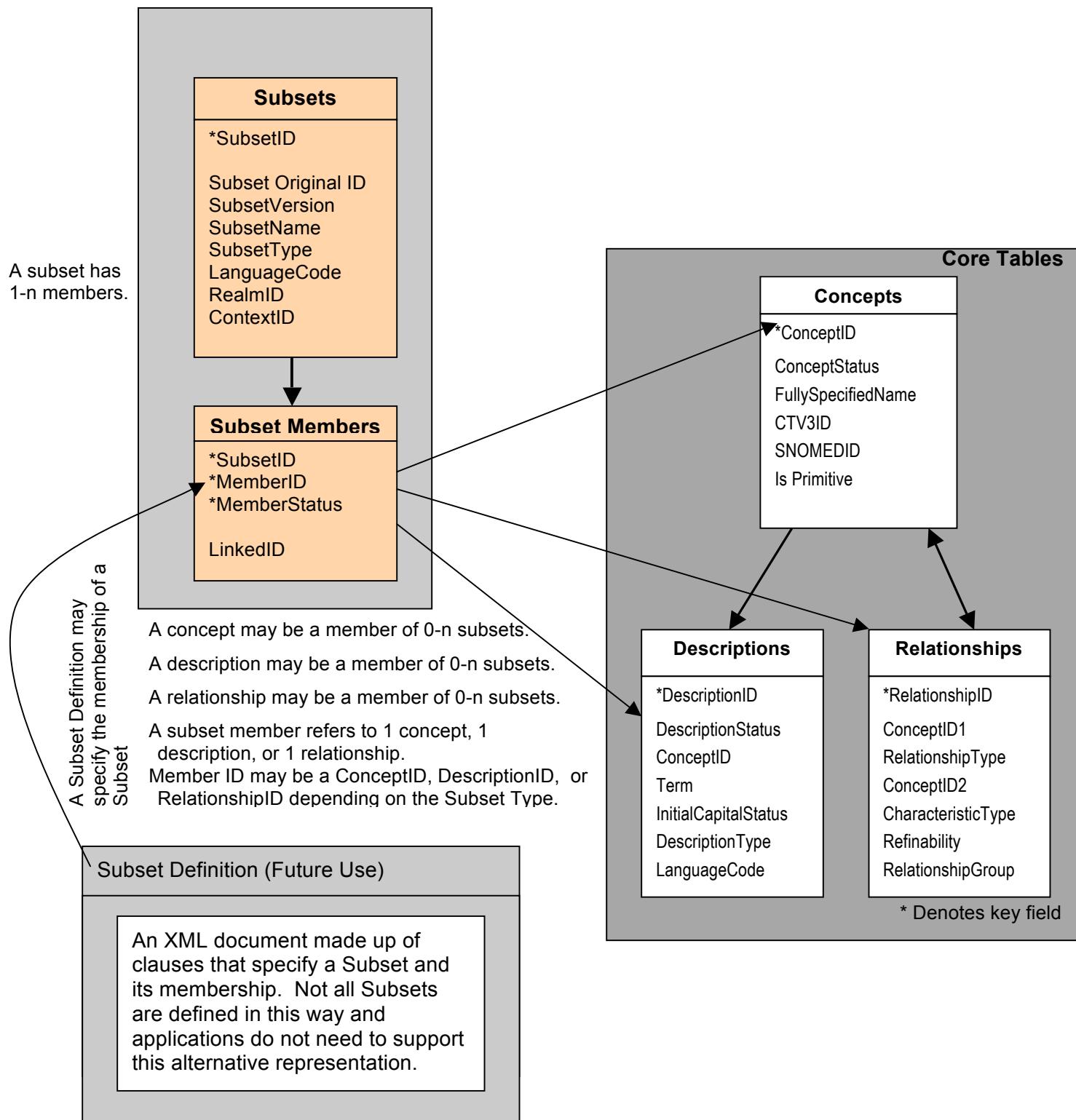
A concept is the target of 0-n relationships.

A concept represents the type of relationship.

A relationship refers to 3 concepts: a source, a target, and a relationship type.

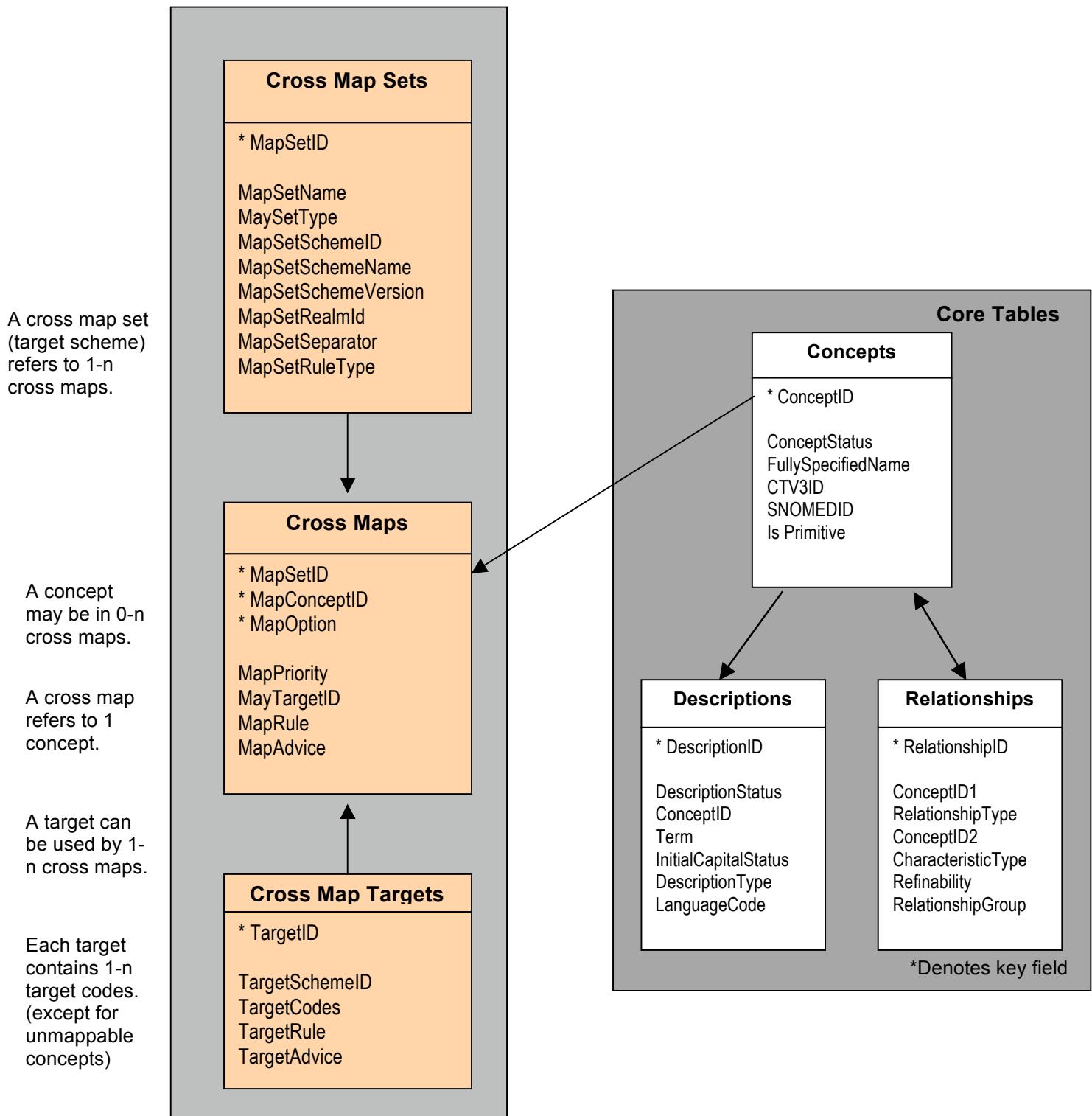
### A.1.2 Subset Mechanism Structure

## Subset Mechanism



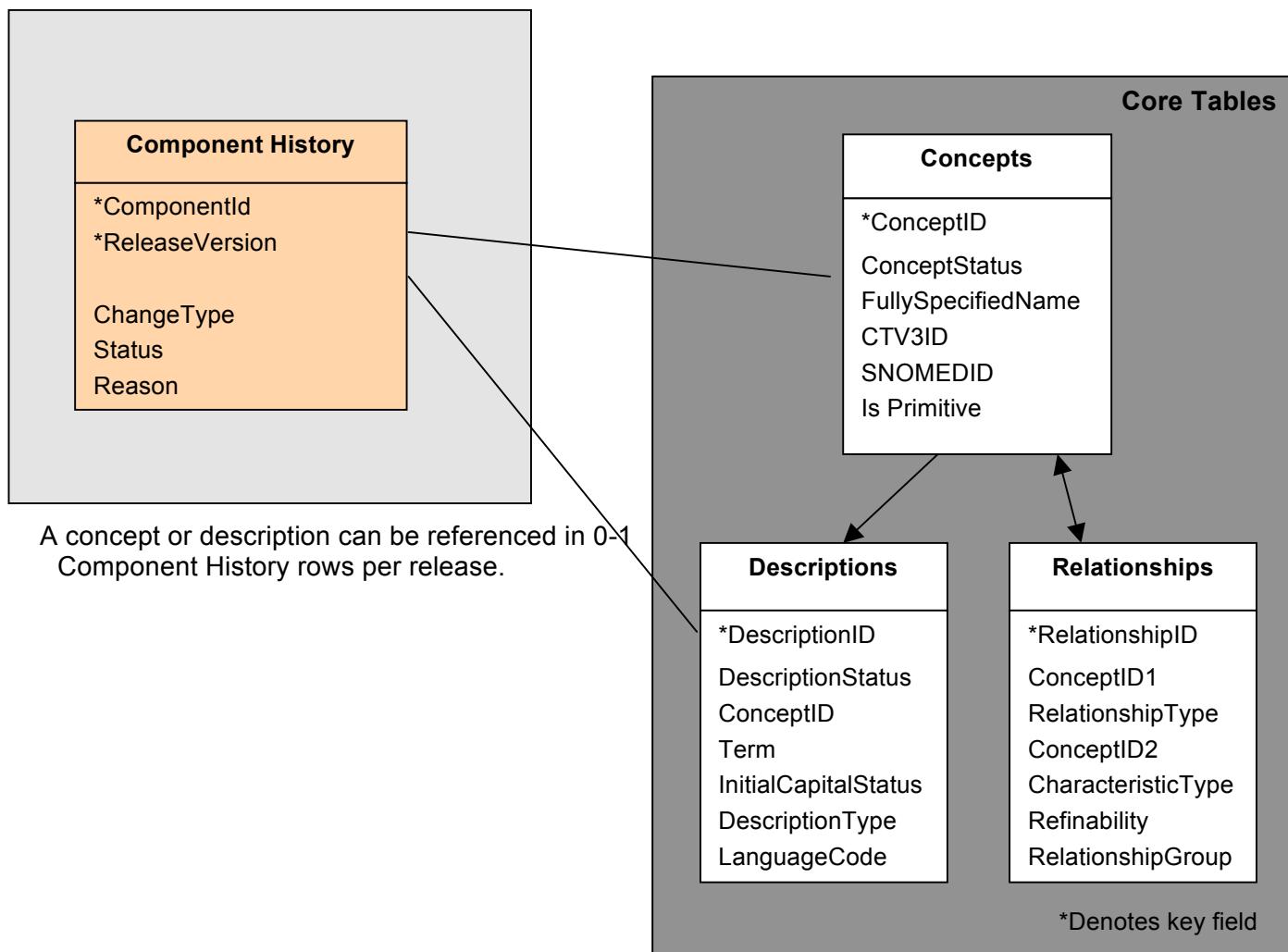
### A.1.3 Cross Mapping Mechanism Structure

## Cross Mapping Mechanism



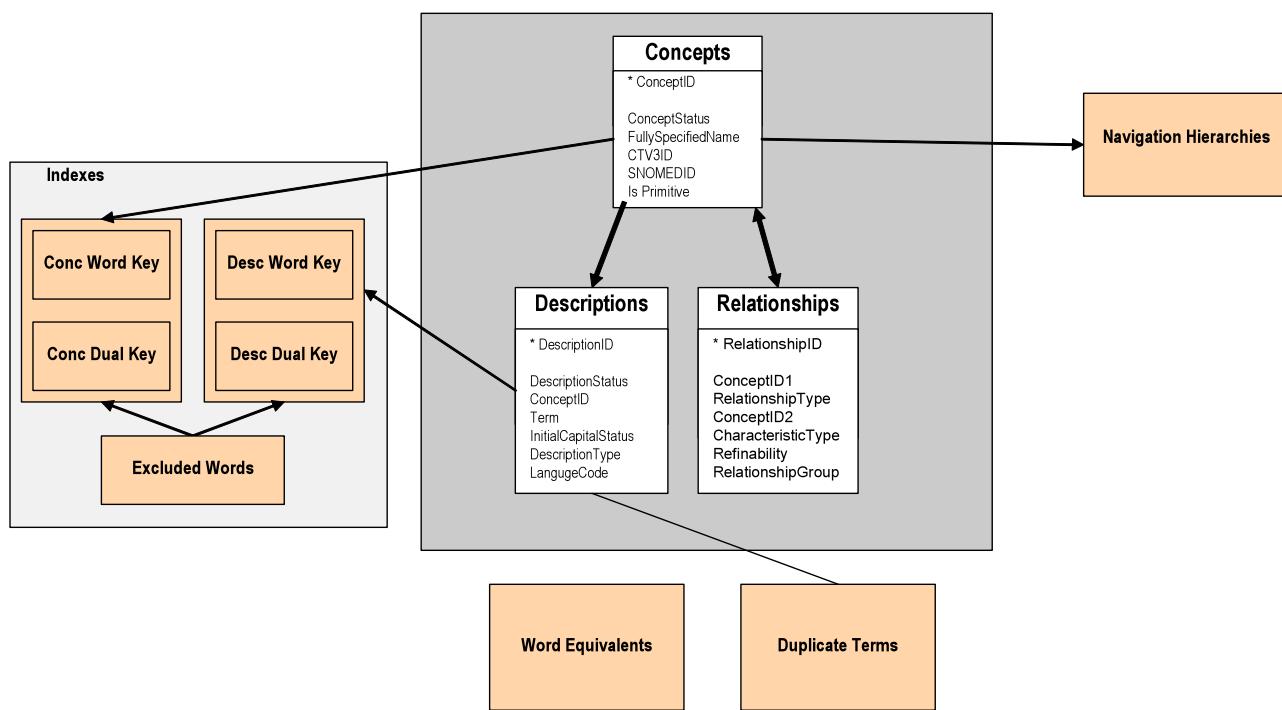
#### A.1.4 History Mechanism Structure

## History Mechanism



### A.1.5 Developer Toolkit Structure

## Developer Toolkit Overview



## Appendix B. Table Structure Details

### B.1 Concepts Table

<b>Concepts Table</b>			
<b>Concepts Table</b> <b>Key Fields</b> <b>Field Type</b> <b>Permitted characters</b> <b>Length</b>			
<b>ConceptId</b>	<b>SCTID</b>	<i>Digits 0 to 9 only</i>	<i>6 to 18</i>
The unique SNOMED CT Identifier for this clinical concept. See Appendix C for an explanation of the SCTID data type format.			
<b>Concepts Table</b>			
<b>Data Fields</b> <b>Field Type</b> <b>Permitted characters</b> <b>Length</b>			
<b>ConceptStatus</b>	<i>Enumerated</i>	<i>See listed values</i>	<i>1 or 2</i>
The status of a Concept indicates whether it is in active use and, if not, indicates the reason for withdrawal from current use.			
<i>Values:</i> <ul style="list-style-type: none"> <li>0 Current The Concept is in current use and is considered active.</li> <li>1 Retired The Concept has been withdrawn without a specified reason. These concepts are considered inactive.</li> <li>2 Duplicate The Concept has been withdrawn from current use because it duplicates another Concept. These concepts are considered inactive.</li> <li>3 Outdated The Concept has been withdrawn from current use because it is no longer recognized as a valid clinical concept. These concepts are considered inactive.</li> <li>4 Ambiguous The Concept has been withdrawn from current use because it is inherently ambiguous. These concepts are considered inactive.</li> <li>5 Erroneous The Concept has been withdrawn from current use as it contains an error. A corrected but otherwise similar Concept may have been added to replace it. These concepts are considered inactive.</li> <li>6 Limited The Concept is of limited clinical value as it is based on a classification concept or an administrative definition. Concepts with this status are still valid for current use and are considered active.</li> <li>10 Moved elsewhere The Concept has been moved to an extension, to a different extension, or to the core. Use the “Moved To” Relationship to locate the namespace to which the concept has been moved. These concepts are considered inactive.</li> </ul>			
Continues ...			

## Concepts Table

Data Fields (continued)	Field Type	Permitted characters	Length
11 Pending move	The Concept will be moved to an extension, to a different extension, or to the core. Use the "Moved To" Relationship to locate the namespace to which the concept will be moved when the recipient organization confirms the move. These concepts are considered active.		
<b>FullySpecifiedName</b>	<i>String</i>	<i>Any (except LF, CR and TAB)</i>	<i>1 to 255</i>

A phrase that describes a Concept in a way that is intended to be unambiguous.

Each Fully-Specified-Name contains a suffix that indicates where it is integrated into the primary hierarchy. This can help distinguish, at a glance, for example, a finding from a disorder.

The suffixes are:

- body structure
- situation
- cell
- disorder
- environment
- ethnic group
- event
- finding
- morphologic abnormality
- observable entity
- occupation
- organism
- person
- physical object
- procedure
- qualifier value
- substance
- life style
- assessment scale
- attribute
- religion/philosophy
- specimen
- physical force
- geographic location

Continues ...

## Concepts Table

Data Fields (continued)	Field Type	Permitted characters	Length
tumor staging			
product			
social concept			
staging scale			
cell structure			
administrative concept			
regime/therapy			
inactive concept			
namespace concept			
special concept			
environment / location			
racial group			
navigational concept			
linkage concept			
record artifact			
link assertion			

*Note:*

The Fully Specified Name is not the same as the Preferred Term in the Descriptions Table. The Fully Specified Name explains the meaning of the concept more fully than the Preferred Term to remove or reduce ambiguity.

The limitation in the length of this field is 255 bytes. All ASCII characters in the range 32 to 127 can be encoded in a single byte using in UTF-8. However, accented and special characters require two or three byte encoding. The maximum length of a Term that contains these characters is less than 255 characters.

The Fully Specified Name is also represented as a row in the Descriptions Table. This allows translated versions of the Fully Specified Name to co-exist and to be referenced by appropriate Language Subsets. The Fully Specified Name in the Concepts Table is the American English Fully Specified Name.

Typically the Fully Specified Name will not be a Term that would be used in a clinical record. Instead, it may be stylized to ensure that it has a single unambiguous meaning.

*Example:*

The Preferred Term of a concept could be 'Aspiration of stomach contents', however, the Fully Specified Name might be 'Aspiration of stomach contents (procedure)' to distinguish it from a post-operative complication.

Continues ...

## Concepts Table

Data Fields (continued)	Field Type	Permitted characters	Length
<b>CTV3ID</b>	<i>String</i>	<b>0 to 9, A to Z, a to z or . (stop)</b>	<b>5</b>
The Read Code for the concept taken from the United Kingdom's Clinical Terms Version 3 terminology.			
As CTV3 is a superset of FourByte and Version 2 Read codes, all the codes from those versions are present in CTV3 and SNOMED CT. The identifiers can be picked out easily as all FourByte codes have a leading '.' and Version 2 codes have a trailing '..'.			
As new concepts are added to SNOMED Clinical Terms, new codes are used to populate this field. This will allow records to be maintained or searched using the existing codes and identifiers during an extended migration period. The IHTSDO will review this commitment from time to time and it may be discontinued at some point in the future. In Extensions, these additional identifier fields may not be populated.			
<b>SNOMEDID</b>	<i>String</i>	<b>0 to 9, A to Z or - (dash)</b>	<b>6 to 8</b>
The SNOMED RT identifier for this concept.			
As new concepts are added to SNOMED Clinical Terms, new SNOMED identifiers are generated to populate this field. This will allow records to be maintained or searched using the existing codes and identifiers during an extended migration period. The IHTSDO will review this commitment from time to time and it may be discontinued at some point in the future. In Extensions, these additional identifier fields may not be populated.			
<b>IsPrimitive</b>	<i>Boolean</i>	<b>0 or 1</b>	<b>1</b>
Indicates if a Concept is Primitive or Fully defined by its defining characteristics.			
A Concept may be Primitive because:			
<ul style="list-style-type: none"> <li>❖ Its only stated Defining characteristics are "is a" subtype Relationships</li> <li>❖ An aspect of its meaning is not fully expressed by existing Relationships.</li> </ul>			
If a Concept is Primitive its place in the subtype hierarchy may be known but it cannot be checked for equivalence with another Concept expression or Post-coordinated expression.			
Values:			
0 Fully defined			
1 Primitive			

## B.2 Descriptions Table

### Descriptions Table

Each row in the Descriptions Table associates a term with a clinical concept, which it can be used to represent. Each Description has its own unique identifier and also contains the text of a Term and the identifier of the Concept that it represents.

*Notes:*

Some terms may be applied to more than one concept. In this case each is represented by a separate row in the Descriptions Table with the same term text but with different identifiers.

Each Description contains a single term, which is valid in one or more languages or dialects.

To identify the descriptions for any language edition, the appropriate Language Subset must be used. Do no use the Descriptions Table alone. The descriptions for each language edition (including English) are designated in the Subset.

### Descriptions Table

Key Fields	Field Type	Permitted characters	Length
DescriptionId	SCTID	<i>Digits 0 to 9 only</i>	6 to 18

The unique SNOMED CT Identifier for this description. See Appendix C for an explanation of the SCTID data type format.

### Descriptions Table

Data Fields	Field Type	Permitted characters	Length
DescriptionStatus	Enumerated	<i>See listed values</i>	1 to 2

The status of a Description indicates whether it is in current use and, if not, indicates the reason for withdrawal from current use.

*Values:*

- |   |             |                                                                                                                                                                                   |
|---|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 | Current     | The Description and its associated Concept are in current use.                                                                                                                    |
| 1 | Non-Current | The Description has been withdrawn without a specified reason.                                                                                                                    |
| 2 | Duplicate   | The Description has been withdrawn from current use because it duplicates another description containing the same term (or a very similar term) associated with the same Concept. |
| 3 | Outdated    | The Description has been withdrawn from current use because this Term is no longer in general clinical use as a label for the associated Concept.                                 |
| 5 | Erroneous   | The Description has been withdrawn as the Term contains errors.                                                                                                                   |
| 6 | Limited     | The Description is a valid Description of a Concept which has “limited” status (i.e. the Concept has ConceptStatus = 6).                                                          |

Continues ...

**Descriptions Table**

<b>Data Fields (continued)</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
7 Inappropriate	The Description has been withdrawn as the Term should not refer to this concept.		
8 Concept non-current	The Description is a valid Description of a Concept which has been made non-current (i.e. the Concept has ConceptStatus 1, 2, 3, 4, 5, or 10).		
10 Moved elsewhere	The Description has been moved to an extension, to a different extension, or to the core. A reference will indicate the namespace to which the description has been moved.		
11 Pending move	The Description will be moved to an extension, to a different extension, or to the core. A reference will indicate the namespace to which the description has been moved when the recipient organization confirms the move (Future Use).		

**Notes:**

Status value 4 is only applicable to ConceptStatus.

A Description is only marked as current (DescriptionStatus = 0) if the associated Concept is also current (ConceptStatus = 0).

- ❖ An “inactive” Concept (ConceptStatus = 1, 2, 3, 4, 5, or 10), retains its previous current Descriptions but these are marked “Concept non-current” (DescriptionStatus = 8).
- ❖ A “limited” Concept (ConceptStatus = 6) has valid usable Descriptions but these are also marked “limited” (DescriptionStatus = 6).

<b>ConceptId</b>	<b>SCTID</b>	<i>Digits 0 to 9 only</i>	<b>6 to 18</b>
------------------	--------------	---------------------------	----------------

The unique SNOMED CT Identifier of the clinical concept to which this Description applies.

**Note:**

This field provides the association between the Descriptions and Concepts tables.

Continues ...

**Descriptions Table**

<b>Data Fields (continued)</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>Term</b>	<b>String</b>	<i>Any (except LF, CR and TAB)</i>	<b>1 to 255</b>

The text of a Term used to describe the associated Concept.

**Notes:**

The term may be the FullySpecifiedName, the Preferred Term or a synonymous term for the associated concept. The DescriptionType field indicates the type of term.

The Preferred Term is not the same as the Fully Specified Name. The Preferred Term expresses the concept accurately using language that a clinician would expect to find in a clinical record. In order to remove or reduce any possible ambiguity the Fully Specified Name may use phraseology that is stylized and unfamiliar.

The Term may be one or more languages or dialects. The Descriptions applicable to each language and/or dialect are indicated by inclusion in Language Subsets distributed with the core tables.

The limitation in the length of this field is 255 bytes. All ASCII characters in the range 32 to 127 can be encoded in a single byte using UTF-8. However, accented and special characters require two or three byte encoding. Therefore, the maximum length for a Term that contains these characters is less than 255 characters.

The FullySpecifiedName is also present in the Concepts Table. It is included in the Descriptions Table to allow language and dialect variations to be represented.

<b>InitialCapitalStatus</b>	<i>Boolean</i>	<i>0 or 1</i>	1
-----------------------------	----------------	---------------	---

Indicates whether the capitalization status of the first character of the Term is significant.

#### Values

- |         |                                                                                                                                                                                                                                              |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 False | The first character of the Term may be capitalized or uncapitalized according to its position in a sentence without changing its meaning. This is true for most Terms.                                                                       |
| 1 True  | The capitalization of the first character of the Term must not be changed. This setting is used to indicate that the Term must retain an initial capital (e.g. "Down syndrome") or must not have its initial letter capitalized (e.g. "ml"). |

*Note: Capitalization of characters other than the first character in the Term is always regarded as significant.*

Continues ...

#### Descriptions Table

<b>Data Fields (continued)</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>DescriptionType</b>	<i>Enumerated</i>	<i>See listed values</i>	1

Indicates whether the Term is the Preferred Term or Synonym for the associated Concept.

#### Values:

- |                      |                                                                                                                      |
|----------------------|----------------------------------------------------------------------------------------------------------------------|
| 0 Unspecified        | This may be assigned as either a Preferred Term or Synonym by a Description Subset for a language, dialect or realm. |
| 1 Preferred          | This is the Preferred Term for the associated Concept.                                                               |
| 2 Synonym            | This is a Synonym for the associated Concept.                                                                        |
| 3 FullySpecifiedName | This is the FullySpecifiedName for the associated Concept.                                                           |

#### Notes:

The Preferred Term and Synonyms may vary according to language and dialect. These variations are specified using Subsets. In any one language or dialect there is one and only one Preferred Term for each Concept. The Preferred Term in one language or dialect may be a Synonym in other languages or dialects. Any Description with a DescriptionType "Unspecified", "Preferred" or "Synonym" in the distributed table may be assigned as a Preferred Term or Synonym in any language or dialect.

The FullySpecifiedName will vary according to language and dialect. These variations are specified using Subsets. In any language or dialect there is one FullySpecifiedName for each Concept. Only Descriptions that have the DescriptionType "FullySpecifiedName" may

be assigned as the FullySpecifiedName in any language or dialect.

LanguageCode	String	0 to 9, a to z, A to Z and dash "-"	1 to 8
--------------	--------	-------------------------------------	--------

This field specifies the language/dialect of the term.

A string identifying a language and, if appropriate, a dialect in which this Description is valid. Consists of a code and optionally a sub-code. If a sub-code is present it is separated from the code by a dash ("").

- ❖ The code is the two-character ISO639-1 language code. ISO639 is the International Standard for "Codes for the representation of names of languages".
- ❖ The sub code is a string of upper-case letters that represent the dialect. This deliberately mirrors the W3C approach and will either be:
  - ❖ If the dialect is general to an entire country, the two-letter ISO 3166 country code is used. ISO3166 is the International Standard for "Codes for the representation of names of countries".
  - ❖ If dialects are used that are less common or not country or language linked, the IANA approach is used. This code consists of a string of more than two letters. IANA is the Internet Assigned Numbers Authority.

This structure follows Internet conventions. Examples: "en" for "English", "es" for Spanish, "en-US" for United States English, "en-GB" for British English.

To identify the members of an edition of SNOMED CT, use the Language subset for that edition. Do not simply search for all entries in the Descriptions Table using the Language Code field.

Each edition includes the appropriate Language Subset, which designates the descriptions that are intended for that edition.

### B.3 Relationships Table

#### Relationships Table

Each row in the Relationships Table represents a Relationship between two Concepts.

*Notes:*

Most Relationship Types are directional and are therefore regarded as having source concept and a target concept. Reciprocal relationships are not explicitly represented by rows in the Relationships Table.

For example, if B is a subtype of A, it follows that A is a supertype of B. The first of these relationships is represented by a row in the Relationships Table. The reciprocal relationship is implied and is not restated by another row in the table.

The Relationship Types supported include the "ISA" (subtype) relationship.

In the case of hierarchical relationships (e.g. "ISA" relationships) only the closest relationships are represented explicitly. Other relationships are subsumed and are not represented by rows in the Relationships Table.

For example, if C is a subtype of B and B is a subtype of A, it follows that C is a subtype of A. The relationship between C and A is not represented by a row in the Relationships Table but is subsumed by the chain of relationships between C and B and B and A.

Relationships other than "ISA" (subtype) relationship are called attribute relationships. These relationships include the concept (object), relationship type (attribute), and attribute value (another concept). This is sometimes called the OAV triplet, which stands for Object-Attribute-Value.

Some sets of relationships may have an expected or logical display order (e.g. cranial nerves or cervical vertebrae). The order is described using the subset mechanism and is not part of the Relationships Table.

In 2003-2004, some relationships were packaged into a separate file called the Historical Relationships Table. These relationships were merged into the Relationships Table starting with the January 2005 release.

To recreate these two tables, use these SQL commands:

Create table historical\_relationships as

Select \* from relationships

Where characteristictype = '2';

Delete from relationships

Where characteristictype = '2';

*Note:*

The type of relationship is itself described using a concept.

Continues...

<b>Relationships Table</b>			
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>RelationshipId</b>	<b>SCTID</b>	<i>Digits 0 to 9 only</i>	<i>6 to 18</i>
The unique SNOMED CT Identifier for this relationship. See Appendix C for an explanation of the SCTID data type format.			
<p><i>Note:</i> This field allows a Relationship to be referenced by a Subset or Extension.</p>			
<b>Relationships Table</b>			
<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>ConceptId1</b>	<b>SCTID</b>	<i>Digits 0 to 9 only</i>	<i>6 to 18</i>
The unique SNOMED CT Identifier of the Concept which is the source of this Relationship.			
<p><i>Note:</i> This field provides the first association between the Relationships and Concepts tables and is sometimes referred to as the “object.”</p>			
<b>RelationshipType</b>	<b>SCTID</b>	<i>Digits 0 to 9 only</i>	<i>6 to 18</i>
The unique SNOMED CT Identifier of the Concept which represents the type of relationship between the related Concepts.			
<p><i>Note:</i> A special category of Concepts is used to represent RelationshipTypes.</p>			
This field provides the second association between the Relationships and Concepts tables and is sometimes called the “attribute” or “role.”			
<b>ConceptId2</b>	<b>SCTID</b>	<i>Digits 0 to 9 only</i>	<i>6 to 18</i>
The unique SNOMED CT Identifier of the Concept which is the target of this Relationship.			
<p><i>Note:</i> This field provides the third association between the Relationships and Concepts tables and is sometimes called the “value.”</p>			
Continues...			

## Relationships Table

Data Fields (continued)	Field Type	Permitted characters	Length
<b>CharacteristicType</b>	<i>Enumerated</i>	<i>See listed values</i>	1
An indication of whether a Relationship specifies a defining characteristic of the <i>source</i> Concept or a possible qualification of that Concept.			
<b>Note:</b> The Relationships Table is concerned with definitions, qualifiers and additional facts about a Concept. Although it can also be used to display a hierarchy of subtypes it does not have a specified or natural display order. More effective browser Navigation is supported by use of a Navigation Subset.			
<b>Values:</b>			
0 Defining	This relationship represents a defining characteristic of the source concept. Hierarchical relationships (e.g. "ISA") are also regarded as defining relationships <b>Example:</b> "Site" = "Liver" is a defining characteristic of 'Liver biopsy'.		
1 Qualifier	This relationship represents an optional qualifying characteristic. <b>Example:</b> "Revision status" = "Conversion from other type of arthroplasty" is a possible qualification of 'Hip replacement'		
2 Historical	This is used to relate an inactive concept to another concept. <b>Example:</b> The "Same As" relationship connects an inactive concept with the concept it duplicates.		
3 Additional	This relationship represents a context specific characteristic. This is used to convey characteristics of a concept that apply at a particular time within a particular organization but which are not intrinsic to the concept. <b>Example:</b> 'Prescription Only Medicine' is a context specific characteristic of the Concept 'Amoxycillin 250mg capsule'. It is true currently in the UK but is not true in some other countries.		
<b>Refinability</b>	<i>Enumerated</i>	<i>See listed values</i>	1
An indication of whether it is possible to refine the target concept when this Relationship is used as a template for clinical data entry.			
<b>Values:</b>			
0 Not refinable	Not refinable.		
1 Optional	May be refined by selecting subtypes.		
2 Mandatory	Must be refined by selecting a subtype.		
Continues ...			

## Relationships Table

Data Fields (continued)	Field Type	Permitted characters	Length																				
<b>RelationshipGroup</b>	<i>Integer</i>	<b>0 to 9</b>	<b>1 to 2</b>																				
<p>An integer value that expresses an association between two or more Relationships.</p> <p>The default Relationship group value is zero and this applies to all Relationships that have not been stated to be associated with any other Relationships. All Relationships that share the same ConceptId1 and the same non-zero Relationship group value are associated with one another. Any Relationships that share the same ConceptId1 but have different Relationship group values are not associated with one another. See example below.</p>																							
<table border="1"> <thead> <tr> <th><b>ConceptId1</b></th><th><b>RelationshipType</b></th><th><b>ConceptId2</b></th><th><b>RoleGroup</b></th></tr> </thead> <tbody> <tr> <td>Ureteroscopic removal of ureteric calculus</td><td>Direct morphology</td><td>Calculus</td><td>1</td></tr> <tr> <td>Ureteroscopic removal of ureteric calculus</td><td>Method</td><td>Removal</td><td>1</td></tr> <tr> <td>Ureteroscopic removal of ureteric calculus</td><td>Procedure site - Indirect</td><td>Ureteric structure</td><td>1</td></tr> <tr> <td>Ureteroscopic removal of ureteric calculus</td><td>Method</td><td>Surgical action</td><td>2</td></tr> </tbody> </table>				<b>ConceptId1</b>	<b>RelationshipType</b>	<b>ConceptId2</b>	<b>RoleGroup</b>	Ureteroscopic removal of ureteric calculus	Direct morphology	Calculus	1	Ureteroscopic removal of ureteric calculus	Method	Removal	1	Ureteroscopic removal of ureteric calculus	Procedure site - Indirect	Ureteric structure	1	Ureteroscopic removal of ureteric calculus	Method	Surgical action	2
<b>ConceptId1</b>	<b>RelationshipType</b>	<b>ConceptId2</b>	<b>RoleGroup</b>																				
Ureteroscopic removal of ureteric calculus	Direct morphology	Calculus	1																				
Ureteroscopic removal of ureteric calculus	Method	Removal	1																				
Ureteroscopic removal of ureteric calculus	Procedure site - Indirect	Ureteric structure	1																				
Ureteroscopic removal of ureteric calculus	Method	Surgical action	2																				

## B.4 Subset Mechanism

### B.4.1 Subset Table

<b>Subsets Table</b>			
Each row in the Subsets Table represents a Subset. Each Subset has a unique identifier, a SubsetName, a SubsetType and a collection of additional characteristics.			
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
SubsetId	SCTID	0 to 9	6 to 18
The unique SNOMED CT Identifier for this Subset. See Appendix C.			
<b>Subsets Table</b>			
<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
SubsetOriginalId	SCTID	0 to 9	6 to 18
The unique SNOMED CT Identifier for the first version of the Subset on which this Subset is based.			
<p><i>Note:</i> For the first version of a Subset the SubsetOriginalId and SubsetId fields contain the same value. For each subsequent version the SubsetVersion is incremented and a new SubsetId is allocated but the SubsetOriginalId field retains the same value in all versions.</p>			
SubsetVersion	Integer	0 to 9	1 to 5
An integer increased for each revised release of this Subset.			
<p><i>Note:</i> A single distribution table will only contain one version of a Subset. However, legacy versions of a Subset may need to be retained to support other Subset Definitions or continued use of a protocol which has not been validated for use with the revised Subset.</p>			
SubsetName	String	Any (except LF, CR and TAB)	1 to 255
A descriptive name given to the Subset by its originator.			
Continues ...			
<b>Subsets Table</b>			
<b>Data Fields (continued)</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
SubsetType	Integer	0 to 9	1 to 2
Indicates the nature of the Subset and the type of SNOMED CT Component that may be a member of the Subset.			

<b>Values</b>			
1 Language	Descriptions appropriate to a specified Language or Dialect.		
2 Realm Concept	Concepts appropriate to a specified Realm.		
3 Realm Description	Descriptions appropriate to a specified Realm.		
4 Realm Relationship	Relationships appropriate to a specified Realm (for future use).		
5 Context Concept	Concepts appropriate to a specified Context Domain.		
6 Context Description	Descriptions appropriate to a specified Context Domain.		
7 Navigation	Navigation Links that represent an ordered Navigation hierarchy.		
8 Duplicate Terms	Descriptions that contain identical Terms.		
Other values are reserved for future use.			
<b>LanguageCode</b>	<i>String</i>	<i>0 to 9, a to z, A to Z and dash "-"</i>	<i>1 to 8</i>
This field specifies the language/dialect of the descriptions in a subset.			
A string identifying a Language and, if appropriate, a dialect to which the Descriptions <i>in this subset</i> are valid. Consists of a code and optionally a sub-code. If a sub-code is present it is separated from the code by a dash ("").			
<ul style="list-style-type: none"> <li>❖ The code is the two-character ISO639-1 language code. ISO639 is the International Standard for "Codes for the representation of names of languages".</li> <li>❖ The sub code is a string of upper-case letters that represent the dialect. This deliberately mirrors the W3C approach and will either be:           <ul style="list-style-type: none"> <li>✧ If the dialect is general to an entire country, the two-letter ISO 3166 country code is used. ISO3166 is the International Standard for "Codes for the representation of names of countries".</li> <li>✧ If dialects are used that are less common or not country or language linked, the IANA approach is used. This code consists of a string of more than two letters. IANA is the Internet Assigned Numbers Authority.</li> </ul> </li> </ul>			
This structure follows Internet conventions. Examples: "en" for "English", "es" for Spanish, "en-US" for United States English, "en-GB" for British English.			
<b>Usage</b>			
Required for <i>Language Subsets</i> , <i>Realm Description Subsets</i> and <i>Context Description Subsets</i> . In all other <i>SubsetTypes</i> the <i>LanguageCode</i> has the value = "0" (zero) and should be ignored.			
To identify the members of an edition of SNOMED CT, use the Language subset for that edition. Do not simply search for all entries in the Descriptions Table using the Language Code field.			
Each edition includes the appropriate Language Subset, which designates the descriptions that are intended for that edition.			
Continues ...			
<b>Subsets Table</b>			
<b>Data Fields (continued)</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>RealmId</b>	<i>String</i>	<i>0 to 9 and full-stop ":"</i>	<i>4 to 24</i>
A string identifying a Realm.			

For example, UK GP subset (a realm subset for general practice physicians in the United Kingdom).

*Usage*

Required for Realm Concept Subsets, Realm Description Subsets, Context Concept Subsets and Context Description Subsets. May also be used in Duplicate Terms Subsets.

In all other Subset Types the RealmId has the value "0" (zero) and should be ignored.

<b>ContextId</b>	<i>String</i>	<i>0 to, 9 a to z, A to Z, "." and "-"</i>	<i>1 to 18</i>
------------------	---------------	--------------------------------------------	----------------

A string that identifies a Context Domain within the Realm indicated by the RealmId. Context Domain may be specified for different purposes. These include:

Categories of Concepts with particular roles in the terminology or in a record:

- ❖ Concepts that have an organizing role in the terminology but which are not appropriate to use in an individual patient record (e.g. the Root Concept, Top-Level Concepts and other Concepts that provide a rational hierarchical structure without the precision appropriate to a patient record).
- ❖ Concepts are applicable as organizing headers in a record but which are not appropriate for use in making clinical statements.

Broad contexts for use within parts of a record:

- ❖ Concepts that are appropriately detailed for use as a discharge diagnosis according to a local convention or agreed protocol.

Narrow contexts used to constrain data entry or population of a message field:

- ❖ Concepts or Descriptions to be presented as valid choices for a particular field in a screen or protocol.
- ❖ Concepts that are applicable to a message field. Examples include:
  - An HL7 "value domain";
  - The NHS Pathology Message bounded code list.

*Usage:*

Required for Context Concept Subsets and Context Description Subsets. May also be used in Duplicate Terms Subsets.

In all other Subset Types the ContextId has the value "0" (zero) and should be ignored.

## B.4.2 Subset Members Table

### B.4.2.1 Subset Members Table – Common Details

#### Subset Members Table

Each row in the Subset Members Table represents one member of a Subset. The Subset to which a member belongs is identified by the Subset ID.

The member is identified by a MemberId, which refers to a Concept, Description, or Relationship.

The MemberStatus and LinkedId fields are interpreted depending on the SubsetType. Each type of subset is described separately. The types of subsets are:

Language Subset

Realm Concept Subset

Realm Description Subset

Realm Relationship Subset (for future use)

Context Concept Subset

Context Description Subset

Navigation Subset

Duplicate Terms Subset

The MemberId may be a ConceptId, DescriptionId, or RelationshipId.

#### Subset Members Table

Key Fields	Field Type	Permitted characters	Length
SubsetId	SCTID	0 to 9	6 to 18
The unique SNOMED CT Identifier for the Subset to which this applies.			
MemberId	SCTID	0 to 9	6 to 18
The SNOMED CT Identifier of a Subset Member. The permitted Subset Members depends on the SubsetType and can be a ConceptId, DescriptionId, or RelationshipId.			
MemberStatus	Integer	0 to 9	1 to 5
The status of the identified member in this Subset. The value of MemberStatus must be greater than zero. The interpretation of MemberStatus values depends on the SubsetType. For most Subsets the combination of Subset ID and MemberId is unique. The exception to this rule is Navigation Subsets and for this reason the MemberStatus is included in the key.			
Data Fields	Field Type	Permitted characters	Length
LinkId	SCTID	0 to 9, Null	6 to 18
The Interpretation of LinkId depends on the SubsetType and may be null in some cases.			

### B.4.2.2 Language Subset Members Tables

<b>Language Subset Members Table</b>						
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>			
<b>SubsetId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>			
The unique SNOMED CT Identifier for the Subset to which this applies.						
<b>MemberId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>			
The Identifier of a SNOMED CT Description.						
<b>MemberStatus</b>	<i>Integer</i>	<i>0 to 9</i>	<i>1 to 5</i>			
The status of the identified member in this Subset.						
The value of MemberStatus must be greater than zero.						
Language Subset	The MemberStatus specifies the role of the referenced Description in this Language. There are three roles.  1 = Preferred Term 2 = Synonym 3 = Fully Specified Name					
<i>Notes:</i>						
The following rules must apply to each Subset:						
<ul style="list-style-type: none"> <li>a) A Description cannot be assigned the role Fully Specified Name unless its DescriptionType is also "Fully Specified Name".</li> <li>b) Only one Description of each Concept may be assigned as the Fully Specified Name.</li> <li>c) If no Description of a Concept is assigned the role Fully Specified Name, the Fully Specified Name in the Concepts Table assumes this role.</li> <li>d) A Description cannot be assigned the role Preferred Term or Synonym if its DescriptionType is "Fully Specified Name".</li> <li>e) One and only one Description of each Concept must be assigned the role "Preferred Term".</li> <li>f) Any number of Descriptions of a Concept may be assigned the role "Synonym".</li> </ul>						
<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>			
<b>LinkId</b>	<b>SCTID</b>	<i>Null</i>	<i>0</i>			
This field is not used and may be treated as null.						

#### B.4.2.3 Realm Concept Subset Members Table

<b>Realm Concept Subset Members Table</b>			
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>SubsetId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The unique SNOMED CT Identifier for the Subset to which this applies.			
<b>MemberId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The identifier of a SNOMED CT Concept.			
<b>MemberStatus</b>	<i>Integer</i>	<i>0 to 9</i>	<i>1 to 5</i>
The status of the identified member in this Subset. The value of MemberStatus must be greater than zero.			
The priority assigned to this Concept.			
<i>Notes:</i>			
The <i>lower</i> the value, the <i>greater</i> the priority. Thus the highest priority is assigned to Concepts with the MemberStatus value "1" (first).			
The priority should be used by applications to determine the items to be displayed first or selected most readily.			
<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>LinkId</b>	<b>SCTID</b>	<i>Null</i>	<i>0</i>
This field is not used and may be treated as null.			

#### B.4.2.4 Realm Description Subset Members Table

<b>Realm Description Subset Members Table</b>						
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>			
<b>SubsetId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>			
The unique SNOMED CT Identifier for the Subset to which this applies.						
<b>MemberId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>			
The Identifier of a SNOMED CT Description.						
<b>MemberStatus</b>	<i>Integer</i>	<i>0 to 9</i>	<i>1 to 5</i>			
The status of the identified member in this Subset. The value of MemberStatus must be greater than zero.						
Realm Subset	The MemberStatus specifies the role of the referenced Description in this Realm. There are three roles.  1 = Preferred Term 2 = Synonym 3 = Fully Specified Name					
<i>Notes:</i>						
The following rules must apply to each Subset:						
<ul style="list-style-type: none"> <li>a) A Description cannot be assigned the role Fully Specified Name unless its DescriptionType is also "Fully Specified Name".</li> <li>b) Only one Description of each Concept may be assigned as the Fully Specified Name.</li> <li>c) If no Description of a Concept is assigned the role Fully Specified Name, the Fully Specified Name in the Concepts Table assumes this role.</li> <li>d) A Description cannot be assigned the role Preferred Term or Synonym if its DescriptionType is "Fully Specified Name".</li> <li>e) One and only one Description of each Concept must be assigned the role "Preferred Term".</li> <li>f) Any number of Descriptions of a Concept may be assigned the role "Synonym".</li> </ul>						
<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>			
<b>LinkId</b>	<b>SCTID</b>	<i>Null</i>	<i>0</i>			
This field is not used and may be treated as null.						

#### B.4.2.5 Realm Relationship Subset Members Table

<b>Realm Relationship Subset Members Table (For Future Use)</b>			
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>SubsetId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The unique SNOMED CT Identifier for the Subset to which this applies.			
<b>MemberId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The identifier of a SNOMED CT Relationship.			
<b>MemberStatus</b>	<i>Integer</i>	<i>0 to 9</i>	<i>1 to 5</i>
The status of the identified member in this Subset. The value of MemberStatus must be greater than zero.			
Realm Relationship Subset	The only permitted value of MemberStatus is: <i>1 = Include</i> All members of these Subsets are treated as equal.		
<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>LinkId</b>	<b>SCTID</b>	<i>Null</i>	<i>0</i>
This field is not used and may be treated as null (for future use).			

#### B.4.2.6 Context Concept Subset Members Table

<b>Context Concept Subset Members Table</b>			
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>SubsetId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The unique SNOMED CT Identifier for the Subset to which this applies.			
<b>MemberId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The identifier of a SNOMED CT Concept.			
<b>MemberStatus</b>	<i>Integer</i>	<i>0 to 9</i>	<i>1 to 5</i>
The status of the identified member in this Subset. The value of MemberStatus must be greater than zero.			
The priority assigned to this Concept.			
<p><b>Notes:</b></p> <p>The <i>lower</i> the value, the <i>greater</i> the priority. Thus the highest priority is assigned to Concepts with the MemberStatus value "1" (first).</p> <p>The priority should be used by applications to determine the items to be displayed first or selected most readily.</p>			
<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>LinkId</b>	<b>SCTID</b>	<i>Null</i>	<i>0</i>
This field is not used and may be treated as null.			

#### B.4.2.7 Context Description Subset Members Table

<b>Context Description Subset Members Table</b>			
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>SubsetId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The unique SNOMED CT Identifier for the Subset to which this applies.			
<b>MemberId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The Identifier of a SNOMED CT Description.			
<b>MemberStatus</b>	<i>Integer</i>	<i>0 to 9</i>	<i>1 to 5</i>
The status of the identified member in this Subset. The value of MemberStatus must be greater than zero.			
Context Description Subset	The only permitted value of MemberStatus is:  1 = <i>Include</i>  All members of these Subsets are treated as equal.		
<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>LinkId</b>	<b>SCTID</b>	<i>Null</i>	<i>0</i>
This field is not used and may be treated as null.			

#### B.4.2.8 Navigation Subset Members Table

<b>Navigation Subset Members Table</b>			
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>SubsetId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The unique SNOMED CT Identifier for the Subset to which this applies.			
<b>MemberId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The identifier of a SNOMED CT Concept.			
<b>MemberStatus</b>	<i>Integer</i>	<i>0 to 9</i>	<i>1 to 5</i>
The status of the identified member in this Subset. The value of MemberStatus must be greater than zero.			
Navigation Subset	The MemberStatus specifies the order of the child Concepts within the set of Navigation Links from the same parent Concept. The combination of SubsetId and MemberId and MemberStatus forms the unique key.		
<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>LinkId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The ConceptId of a Navigation child of the Concept identified by the MemberId.			

#### B.4.2.9 Duplicate Terms Subset Members Table

<b>Duplicate Terms Subset Members Table</b>			
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>SubsetId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The unique SNOMED CT Identifier for the Subset to which this applies.			
<b>MemberId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The Description Identifier for a SNOMED CT Concept that has a duplicate term.			
<b>MemberStatus</b>	<i>Integer</i>	<i>0 to 9</i>	<i>1 to 5</i>
The status of the identified member in this Subset. The value of MemberStatus must be greater than zero.			
Duplicate Terms Subset	The priority assigned to this Concept.  <i>Notes:</i> The <i>lower</i> the value, the <i>greater</i> the priority. Thus the highest priority is assigned to Concepts with the MemberStatus value "1" (first). The priority should be used by applications to determine the items to be displayed first or selected most readily.		
<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>LinkId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The MemberID (and therefore, the DescriptionId) of the Member with the same Term which has the highest priority. A group of duplicate terms can be identified since they will all point to the same LinkId.			

### B.4.3 Subset Definition File

Please contact the IHTSDO for the current specifications for this file.

## B.5 Cross Maps

### B.5.1 Cross Map Sets Table

<b>Cross Map Sets Table</b>			
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
MapSetId	SCTID	0 to 9	6 to 18
The unique SNOMED CT Identifier for this Cross Map Set.			
<p><i>Note:</i> The format and construction of these identifiers is described in Appendix C.</p>			
<b>Cross Map Sets Table</b>			
<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
MapSetName	String	Any (except LF, CR and TAB)	1 to 255
A descriptive name given to the Cross Map Set by its originator.			
<i>Continues</i>			
<b>Cross Map Sets Table</b>			
<b>Data Fields (continued)</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
MapSetType	Enumerated	0 to 9	1 to 2
Indicates the nature of the Cross Maps associated with this scheme. CrossMapType is used to indicate the inclusion of one to one, one to many and choices of maps.			
<p><i>Values:</i></p> <ul style="list-style-type: none"> <li>0 Unspecified.</li> <li>1 Single All maps are unique one-to-one maps. <ul style="list-style-type: none"> <li>▪ Each Concept has only one associated Cross Map</li> <li>▪ Each Cross Map Target contains a single Target Code.</li> </ul> </li> <li>2 Multiple Some maps are one-to-many maps but there are no choices. <ul style="list-style-type: none"> <li>▪ Each Concept has only one associated Cross Map</li> <li>▪ Some Cross Map Targets contains a list of more than one Target Code.</li> </ul> </li> <li>3 Choice Some maps include choices of one-to-one maps but there are no one-to-many maps. <ul style="list-style-type: none"> <li>▪ Some Concepts have more than one associated Cross Map</li> <li>▪ Each Cross Map Target contains a single Target Code.</li> </ul> </li> </ul>			

4 Flexible Some maps include choices and there are some one-to-many maps.

- Some Concepts have more than one associated Cross Map

Some Cross Map Targets contain a list of more than one Target Code.

<b>MapSetSchemeId</b>	<i>String</i>	<i>Any (except LF, CR and TAB)</i>	<i>1 to 64</i>
A standard identifier for the Target Scheme. This may be an International Coding Scheme Identifier (ISO7826) or an Object Identifier (OID) used as specified by HL7.			
<b>MapSetSchemeName</b>	<i>String</i>	<i>Any (except LF, CR and TAB)</i>	<i>1 to 255</i>
The full name of the Target Scheme.			
<b>MapSetSchemeVersion</b>	<i>String</i>	<i>Any (except LF, CR and TAB)</i>	<i>1 to 12</i>
The version number of the Target Scheme as published by the issuing organization.			

*Continues*

### Cross Map Sets Table

<b>Data Fields (continued)</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>MapSetRealmId</b>	<i>String</i>	<i>Any (except LF, CR and TAB)</i>	<i>1 to 24</i>
A string identifying a Realm within which this mapping table is applicable. This is only used in cases where Realm specific business rules or guidelines alter the acceptable mappings. Realm is the same as used in the Subsets Table. It includes a four character ISO6523 identifier followed by an optional series of concatenated subdivision codes defined by the registered organization.			
<i>Example:</i> The EDI identifier scheme used by the NHS. The "0080" is the ISO6523 identifier for the NHS Trusts, Health Authorities, GP practices are issued with a ten-digit identifier and are permitted to issue subdivision codes of up to five digits in length. This results in a 19-digit string.			
<i>Usage:</i> This is only used in cases where Realm specific business rules or guidelines alter the acceptable mappings. In all other cases the RealmId has the value "0" (zero) and should be ignored.			
<b>MapSetSeparator</b>	<i>String</i>	<i>Any (except LF, CR and TAB)</i>	<i>1</i>
The character used as a separator between the individual codes in the Target Codes field of the Cross Map Targets.			
<b>MapSetRuleType</b>	<i>Enumerated</i>	<i>0 to 9</i>	<i>1</i>
An indication of the types of rules used in the Cross Maps and Cross Map Targets. This discussion of rules is included although rules are not yet used in the released SNOMED CT Cross Maps. However, this feature may be of interest to implementers. See Appendix H for more information.			

## B.5.2 Cross Maps Table

<b>Cross Maps Table</b>			
<p>Each row in the Cross Maps Table represents one option for mapping a Concept to a Cross Map Target. If there are several alternative Cross Maps for a Concept.</p> <ul style="list-style-type: none"> <li>❖ Each option is represented by a row in the Cross Maps Table.</li> <li>❖ Each row may include rules for choosing that option</li> <li>❖ The rules for choosing an option may be expressed as:           <ul style="list-style-type: none"> <li>◊ Machine-processable instructions</li> <li>◊ Textual advice to support manual coding</li> <li>◊ Both of the above</li> </ul> </li> </ul>			
<b>Cross Maps Table</b>			
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>MapSetId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The unique SNOMED CT Identifier for the Cross Map Set of which this Cross Map is a member.			
<b>MapConceptId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The SNOMED CT Identifier of the mapped Concept.			
<b>MapOption</b>	<i>Integer</i>	<i>0 to 9</i>	<i>1 to 5</i>
An integer that distinguishes between alternative mappings for a single Concept. If automatic rules are used to determine which option is applicable, the Cross Map with the lowest MapOption value is tested first.			
<b>Cross Maps Table</b>			
<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>MapPriority</b>	<i>Integer</i>	<i>0 to 9</i>	<i>1 to 5</i>
Indication of the suggested order in which to present a series of options for mapping a Concept for manual assessment. The first of these is the default option for mapping the Concept.			
<b>MapTargetId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The unique SNOMED CT Identifier for a Cross Map Target to which this Concept can be mapped.			
<i>Continues</i>			

**Cross Maps Table**

<b>Data Fields</b> (continued)	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>MapRule</b>	<i>String</i>	<i>Any (except LF, CR and TAB)</i>	<i>0 to 255</i>
A machine-processable expression that determines whether this is an appropriate Cross Map.			
<i>Note:</i> The form of expression used for these rules depends on the MapSetRuleType and is discussed in Appendix H.			
<b>MapAdvice</b>	<i>String</i>	<i>Any (except LF, CR and TAB)</i>	<i>0 to 255</i>
Textual advice to support manual mapping decisions between this Cross Map and other alternative Cross Maps for mapping the same Concept.			

### B.5.3 Cross Map Targets Table

<b>Cross Map Targets Table</b>											
<b>Cross Map Targets Table</b> <table border="1"> <thead> <tr> <th><b>Key Fields</b></th><th><b>Field Type</b></th><th><b>Permitted characters</b></th><th><b>Length</b></th></tr> </thead> <tbody> <tr> <td>TargetId</td><td>SCTID</td><td>0 to 9</td><td>6 to 18</td></tr> </tbody> </table>				<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>	TargetId	SCTID	0 to 9	6 to 18
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>								
TargetId	SCTID	0 to 9	6 to 18								
The unique SNOMED CT Identifier for the Cross Map Set of which this Cross Map is a member. See Appendix C.											
<b>Cross Map Targets Table</b>											
<table border="1"> <thead> <tr> <th><b>Data Fields</b></th><th><b>Field Type</b></th><th><b>Permitted characters</b></th><th><b>Length</b></th></tr> </thead> <tbody> <tr> <td>TargetSchemeld</td><td>String</td><td>Any (except LF, CR and TAB)</td><td>1 to 64</td></tr> </tbody> </table>				<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>	TargetSchemeld	String	Any (except LF, CR and TAB)	1 to 64
<b>Data Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>								
TargetSchemeld	String	Any (except LF, CR and TAB)	1 to 64								
A standard identifier for the coding scheme in which the TargetCodes are expressed. This may be an International Coding Scheme Identifier (ISO7826) or an Object Identifier (OID) used as specified by HL7.											
<p><i>Note:</i> The value of this field must be the same as the MapSetSchemeld of any Cross Map Set that includes Cross Maps referring to this Cross Map Target.</p>											
<table border="1"> <tbody> <tr> <td>TargetCodes</td><td>String</td><td>Any (except LF, CR and TAB)</td><td>1 to 255</td></tr> </tbody> </table>				TargetCodes	String	Any (except LF, CR and TAB)	1 to 255				
TargetCodes	String	Any (except LF, CR and TAB)	1 to 255								
A code or list of codes in the Target Scheme that together represent an appropriate mapping for one or more Concepts.											
If more than one code is included:											
<ul style="list-style-type: none"> <li>❖ A separator character specified in the Cross Map Sets Table is used to separate the codes.</li> <li>❖ The mapping is to the combination of all the codes in the list.</li> </ul>											
This field may be null if no target codes apply to this cross map.											
<i>Continues</i>											
<b>Cross Map Targets Table</b>											
<table border="1"> <thead> <tr> <th><b>Data Fields</b> (continued)</th><th><b>Field Type</b></th><th><b>Permitted characters</b></th><th><b>Length</b></th></tr> </thead> <tbody> <tr> <td>TargetRule</td><td>String</td><td>Any (except LF, CR and TAB)</td><td>0 to 255</td></tr> </tbody> </table>				<b>Data Fields</b> (continued)	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>	TargetRule	String	Any (except LF, CR and TAB)	0 to 255
<b>Data Fields</b> (continued)	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>								
TargetRule	String	Any (except LF, CR and TAB)	0 to 255								
A machine processable expression of rules that determine the combinations of conditions to											

which this Cross Map Target applies.

**Note:**

The form of expression used for these rules depends on the Map Set Rule Type and is discussed in Appendix H.

TargetAdvice	String	Any (except LF, CR and TAB)	0 to 255
Textual advice expressing the combinations of conditions to which this Cross Map Target applies.			

### B.5.4 SNOMED CT – LOINC® Integration Table

The Laboratory LOINC database provides a standardized set of names and codes for identifying laboratory test results. Created by the Regenstrief Institute, the purpose of LOINC is to facilitate the exchange and pooling of results for outcomes management and research. Each LOINC code represents a unique laboratory test distinguished by six main parts that include the analyte measured, the property observed, the time aspect involved, the sample or system type, the scale of measurement, and where relevant the method of measurement. Taken together, these six components define a single laboratory test result. Additional details about LOINC, including access to the LOINC database files, is available from [www.regenstrief.org/loinc/loinc.htm](http://www.regenstrief.org/loinc/loinc.htm).

SNOMED CT is a clinical reference terminology. SNOMED CT concepts are explicitly represented in a multi-hierarchical structure. Each of the six distinguishing parts of a given LOINC test result are found in SNOMED CT and assigned in a hierarchy.

The integration exists as a table containing 11 columns. The first nine columns of the table are taken directly from the Laboratory LOINC version 11 database. The last two columns contain concept identifiers from SNOMED CT that relate a specific component of the LOINC test to the SNOMED CT hierarchy.

An excerpt from the LOINC-SNOMED integration table is shown below. This example shows how LOINC code 5792-7 is defined in the integrated SNOMED hierarchy.

**Excerpt from SNOMED-LOINC Integration table**

LOINC_NUM	COMPONENT	PROPERTY	TIME_	ASPCT	SYSTEM	SCALE_	METHOD_	Relationship_	ConceptID
								Type	
5792-7	GLUCOSE	MCNC	PT		UR	QN	TEST STRIP	116684007	123029007
5792-7	GLUCOSE	MCNC	PT		UR	QN	TEST STRIP	116678009	67079006
5792-7	GLUCOSE	MCNC	PT		UR	QN	TEST STRIP	116680003	69376001
5792-7	GLUCOSE	MCNC	PT		UR	QN	TEST STRIP	116686009	122575003
5792-7	GLUCOSE	MCNC	PT		UR	QN	TEST STRIP	116685008	118539007
5792-7	GLUCOSE	MCNC	PT		UR	QN	TEST STRIP	116687000	30766002
5792-7	GLUCOSE	MCNC	PT		UR	QN	TEST STRIP	84203001	117021008

*Data in the following columns of the SNOMED-LOINC Integration table are derived directly from the LOINC table:*

**LOINC\_NUM** = LOINC code

**COMPONENT** = one of the six parts of the LOINC fully specified name; maps to the SNOMED RelationshipType "has measured component"

**PROPERTY** = one of the six parts of the LOINC fully specified name; maps to the SNOMED RelationshipType "has property"

**TIME\_**  
**ASPCT** = one of the six parts of the LOINC fully specified name; maps to the SNOMED RelationshipType "has time aspect"

**SYSTEM** = one of the six parts of the LOINC fully specified name; maps to the SNOMED RelationshipType "has specimen"

**SCALE\_TYP** = one of the six parts of the LOINC fully specified name; maps to the SNOMED RelationshipType "has scale type"

**METHOD\_TYP** = one of the six parts of the LOINC fully specified name; maps to the SNOMED RelationshipType "has method"

**RELAT\_NMS** = column in the LOINC table that provides synonyms (when applicable) for the fully specified LOINC name.

**ANSWERLIST** = column in the LOINC table that provides examples of answers for results that are reportable from a multiple choice list (when applicable)

*Data in the last two columns of the SNOMED-LOINC Integration table are derived directly from the SNOMED CT Concepts Table:*

**Relationship\_Type** = Concept identifier (ConceptID) from the SNOMED CT Concepts table; defines the relationship between the LOINC name and the target SNOMED concept.

**ConceptID** = target SNOMED Concept from the SNOMED CT Concepts table

The SNOMED-LOINC integration table may be better visualized with the following figure, where the SNOMED identifiers in the last two columns are replaced with their corresponding SNOMED CT description.

**SNOMED-LOINC INTEGRATION with SNOMED ConceptIDs in last two columns replaced with the SNOMED description. Shaded cells highlight the part of the LOINC fully specified name that is being mapped in each row.**

LOINC_NUM	COMPONENT	PROPERTY	TIME_ASPECT	SYS TEM	SCALE_TYP	METHOD_TYP	RELAT_NMS	ANSWER LIST	Relationship_Type	ConceptID
5792-7	GLUCOSE	MCNC	PT	UR	QN	TEST STRIP			Is a	Urinalysis, glucose, qualitative
5792-7	GLUCOSE	MCNC	PT	UR	QN	TEST STRIP			has measured component	Glucose
5792-7	GLUCOSE	MCNC	PT	UR	QN	TEST STRIP			Has property	Mass concentration
5792-7	GLUCOSE	MCNC	PT	UR	QN	TEST STRIP			has time aspect	Single point in time
5792-7	GLUCOSE	MCNC	PT	UR	QN	TEST STRIP			Has specimen	Urine specimen
5792-7	GLUCOSE	MCNC	PT	UR	QN	TEST STRIP			Has scale type	Quantitative
5792-7	GLUCOSE	MCNC	PT	UR	QN	TEST STRIP			Has method	Test strip method

The value of the SNOMED/LOINC integration lies within the structure of the corresponding SNOMED hierarchies.

For example, the first row in the figures above show that LOINC 5792-7 is a "Urinalysis, glucose, quantitative" (ConceptID 123029007). Looking up ConceptId 123029007 ("Urinalysis,

glucose, quantitative") in the SNOMED CT Relationships Table, the following hierarchy can be traced:

- ❖ Urinalysis, glucose, quantitative *is a* Urinalysis
- ❖ Urinalysis *is a* Body fluid analysis
- ❖ Body fluid analysis *is a* Laboratory procedure
- ❖ Laboratory Procedure *is a* Procedure

In the LOINC-SNOMED integration, numerous other Laboratory LOINC codes are also defined as *is a* Urinalysis (16408-7, 11135-1, etc.) or, as in the example above, a child of Urinalysis (11276-3, 11258-0, etc.). The SNOMED-LOINC integration enables aggregation of LOINC-coded data, so that all urinalysis tests, for example, can be isolated. Listed below is a small sample of LOINC codes that would be included in a retrieval of all urinalysis procedures.

**Sample of LOINC codes that would be captured in a retrieval of all Urinalysis procedures.**

LOINC_NUM	COMPONENT	PROPERTY	TIME_ASPCT	SYSTEM	SCALE_TYP	METHOD_TYP
11276-3	TUBULAR CELLS	ACNC	PT	URNS	ORD	MICROSCOPY.LIGHT
11277-1	SQUAMOUS CELLS	NARIC	PT	URNS	QN	MICROSCOPY.LIGHT.HPF
11278-9	BLADDER CELLS	NARIC	PT	URNS	QN	MICROSCOPY.LIGHT.HPF
11279-7	URINE SEDIMENT COMMENT	FIND	PT	URNS	NAR	MICROSCOPY.LIGHT
12248-1	RENAL CELLS	ACNC	PT	URNS	ORD	MICROSCOPY.LIGHT
12258-0	SQUAMOUS CELLS	ACNC	PT	URNS	ORD	MICROSCOPY.LIGHT.HPF
12448-7	KETONES^ POST CFST	MCNC	PT	UR	QN	TEST STRIP
12512-0	BRUSHITE CRYSTALS	ACNC	PT	URNS	ORD	MICROSCOPY.LIGHT
13653-1	EPIHELIAL CELLS.RENAL	NCNC	PT	URNS	QN	
13945-1	ERYTHROCYTES	NARIC	PT	URNS	QN	MICROSCOPY.LIGHT.HPF
15033-4	ASCORBATE	SRAT	24H	UR	QN	
16408-7	ASCORBATE	MCNC	PT	UR	QN	
1702-0	ACETOACETATE	MCNC	PT	UR	QN	
18407-7	LEUKOCYTES	NRAT	12H	URNS	QN	MICROSCOPY.LIGHT
18487-9	BROAD CASTS	NARIC	PT	URNS	QN	MICROSCOPY.LIGHT.LPF
20409-9	ERYTHROCYTES	NCNC	PT	UR	QN	TEST STRIP
20453-7	EPIHELIAL CELLS	ACNC	PT	URNS	ORD	MICROSCOPY.LIGHT
20409-9	ERYTHROCYTES	NCNC	PT	UR	QN	TEST STRIP

The SNOMED CT Relationships Table enables even broader searches such as, for example, all body fluid analyses. Since Urinalysis is a Body fluid analysis all the LOINC codes shown above would be included in the search, in addition to LOINC codes for CSF analyses, joint fluid analyses, etc.

The SNOMED-LOINC Integration provides a mechanism that reflects the complementary relationship between LOINC and SNOMED. This integration yields formally defined appropriately classified laboratory terms that can be implemented in the design of robust laboratory analysis applications.

## Comments on Some LOINC Analyte Names and Their Corresponding SNOMED Codes

LOINC Analyte Name(s)	SNOMED ID SNOMED ConceptID	Comments
ENTEROTOXIN	C-00226 116554007	This may represent an assay for bacterial enterotoxins, but rotavirus also produces an enterotoxin, and so we use the more general parent term C-00226 Enterotoxin, instead of the more specific term C-36205 Bacterial enterotoxin
ANTHRAQUINONE 9,10-ANTRHACENEDIONE	C-10097 ----- 116283009	LOINC lists 9,10 anthracenedione as a related name for ANTHRAQUINONE, with CAS number 84-65-1 (the number for 9,10-anthracenedione. The SNOMED code means the class of anthraquinones, which includes anthraquinone antineoplastics (e.g. mitoxantrone) as well as anthraquinone laxatives and anthraquinone dyes. We assume an anthraquinone assay would measure <i>any</i> anthraquinone, not just 9,10-anthracenedione.
BUTANE N-BUTANE	C-20522 73229004	Butane and n-butane are generally regarded as synonyms. In other words, ordinarily isobutane (C-20527) is specified explicitly, and is not counted as a subtype of butane.
HEXANE N-HEXANE	C-20524 40647006  C-20529 123008003	Unlike butane, hexane is a general term for 6-carbon saturated hydrocarbons. N-hexane is one isoform.
DIOXANE 1,4-DIOXANE	C-21304 27247007	Assume dioxane is 1,4-diethylene dioxide, same as 1,4-dioxane.
HEXACHLOROCYCLOHEXANE GAMMA HEXACHLOROCYCLOHEXANE	C-23112 49490007  C-91170 77496001	LOINC lists CAS 608-73-1, but this refers to hexachlorocyclohexane mixed isomers (SNOMED code C-20885). We assume a hexachlorocyclohexane assay would measure <i>any</i> isomer or mixture of isomers, so the parent term C-23112 is the right one, even though it does not correspond to CAS 608-73-1.
FENCLORVOS FENCHLORPHOS	C-23151 22008009	Fenclorvos is probably a "spelling variant" of fenchlorphos.
ENDOTOXIN	C-36210 18127008	We assume "endotoxin" and "bacterial endotoxin" are synonymous.
KETOCONAZOLE	C-52B50	Ketokonazole is probably a "spelling variant".

LOINC Analyte Name(s)	SNOMED ID SNOMED ConceptID	Comments
KETOKONAZOLE	40232005	
MONACETYLDAPSONE MONOACETYLDAPSONE	C-55296 123003007	Monacetyldapsone may be a "spelling variant" of mono <u>acetyl</u> dapsone.
ACETYLMORPHINE MONOACETYLMORPHINE 6-MONOACETYLMORPHINE	C-606B3 118290009	We assume these are all the same as 6-O-monoacetylmorphine, the major metabolite of heroin (besides morphine). If this is true, it appears to result in some duplicate LOINC codes.
OXYCODINONE OXYCODONE	C-606D0 55452001	Oxycodinone is probably another name for oxycodone, but we were unable to find the name Oxycodinone in MEDLINE or any major chemical/drug reference.
6-BETA NALTREXONE 6-BETA NALTREXOL	C-60D22 116562004	The major metabolite of naltrexone is 6-beta naltrexol, also called 6-beta hydroxynaltrexone. We assume this is what is meant by 6-beta naltrexone.
METHABARBITAL METHARBITAL	C-61340 30676006	LOINC related names for Methabarbital says Barbitone (not the same! Barbitone is Ethylbarbital!) and also Metharbital (the correct name) is a synonym. "Methabarbital" does not occur in MEDLINE, though some lists of controlled substances also use this spelling.
DESMETHYLDUXEPIN NORDOXEPIN	C-62285 96204007	These are synonyms for the demethylated metabolite of doxepin, N-desmethyldoxepin.
HYDROXYALPRAZOLAM ALPHA HYDROXYALPRAZOLAM	C-64523 123010001  C-64521 117158005	Probably hydroxyalprazolam is intended to include both alpha- and 4-hydroxyalprazolam... (C-64521 is the alpha form).
N-DESALKYLFLURAZEPAM DESALKYLFLURAZEPAM	C-64552 115558004	Synonyms for a major metabolite of flurazepam, N-1-desalkylflurazepam.
DESMETHYLAMIODARONE DESETHYLAMIODARONE	C-80352 96295003	The only important metabolite of amiodarone (particularly in humans) is <u>DESETHYLAMIODARONE</u> , which is the meaning we have chosen here. There are no MEDLINE references containing the word <u>DESMETHYLAMIODARONE</u> , and we have assumed the addition of the "M" may be a spelling error.
LINDANE	C-91170	Lindane is the gamma isomer of

LOINC Analyte Name(s)	SNOMED ID SNOMED ConceptID	Comments
	77496001	hexachlorocyclohexane (strictly speaking must contain over 99% pure gamma isomer).
AMINOBENZOATE PARA AMINOBENZOATE	C-93210 39707000	Para-aminobenzoic acid (PABA), UV screen, B vitamin. Although both m-aminobenzoic acid and o-aminobenzoic acid exist, they are probably not what is meant here.
FLUBIPROFEN FLURBIPROFEN	C-96050 54344006	Flubiprofen is probably a "spelling variant" of flurbiprofen.
2-AMINOBUTYRATE 2-AMINOBUTYRIC	F-65C04 115343006	2-aminobutyrate
A-1-IDURONIDASE	F-6A928 86430005	Alpha L iduronidase
KETOGENIC STEROIDS 17-KETOGENIC STEROIDS	F-B2430 46120009	Assume these mean the same. These steroids have an -OH on C17. They include all of the 17-hydroxycorticosteroids, plus pregnanetriol, cortisol, cortolone, etc.
17-HYDROXYKETOSTEROIDS	F-B2430 46120009	Possibly means any steroids with a keto or hydroxy on carbon 17. Assume these are the 17-ketogenic steroids.
20-HYDROXYPROGESTERONE	F-B2460 52422003	F-B2460 is 20-Hydroxyprogesterone, <i>but</i> LOINC related names and the CAS number both point to 17-alpha hydroxyprogesterone, which is F-B2470 (and has a keto group at C20!)
11-DEOXYCORTISOL DEOXYCORTISOL	F-B2480 22941009	These two are assumed to be the same.
HYDROCORTICOSTERONE 18-HYDROXYCORTICOSTERONE	F-B2491 103034000	Corticosterone is 11,21-Dihydroxypregn-4-ene-3,20-dione; hydroxylation of corticosterone could commonly occur at carbons 17 and 18. If a hydroxy is added at 17 we get cortisol, and at 18 we get 18-hydrocorticosterone. We assume "hydrocorticosterone" means the latter.
11-OXOPREGNANETRIOL	F-B2746 116617008	Assume this is a class that includes 11-ketopregnatriol plus 11-hydroxy substituted pregnanetriol
ANDROSTANEDIOL	F-B28A0 103048000	Same as 3-alpha-androstanediol, a major metabolite of dihydrotestosterone. Distinct from the 3-beta- isomer.
HYDROXYCALCIDIOL	F-BB140	Assume this is 24,25-

LOINC Analyte Name(s)	SNOMED ID SNOMED ConceptID	Comments
	1459001	dihydroxycholecalciferol. Calcidiol is 25-hydroxycholecalciferol. The other possibility might be calcitriol, which is 1,25-dihydroxycholecalciferol.
COMPLEMENT C3.NEPHRITIC	F-C2402 123001009	Complement C3 nephritic factor, is <i>not</i> a complement component but an (auto)antibody which causes unregulated C3 splitting activity, usually by preventing intrinsic decay of C3bBb (F-C7640)
COMPLEMENT C4.NEPHRITIC	F-C2403 123002002	Complement C4 nephritic factor, is <i>not</i> a complement component but an (auto)antibody which prevents the intrinsic decay of C4b2a (F-C7540)
COMPLEMENT CLR2-CLS2 COMPLEMENT C1R2+C1S2	F-C70D1 123000005	Assume both refer to C1r2C1s2, see Biochem J 1989 Oct 15;263(2):463-9 "The quaternary structure in solution of human complement subcomponent C1r2C1s2"
COMPLEMENT C'2 ESTERASE COMPLEMENT C'3 ESTERASE COMPLEMENT C'4 ESTERASE	F-C7100 923009  F-C7150 10473000  F-C7200 65044008	Assume these mean the complement components C2, C3 and C4. The "prime" symbol (C') used in early literature has been dropped from complement nomenclature. C2, C3 and C4 are proenzymes.
COMPLEMENT C3B.INACTIVE	F-C7171 122999009	<i>Could</i> also have LOINC name "COMPLEMENT IC3B"
COMPLEMENT IC3	F-C7172 123004001	<i>Could</i> also have LOINC name "COMPLEMENT C3.INACTIVE"
COMPLEMENT MEMBRANE C3B-C4B COFACTOR PROTEIN	F-C7A10 73042005	Also known as MCP and CD46, a "widely distributed C3b/C4b-binding glycoprotein that inhibits complement activation"
HYDROXYTRYPTAMINE SEROTONIN	F-CB040 33635003	Serotonin is 5-hydroxytryptamine. (5-hydroxytryptophan is a precursor).
L LITTLE E NOS AG	F-D1300 2728001	There is no Le NOS antigen, but perhaps this means Lewis blood group antigen, not otherwise specified.
ENTEROVIRUS	L-30200 32697003	Picornavirus group

## FILE STRUCTURE

SNOMED-LOINC Integration version 1.0 is provided as an ASCII tab delimited flat file.

There have been no additions to this file since the release of SNOMED RT Version 1.1. Minor revisions were made where SNOMED concepts have been retired and, in some cases, replaced with other concepts.

The first row of the file contains column headings.

Column Name	Data Type	Max. Length	Description
LOINC_NUM	Char	7	The unique LOINC Code.*
COMPONENT	Char	150	Fields 2-7 contain the six parts of the name. The fully specified name for a given LOINC code would be constructed by printing out the contents of these fields (2-7), inserting a colon (:) between the contents of each of these fields.*
PROPERTY	Char	10	
TIME_ASPCT	Char	10	
SYSTEM	Char	50	
SCALE_TYP	Char	30	
METHOD_TYP	Char	50	
RELAT_NMS	Char	254	One or more synonyms, separated by semicolons (;). This field is intended to make it easier to find a given observation by providing other names by which the observation may be known. For a drug level, for example, we include the trade names of that drug under the related names.*
ANSWERLIST	Char	2056	The list of answers for results that are reportable from a multiple choice list (e.g., the answers for the term DISPOSITION OF BLOOD PACK are GIVEN;PARTIALLY GIVEN;DISCARDED). This field provides examples, not required answer lists.*
RelationshipType	Integer	18	SNOMED CT Concept Identifier (ConceptId) from the SNOMED CT Concepts table.  Defines the relationship between the LOINC name and the target SNOMED concept.
ConceptID	Integer	18	Target SNOMED Concept ID from the SNOMED CT Concepts table

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## B.6 History

### B.6.1 Component History Table

<b>Component History Table</b>									
Each row in the Component History Table represents a single instance of a change to a Component in a particular release of SNOMED CT.									
<b>Key Fields</b>	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>						
<b>ComponentId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>						
The unique SNOMED CT Identifier for the changed Component.									
The Component may be a Concept, Description, Relationship, Subset or a Cross Map Set.									
<b>ReleaseVersion</b>	<i>Integer</i>	<i>0 to 9</i>	<i>8</i>						
The version of SNOMED CT in which this change was made.									
Several changes may be made during internal maintenance between one release and the next but only the net result of these changes is recorded in the distributed Component History Table. Therefore, no more than one change is recorded for each Component in each Release Version.									
The format for this field is the ISO format date of the release, not the date of the individual change to the component. The format is "yyyymmdd" so for a release on 10 December 2002 the value would be "20021210".									
Please refer to the "Introducing History" section for details about the special considerations for the Release Version values used for the SNOMED CT First Release that merged the SNOMED RT and Clinical Terms Version 3 terminologies.									
<b>ChangeType</b>	<i>Enumerated</i>	<i>0 to 9</i>	<i>1</i>						
An indication of the nature of the change.									
<p><b>Values</b></p> <table> <tr> <td>0 Added</td> <td>The Component was added to SNOMED CT in this Release Version.</td> </tr> <tr> <td>1 Status Change</td> <td>The status of the Component has changed since the last Release Version.</td> </tr> <tr> <td>2 Minor Change</td> <td>A minor change has been made to this Component since the last Release Version.. All other changes require a Component to be inactivated and replaced with a new component with a different SCTID.</td> </tr> </table>				0 Added	The Component was added to SNOMED CT in this Release Version.	1 Status Change	The status of the Component has changed since the last Release Version.	2 Minor Change	A minor change has been made to this Component since the last Release Version.. All other changes require a Component to be inactivated and replaced with a new component with a different SCTID.
0 Added	The Component was added to SNOMED CT in this Release Version.								
1 Status Change	The status of the Component has changed since the last Release Version.								
2 Minor Change	A minor change has been made to this Component since the last Release Version.. All other changes require a Component to be inactivated and replaced with a new component with a different SCTID.								
<i>Continues</i>									

### Component History Table

Data Fields	Field Type	Permitted characters	Length
<b>Status</b>	<i>Enumerated</i>	<i>0 to 9</i>	<i>1 to 2</i>
The status of the Component after the change.			
<i>Values</i>			
0 Current	Active Component In current use. This may apply to any type of Component. However, a Description only has this status if both it and its associated Concept are in current use.		
1 Retired	Inactivated without a specified reason.		
2 Duplicate	Inactivated as it duplicates another Component		
3 Outdated	Inactivated from current use because it is no longer in general clinical use.		
4 Ambiguous	Concept withdrawn as it is inherently ambiguous.		
5 Erroneous	Inactivated as it contains errors. A corrected but otherwise similar Component has been added to replace it.		
6 Limited	Applies to an Active Component that has limited clinical value as it is based on a classification concept or an administrative definition. Also applies to all valid Descriptions of that Concept.		
7 Inappropriate	Description has been inactivated as the Term should not refer to this concept.		
8 Concept Inactive	Remains as a valid Description of a Concept which is no longer active.		
9 Implied	Relationship withdrawn but is implied by other active Relationships.		
10 Moved elsewhere	The Concept has been moved to an Extension, to a different Extension, or to the core. Use the “Moved To” Relationship to locate the Namespace to which the Concept has been moved. These Concepts are considered inactive.		
11 Pending move	The Concept will be moved to an Extension, to a different Extension, or to the core. Use the “Moved To” Relationship to locate the Namespace to which the Concept will be moved when the recipient organization confirms the move. These Concepts are considered active.		
<i>Continues</i>			

## Component History Table

Data Fields	Field Type	Permitted characters	Length
<b>Notes:</b>			
The permitted values differ according to the nature of the Component.			
The release tables contain active and Inactive Concepts and Descriptions. The status value in the most recent Status Change associated with each Concept and Description will be identical to the value in the ConceptStatus or DescriptionStatus field for that Component.			
Relationships, Subsets, Cross Map Sets and Cross Map Targets are only included in a release if their status is “current”. Therefore, the only source of information about the changing status of these Components is the Component History Table and References Table (for Future Use).			
The released Subsets Table contains current Subsets and may also contain previous versions of Subsets (distinguished by the Subset Version).			
Reason	String	Any (except LF, CR and TAB)	0 to 255
An optional textual description of the reasons for this change.			

## B.6.2 References Table (Future Use)

### References Table

Each row in the References Table represents a Reference from an inactive Component to other equivalent or related Components that were current in the Release Version in which that Component was inactivated.

Each Reference indicates the nature of the relationship between the Components.

The References Table contains References:

- ❖ From each inactive Description to one or more other Descriptions that are current in the Release Version in which the Description was inactivated.
- ❖ From each inactive Subset for which there is a current replacement to the replacement Subset
- ❖ From each inactive Cross Map Set for which there is a current replacement to the replacement Cross Map Set.

The References Table does **not** include References:

- ❖ Between Concepts
  - ❖ Equivalent functionality is provided by Relationships with specialized Relationship Types. The rules for their use for tracking replacement Concepts are outlined in Section [9].
- ❖ Between Relationships
  - ❖ There are technical obstacles to tracking Relationships that replace or imply other inactive Relationships and no practical use case has been identified in which this would provide added value.

The requirement for References between Cross Map Targets depends on further analysis and definition of this type of Component.

### References Table

Key Fields	Field Type	Permitted characters	Length
ComponentId	SCTID	0 to 9	6 to 18
The unique SNOMED Clinical Terms Identifier for the inactive Component. The Component may be a Description, a Subset or a Cross Map Set.			
<i>Note:</i> The format and construction of these identifiers is described in Appendix C.			
<i>Continues</i>			

<b>References Table</b>			
<b>Key Fields</b> (continued)	<b>Field Type</b>	<b>Permitted characters</b>	<b>Length</b>
<b>ReferenceType</b>	<i>Enumerated</i>	<i>0 to 9</i>	<i>1 to 5</i>
Indicates the nature of the relationship between the inactive Component and the active Component.			
Values:			
1 Replaced by		Refers to a revised replacement for the Component.	
2 Duplicated by		Refers to an identical duplicate for the Component.	
3 Similar to		Refers to a Description that is identical in all respects except for the associated Term which, while not identical, is similar	
4 Alternative		Refers to one of several alternatives that are similar or equivalent to the Component (e.g. where a single Component is replaced by two more narrowly defined Components).	
5 Moved to		Refers to the Concept identifying the target Namespace to which a Component has been moved (Status value Moved Elsewhere or is scheduled to be moved (Status value Pending Move)).	
6 Moved from		Refers to an original Component in another Namespace which is the source of this current Component.	
<b>ReferencedId</b>	<b>SCTID</b>	<i>0 to 9</i>	<i>6 to 18</i>
The unique SNOMED Clinical Terms Identifier for the referenced Component.			
The Component identified by the ReferencedId must be an instance of the same class of Component as the component identified by the ComponentId.			
The ReferenceID is used differently for the “moved to” and “Moved from” Reference Types. In these cases, the ReferenceID does not refer directly to a replacement component, but rather to the namespace to which the component was moved to or moved from. The ReferenceID actually contains a ConceptID for the concept that represents the namespace.			
This approach is used since the organization sourcing the component may not always be able to determine the precise reference that is applicable in the receiving organization (namespace). Thus the responsibility for these references lies with the new responsible (receiving) organization.			

## Appendix C. The SNOMED Clinical Terms Identifier (SCTID)

### C.1 Introduction

Components within SNOMED Clinical Terms are identified using numeric identifiers. In the descriptions of the individual tables these identifiers are noted as having the data type SCTID. This section describes the characteristics of all fields with the data type SCTID.

These identifiers have a common set of characteristics and obey a set of rules, which enable each identifier to refer unambiguously to a single component.

### C.2 SCTID Data Type

The SCTID data type is a 64-bit integer, which is subject to the following constraints:

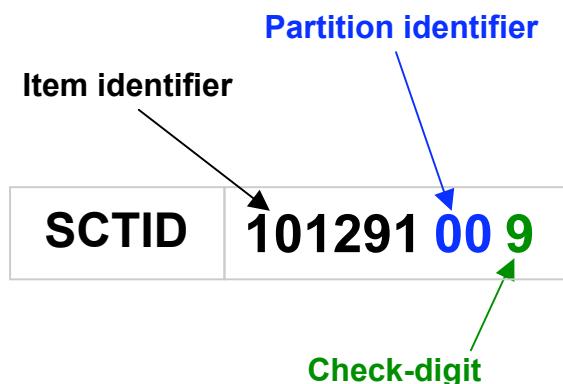
- ❖ Only positive integer values are permitted.
- ❖ The minimum permitted value is 100,000 (6 digits)
- ❖ The maximum permitted value is 999,999,999,999,999,999 (18-digits).
- ❖ As a result of rules for the partition-identifier and check-digit, many integers within this range are not valid SCTIDs.

### C.3 SCTID Representation

The SCTID does not contain semantic information related to the meaning of a concept or term. It does however have a structure that is designed to allow different types of terminological components to be recognized. The nature of a component can also be derived from the table in which a component is distributed. However, the advantage of partitioning the SCTID is that it avoids reuse of the same identifier for a different type of component – thus avoiding ambiguity. This also allows the nature of the identifier to be recognized when stored in a record or transferred in a message.

The rightmost digits in a decimal string representation of the SCTID have the following defined roles (see Figure 6).

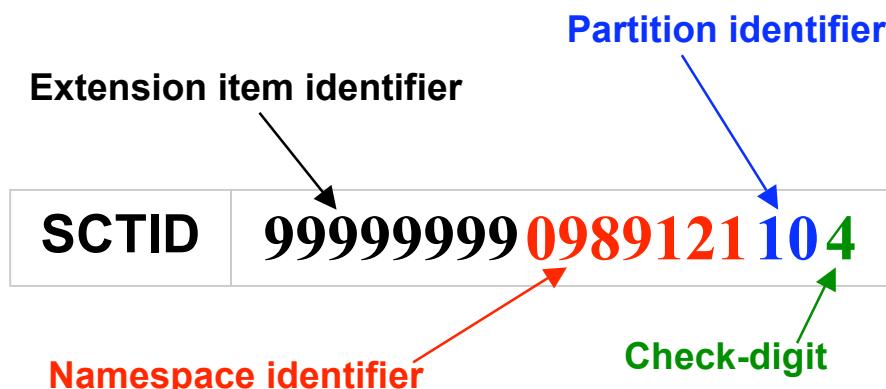
- ❖ A single check-digit is used to validate the identifier.
- ❖ A two-digit partition-identifier, which:
  - ❖ Ensures that the identifier is unique in the scope of SNOMED CT; for example, the same identifier cannot be allocated to a Concept and to a Description.
  - ❖ Ensures that the identifier of a component in a valid Extension of SNOMED CT cannot be the same as the identifier of a component in the main body of SNOMED CT.



**Figure 6 – SCTID Structure for centrally issued component**

#### C.4 SCTIDs and Extensions

If the partition-identifier indicates that the SCTID is part of an Extension the next seven-digits (from the right) are a namespace-identifier (see Figure 7). Namespace-identifiers are allocated to organizations which are authorized to issue Extensions. They enable unique SCTIDs to be issued by many organizations and allow each SCTID to be traced to an authorized originating organization.



**Figure 7 – SCTID Structure for a component in an Extension**

#### C.5 SCTID Constraints

The constraints on value range for SCTIDs allow consistent string and integer representation of these values.

Exclusion of negative values avoids potential formatting confusion in string representations.

The lower limit of 100,000 ensures the decimal string representation is at least six digits in length. This ensures that an SCTID can be distinguished from:

- ❖ A Read Code, which is 4 or 5 characters in length.
- ❖ A SNOMED ID, which always starts with a letter.

The upper limit of 18 digits ensures that any valid decimal string can be stored in either a signed or unsigned 64-bit integer.

## C.6 Check-digit

The final (units) digit of the SCTID is the check-digit.

It is not envisaged that users will be routinely required to type SCTID values. However, the objective of the check-digit is to detect the commonest types of error that may occur due to typographical errors on those occasions where transcription or communication mechanisms may introduce error. Examples may include high-level development such as creating or modifying protocols or pre-specified queries.

An SCTID is checked by using the "Verhoeff check", which is a Dihedral D<sub>5</sub> Check. This detects a higher proportion of common typographical errors than either the IBM or Modulus 11 check. Unlike the Modulus 11 check (used for the UK NHS number) it is effective on decimal strings longer than ten-digits. Furthermore its value can always be represented as a decimal digit without excluding any values.

See Appendix F for detailed information about the Verhoeff check-digit and sample program code.

## C.7 Partition-identifier

The penultimate two-digits of the SCTID (second and third from the right), are the partition-identifier.

The partition-identifier indicates the nature of the entity identified. This allows the identifier of a Description to be distinguished from the identifier of a Concept. It also allows SCTIDs issued centrally to components of the main body of SNOMED CT to be distinguished from components issued as parts of Extensions.

### Values

Identifiers of components in the main body of SNOMED CT have one of the following partition-identifier values:

- |    |                    |
|----|--------------------|
| 00 | A Concept          |
| 01 | A Description      |
| 02 | A Relationship     |
| 03 | A Subset           |
| 04 | A Cross Map Set    |
| 05 | A Cross Map Target |

Identifiers of components in Extensions have one of the following partition-identifier values:

- |    |                                    |
|----|------------------------------------|
| 10 | A Concept in an Extension          |
| 11 | A Description in an Extension      |
| 12 | A Relationship in an Extension     |
| 13 | A Subset in an Extension           |
| 14 | A Cross Map Set in an Extension    |
| 15 | A Cross Map Target in an Extension |

All other partition-identifier values are reserved for future use.

## C.8 Extension namespaces

If the partition-identifier indicates that the SCTID is part of an Extension the seven-digits immediately to the left of the partition-digit are a namespace-identifier.

Each organization that is authorized to issue Extensions is allocated a namespace-identifier. The authorized organization is permitted to assign any valid item identifier that ends with this string of digits.

SNOMED CT core release files include Namespace Concepts representing each of the allocated Namespace-identifiers. These Concepts have the following characteristics:

- ❖ They are direct subtypes of the Concept “Namespace Concept” which is a direct subtype of the Concept “Special Concept”.
- ❖ The Fully Specified Name has the form “Extension Namespace {nnnnnnn} (namespace concept) – where nnnnnnn is the seven digit Namespace-identifier.
- ❖ The Preferred Term associated with the Concept has the form “Extension Namespace nnnnnnn”
- ❖ Where appropriate Synonyms may be included to identify the nature of the Extension and/or responsible organization. However, this information may not be made available for all Namespaces due to privacy constraints.

## C.9 Item identifier digits

The remaining digits to the left of the partition-identifier (or in the case of Extensions, to the left of the namespace-identifier) are available to uniquely identify an individual entity within the specified partition. The same item identifier can be allocated in each partition and is rendered unique by the partition-identifier.

For components in the main body of SNOMED CT, item identifiers will usually be issued in the arbitrary order in which components are added to SNOMED Clinical Terms. Due to management of the editing process the sequence of issued item identifiers may be discontinuous and the order of identifiers should be regarded as meaningless.

## C.10 Example SCTIDs

The following SCTID examples are based on the above rules and illustrate the range of possible item identifiers within each partition.

SCTID	Partition-identifier	Check -digit	Notes
<b>1 0 0 0 0 5</b>	<b>00</b> =Concept	<b>5</b> =OK	The Item identifier digits '1000' are the lowest permitted value thus this is the lowest SCTID that can be allocated to a Concept.
<b>1 0 0 0 1 4</b>	<b>01</b> =Description	<b>4</b> =OK	This is the lowest SCTID that can be allocated to a Description.
<b>1 0 0 0 2 2</b>	<b>02</b> =Relationship	<b>2</b> =OK	This is the lowest SCTID that can be allocated to a Relationship.
<b>1 0 0 0 3 3</b>	<b>03</b> =Subset	<b>3</b> =OK	This is the lowest SCTID that can be allocated to a Subset.
<b>1 0 1 2 9 1 0 0 9</b>	<b>00</b> =Concept	<b>9</b> =OK	A valid SCTID for a Concept.
<b>1 2 9 0 0 2 3 4 0 1 0 1 5</b>	<b>01</b> =Description	<b>5</b> =OK	A valid SCTID for a Description.
<b>9 9 4 0 0 0 0 0 0 1 0 2 9</b>	<b>02</b> =Relationship	<b>9</b> =OK	A valid SCTID for a Relationship.
<b>4 0 0 9 9 9 0 1 0 3 7</b>	<b>03</b> =Subset	<b>7</b> =OK	A valid SCTID for a Subset.
<b>1 0 0 0 0 0 0 1 1 0 5</b>	<b>10</b> =Extra-Concept	<b>5</b> =OK	A valid SCTID for a Concept in an Extension in the <b>0000001</b> namespace.
<b>1 0 9 8 9 1 2 1 1 0 8</b>	<b>10</b> =Extra-Concept	<b>8</b> =OK	A valid SCTID for a Concept in an Extension in the <b>0989121</b> namespace.
<b>1 2 9 0 9 8 9 1 2 1 1 0 3</b>	<b>10</b> =Extra-Concept	<b>3</b> =OK	A valid SCTID for a Concept in an Extension in the <b>0989121</b> namespace.
<b>1 2 9 0 0 0 0 0 0 1 1 1 7</b>	<b>11</b> =Extra-Description	<b>7</b> =OK	A valid SCTID for a Description in an Extension in the <b>0000001</b> namespace.
<b>9 9 4 0 0 0 0 0 1 1 2 6</b>	<b>12</b> =Extra-Relationship	<b>6</b> =OK	A valid SCTID for a Relationship in an Extension in the <b>0000001</b> namespace.
<b>4 0 0 0 0 0 0 1 1 3 2</b>	<b>13</b> =Extra-Subset	<b>2</b> =OK	A valid SCTID for a Subset in an Extension in the <b>0000001</b> namespace.
<b>9 9 9 9 9 9 9 0 9 8 9 1 2 1 1 0 4</b>			The maximum valid SCTID for a Concept in an Extension in the <b>0989121</b> namespace.

## Appendix D. Distribution Files

### D.1 Distribution Media

The SNOMED CT International Release is distributed to most Affiliates by an IHTSDO Member National Release Center. The core files are in the standard flat file structure for healthcare terminology. See the *readme.txt* file for a complete list of files included in the release. These files can be loaded into the specific file or database system used at your location.

### D.2 File Formats

SNOMED CT files are UTF-8 encoded to support character sets from around the world. Some database products, such as Oracle, require UTF-8 to be specified in advance; if UTF-8 is not specified, there may be some difficulty with using and displaying the special characters used in some of the terms. Note that these special characters are used occasionally in the SNOMED English language edition, as well as in non-English editions. Some English language medical terms include the name of an individual which may contain special characters.

SNOMED CT release files are consistently named according to the following convention.

- ❖ sct\_filename\_yyyymmdd.txt
  - ✧ yyyymmdd represents the release date in ISO format

For example, SNOMED CT First Release (January 31, 2002) contains files named

- sct\_concepts\_20020131.txt
- sct\_descriptions\_20020131.txt
- sct\_relationships\_20020131.txt

A *readme.txt* file is distributed with each release. It contains a full list of all files and file sizes.

### D.3 Directory Structures and Naming Conventions

Where compressed files are used for distribution, each archive may contain multiple files and subdirectories. The archives are named to reflect the types of files they contain, the *yyyymmdd* version, and the file extension ".zip". For example:

- ❖ SNOMED\_CT\_International\_Release\_20070731\_essential.zip contains the following subdirectories and files:
  - ✧ Content
    - sct\_concepts\_20070731.txt
    - sct\_descriptions\_20070731.txt
    - sct\_relationships\_20070731.txt
  - ✧ Cross\_Maps
    - sct\_crossmapsets\_icdo\_20070731.txt
    - sct\_crossmaptargets\_icdo\_20070731.txt
    - sct\_crossmaps\_icdo\_20070731.txt
    - sct\_loinc\_file\_20050731.txt
    - sno2-srt\_bridge.zip
    - sno35-srt\_bridge.zip

- ❖ History
  - sct\_componenthistory\_20070731.txt
- ❖ Subsets
  - sct\_subsetmembers\_us\_20070731.txt
  - sct\_subsets\_us\_20070731.txt
  - sct\_subsetmembers\_uk\_20070731.txt
  - sct\_subsets\_uk\_20070731.txt
  - sct\_subsetmembers\_vtm\_vmp\_20070731.txt
  - sct\_subsets\_vtm\_vmp\_20070731.txt
  - sct\_subsetmembers\_doseform\_20070731.txt
  - sct\_subsets\_doseform\_20070731.txt

When uncompressed files are distributed, similar directories are used.

#### D.4 Terminology version information

- ❖ Information about the current release is contained in the Term of a Description for the Root Concept.
- ❖ The Description carrying this information is a Synonym (DescriptionType=2) and its status is current (DescriptionStatus=0).
- ❖ The Description conveying version information for each release has a unique DescriptionId (i.e. it is **not** a revision of a previous versioning Description)
- ❖ In each release there is only one Preferred Term and one current “version” Synonym associated with the Root Concept. All previous version Synonyms are non-current (DescriptionStatus=1).
- ❖ The information in the “version” synonym is represented in the Term field as follows:
  - ✧ SNOMED Clinical Terms version: yyyyymmdd [status] (description)
    - *status* represents a word indicating of whether this is a release [R] or has some other status (e.g. for development set [D], evaluation [E], etc.).
    - *yyyyymmdd* represents the release date in ISO format.
    - *description* is a textual description of the release (optional).
    - For example:
    - SNOMED CT 20020131 [R]
- ❖ Other synonyms may be active for the Root Concept.

SCT enabled applications must make this version information synonym visible, along with copyright and other similar information about the terminology.

## Appendix E. Unicode UTF-8 encoding

### E.1 Introduction

UTF-8 is an efficient encoding of Unicode character-strings that recognizes the fact that the majority of text-based communications are in ASCII. It therefore optimizes the encoding of these characters. UTF-8 is supported by many 32-bit Windows® applications.

Unicode is preferred to ASCII because it permits the inclusion of accents, scientific symbols and characters used in languages other than English. The UTF-8 format is a standard encoding that provides the most efficient means of encoding 16-bit Unicode characters in cases where the majority of characters are in the ASCII range. Both UTF-8 and the alternative UTF-16 encoding are supported by modern 32-bit operating systems such as Windows® 95, 98 and NT.

SNOMED CT uses UTF-8 characters.

### E.2 Character encoding

ASCII characters are encoded as a single byte.

- Greek, Hebrew, Arabic and most accented European characters are encoded as two bytes.
- All other characters are encoded as three bytes.
- The individual characters are encoded according to the following rules.

#### E.2.1 Single byte encoding

Characters in the range 'u+0000' to 'u+007f' are encoded as a single byte.

byte 0	
0	bits 0-6

#### E.2.2 Two byte encoding

Characters in the range 'u+0080' to 'u+07ff' are encoded as two bytes.

byte 0				byte 1		
1	1	0	bits 6-10	1	0	bits 0-5

#### E.2.3 Three byte encoding

Characters in the range 'u+0800' to 'u+ffff' are encoded as three bytes:

byte 0				byte 1			byte 2			
1	1	1	0	bits 12-15	1	0	bits 6-11	1	0	bits 0-5

### E.3 Notes on encoding rules

The first bits of each byte indicate the role of the byte. A zero bit terminates this role information. Thus possible byte values are:

Bits	Byte value	Role
0 ????????	000-127	Single byte encoding of a character
1 0???????	128-191	Continuation of a multi-byte encoding
1 1 0???????	192-223	First byte of a two byte character encoding
1 1 1 0???????	224-239	First byte of a three byte character encoding
1 1 1 1???????	240-255	Invalid in UTF-8

### E.4 Example encoding

Character	S	C	T	®	Â
Unicode	0053	0043	0054	00AE	2462
Bytes	01010011	01000011	01010100	11000010	10101110

11101111	10111111	10111111
----------	----------	----------

## Appendix F. Check-digit computation

### F.1 Introduction

The SCTID (See Appendix C) includes a check-digit, which is generated using Verhoeff's dihedral check. This section explains the reasons for including a check-digit and the rationale for use of this particular algorithm. It also includes sample source code for generating and checking the check-digit in Java Script and Microsoft Visual Basic.

### F.2 Reasons for using a check-digit

Although a user should rarely type the SCTID, experience suggests that from time to time this will happen. A user may also copy and paste an SCTID. There is a significant risk of errors in these processes and inclusion of a check-digit is intended to reduce the risk of such errors passing undetected. The choice of check-digit algorithm has been made to maximize the detection of common typographical errors. These have been analyzed by in a paper by J. Verhoeff (*Error Detecting Decimal Codes*, Mathematical Centre Tract 29, The Mathematical Centre, Amsterdam, 1969) and subsequently cited in Wagner and Putter, ("Error Detecting Decimal Digits", CACM, Vol 32, No. 1, January 1989). These papers give a detailed categorization of the sorts of errors humans make in dealing with decimal numbers, based on a study of 12000 errors:

- ❖ single errors:  $a$  becomes  $b$  (60% to 95% of all errors)
- ❖ omitting or adding a digit (10% to 20%)
- ❖ adjacent transpositions:  $ab$  becomes  $ba$  (10% to 20%)
- ❖ twin errors:  $aa$  becomes  $bb$  (0.5% to 1.5%)
- ❖ jump transpositions:  $acb$  becomes  $bca$  (0.5% to 1.5%)
- ❖ jump twin errors:  $aca$  becomes  $bcb$  (below 1%)
- ❖ phonetic errors:  $a0$  becomes  $1a$  - similar pronunciation e.g. thirty or thirteen (0.5% to 1.5%)

In the explanations above,  $a$  is not equal to  $b$ , but  $c$  can be any decimal digit.

## F.3 A brief comparison of check-digit effectiveness

### F.3.1 The IBM Check

The check-sums used for credit cards (the IBM check) picks up the most common errors but miss some adjacent transpositions and many jump transpositions. Assuming the pattern of errors described above, on average it will miss between 4% and 5% of expected errors.

### F.3.2 The ISBN Check (Modulus 11)

The ISBN modulus 11 (used for UK NHS number) picks up more errors than the IBM check-sum. Leaving 2% to 3% of errors undetected. However, it generates a check-sum value of 0 to 10 and thus cannot be represented as a single check-digit in about 9% of cases. The ISBN convention is to use "X" to represent the check-digit value 10 but this is incompatible with an integer representation. The UK NHS number uses this check-sum but regards any number generating a check-sum of 10 as an invalid identifier. This approach could be applied to the SCTID but this would render 9% of possible values unusable in each partition and namespace. This would prevent a simple sequence of values from being allocated as the "item identifier" within each namespace. More significantly the unusable item identifiers would differ in each namespace or partition and this would prevent simple transpositions of item identifiers between partitions and namespaces. Partitions could be a useful way of distinguishing developmental and released components and revising the partition and recalculating the check-digit would then be an elegant way to activate these components for a distribution version. It seems unwise to prevent future development and maintenance by using a check-sum that will prevent this.

### F.3.3 Verhoeff's Check

Verhoeff's check catches all single errors, all adjacent transpositions, over 95% of twin errors, over 94% of jump transpositions and jump twin errors, and most phonetic errors. Therefore, like modulus 11, the Verhoeff check reduces the undetected error rate to 2% or 3%. Unlike modulus 11, it does this using a single decimal check-digit and without limiting the range of valid numbers.

The majority of the undetected errors with both modulus 11 and Verhoeff result from additions or omissions of digits. Any check-digit method is likely to miss 10% of such errors and since these comprise 10% to 20%. The Verhoeff scheme also misses four jump twin errors involving digits with a difference of 5 (i.e. 050 vs. 505, 161 vs. 616, 272 vs. 727, and 494 vs. 949).

## F.4 Verhoeff's Dihedral Group D5 Check

The mathematical description of this technique may appear complex but in practice it can be reduced to a pair of two-dimensional arrays, a single dimensional inverse array and a simple computational procedure. These three arrays are shown in Figure 8.

- ❖ The first array contains the result of "Dihedral D5" multiplication.
- ❖ The second array consists of 8 rows of which two are defined while the rest are derived by applying the following formula:  $F(i, j) = F(i - 1, F(1, j))$ .
- ❖ The third array consists of a single row containing the inverse of the Dihedral D5 array it identifies the location of all the zero values in the first array.

Results of Dihedral D5 multiplication										The full array for Function $F$											
	0	1	2	3	4	5	6	7	8	9		0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9	0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	0	6	7	8	9	5	1	1	5	7	6	2	8	3	0	9	4
2	2	3	4	0	1	7	8	9	5	6	2	5	8	0	3	7	9	6	1	4	2
3	3	4	0	1	2	8	9	5	6	7	3	8	9	1	6	0	4	3	5	2	7
4	4	0	1	2	3	9	5	6	7	8	4	9	4	5	3	1	2	6	8	7	0
5	5	9	8	7	6	0	4	3	2	1	5	4	2	8	6	5	7	3	9	0	1
6	6	5	9	8	7	1	0	4	3	2	6	2	7	9	3	8	0	6	4	1	5
7	7	6	5	9	8	2	1	0	4	3	7	7	0	4	6	9	1	3	2	5	8
8	8	7	6	5	9	3	2	1	0	4	0	0	4	3	2	1	5	6	7	8	9
9	9	8	7	6	5	4	3	2	1	0	9	0	4	6	9	1	3	2	5	8	0

The Inverse D5 array										
	0	1	2	3	4	5	6	7	8	9
	0	4	3	2	1	5	6	7	8	9

Figure 8 – The arrays used in the Verhoeff check

The identifier is checked by starting at the rightmost digit of the identifier (the check-digit itself) and proceeding to the left processing each digit as follows:

- ❖ **Check = ArrayDihedralD5 (Check, ArrayFunctionF((Position Modulus 8), Digit))**  
 Check = the running value of the check-sum (starts at zero and modified by each step).  
 Position = the position of the digit (counted from the right starting at zero).  
 Digit = the value of the digit.

The final value of *Check* should be zero. Otherwise the check has failed.

When calculating the check-digit the same process is applied with a minor variation:

- ❖ *Position* is the position that the digit *will have* when the check-digit has been appended.
- ❖ The final value of *Check* is applied to the Inverse D5 array to find the correct check-digit.  
*Check-digit = ArrayInverseD5 (Check).*

## F.5 Sample Java Script for computing Verhoeff's Dihedral Check

The script is presented here as part of an HTML page.

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML><HEAD><TITLE>Verhoeff's Check</TITLE>
<META content="text/html; charset=iso-8859-1" http-equiv=Content-Type>
<SCRIPT language=JavaScript>

<!-- Hide script

var FnF = new Array();
FnF [ 0 ] = [ 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 ];
FnF [ 1 ] = [ 1, 5, 7, 6, 2, 8, 3, 0, 9, 4 ];
for ( var i = 2; i < 8; i++ )
{
  FnF [ i ] = [,,,,,,];
  for ( var j = 0; j < 10; j++ )
    FnF [ i ][ j ] = FnF [ i - 1 ][ FnF [ 1 ][ j ] ];
}
var Dihedral = new Array(
  [ 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 ],
  [ 1, 2, 3, 4, 0, 6, 7, 8, 9, 5 ],
  [ 2, 3, 4, 0, 1, 7, 8, 9, 5, 6 ],
  [ 3, 4, 0, 1, 2, 8, 9, 5, 6, 7 ],
  [ 4, 0, 1, 2, 3, 9, 5, 6, 7, 8 ],
  [ 5, 9, 8, 7, 6, 0, 4, 3, 2, 1 ],
  [ 6, 5, 9, 8, 7, 1, 0, 4, 3, 2 ],
  [ 7, 6, 5, 9, 8, 2, 1, 0, 4, 3 ],
  [ 8, 7, 6, 5, 9, 3, 2, 1, 0, 4 ],
  [ 9, 8, 7, 6, 5, 4, 3, 2, 1, 0 ] );

var InverseD5 = new Array( 0, 4, 3, 2, 1, 5, 6, 7, 8, 9 );

function VerhoeffCheck()
{
  var check = 0;
  var IdValue = document.form.numcd.value;
```

```
for ( var i=IdValue.length-1; i >=0; i-- )
    check = Dihedral[ check ][ FnF [ (IdValue.length-i-1) % 8 ] [ IdValue.charAt(i)]];
if ( check != 0 )
    document.form.out.value = "ERROR";
else
    document.form.out.value = "OK"
}

function VerhoeffCompute( )
{
    var IdValue = document.form.num.value;
    var check = 0;
    for ( var i = IdValue.length-1; i >=0; i-- )
        check = Dihedral[ check ][ FnF [(IdValue.length-i) % 8 ] [ IdValue.charAt(i)]];
    document.form.numcd.value = document.form.num.value + InverseD5 [ check ];
}
// end script hiding -->
</SCRIPT>
</HEAD>
```

```
<BODY>
<h1>Verhoeff's Dihedral Check Digit</h1>
<FORM name=form>
<table border="1" width="441" height="101">
<tr>
    <td width="212" height="25">
Input value (without check-digit)&nbsp;</td>
    <td width="115" height="25">
        <INPUT name=num size=15>
    </td>
    <td width="92" height="25">
        <INPUT onclick= VerhoeffCompute() type=button value="Compute">
    </td>
</tr>
<tr>
```

```
<td width="212" height="35">&nbsp;&nbsp;
Value with check-digit&nbsp;&nbsp;&nbsp;</td>
<td width="115" height="35">
<INPUT name=numcd size=15>
</td>
<td width="92" height="35">
<INPUT onclick= VerhoeffCheck() type=button value="Check">
</td>
</tr>
<tr>
<td width="212" height="23">&nbsp;
Result of check&nbsp;</td>
<td width="115" height="23"><!--webbot bot="Validation" S-Data-Type="String"
B-Value-Required="TRUE" --><INPUT name=out size=6 style="background-color: #FFFF00">
</td>
<td width="92" height="23"></td>
</tr>
</table>
<p style="margin-left: 0; margin-right: 0">This code was based on a web page at:</p>
<ul>
<li>
<p style="margin-left: 0; margin-right: 0">&nbsp; <a href="http://www.augustana.ab.ca/~mohrj/algorithms/checkdigit.html">http://www.augustana.ab.ca/~mohrj/algorithms/checkdigit.html</a></li>
</ul>
</FORM>
</BODY>
</HTML>
```

*Note:*

The code above can be used by copying all the lines in the above section into a plain text document and naming it "checksum.htm". Then open that document in a web browser.

## F.6 Sample Visual Basic for computing Verhoeff's Dihedral Check

```

Private Dihedral(9) As Variant
Private FnF(7) As Variant
Private InverseD5 As Variant
Public Function VerhoeffCheck(ByVal IdValue As String) As Boolean
'Check the supplied value and return true or false
Dim tCheck As Integer, i As Integer
    VerhoeffArrayInit
    For i = Len(IdValue) To 1 Step -1
        tCheck = Dihedral(tCheck)(FnF((Len(IdValue) - i) Mod 8)(Val(Mid(IdValue, i, 1))))
    Next
    VerhoeffCheck = tCheck = 0
End Function

Public Function VerhoeffCompute(ByVal IdValue As String) As String
Dim tCheck As Integer, i As Integer
'Compute the check digit and return the identifier complete with check-digit
    VerhoeffArrayInit
    For i = Len(IdValue) To 1 Step -1
        tCheck = Dihedral(tCheck)(FnF((Len(IdValue) - i + 1) Mod 8)(Val(Mid(IdValue, i, 1))))
    Next
    VerhoeffCompute = IdValue & InverseD5(tCheck)
End Function

Private Sub VerhoeffArrayInit()
'Create the arrays required
Dim i As Integer, j As Integer
'if already created exit here
    If VarType(InverseD5) >= vbArray Then Exit Sub
'create the DihedralD5 array
    Dihedral(0) = Array(0, 1, 2, 3, 4, 5, 6, 7, 8, 9)
    Dihedral(1) = Array(1, 2, 3, 4, 0, 6, 7, 8, 9, 5)
    Dihedral(2) = Array(2, 3, 4, 0, 1, 7, 8, 9, 5, 6)
    Dihedral(3) = Array(3, 4, 0, 1, 2, 8, 9, 5, 6, 7)
    Dihedral(4) = Array(4, 0, 1, 2, 3, 9, 5, 6, 7, 8)
    Dihedral(5) = Array(5, 9, 8, 7, 6, 0, 4, 3, 2, 1)
    Dihedral(6) = Array(6, 5, 9, 8, 7, 1, 0, 4, 3, 2)
    Dihedral(7) = Array(7, 6, 5, 9, 8, 2, 1, 0, 4, 3)
    Dihedral(8) = Array(8, 7, 6, 5, 9, 3, 2, 1, 0, 4)
    Dihedral(9) = Array(9, 8, 7, 6, 5, 4, 3, 2, 1, 0)
'create the FunctionF array
    FnF(0) = Array(0, 1, 2, 3, 4, 5, 6, 7, 8, 9)
    FnF(1) = Array(1, 5, 7, 6, 2, 8, 3, 0, 9, 4)
'compute the rest of the FunctionF array

```

```
For i = 2 To 7
  FnF(i) = Array(0, 0, 0, 0, 0, 0, 0, 0, 0, 0)
  For j = 0 To 9
    FnF(i)(j) = FnF(i - 1)(FnF(1)(j))
  Next
Next
'Create the InverseD5 array
InverseD5 = Array("0", "4", "3", "2", "1", "5", "6", "7", "8", "9")
End Sub
```

## Appendix G. Top-Level and Special Concepts

### G.1 The Root Concept

The Concepts Table includes one special Concept referred as the "Root Concept". This represents the root of the entire contents of SNOMED CT.

All other Concepts are descended from the Root Concept via at least one series of Relationships of the Relationship Type "IS A" (i.e. all other Concepts are regarded as subtypes of this Concept).

The SCTID of the Root Concept is "138875005".

In each release of SNOMED CT the Root Concept will be associated with a Description stating the release date in a human readable form. The objective of this is to provide a simple implementation independent mechanism for checking the current installed release of SNOMED CT.

### G.2 Top Level Concepts

Concepts that are directly related to the Root Concept by a single Relationship of the Relationship Type "IS A", are referred to a "Top-Level Concept". All other Concepts are descended from one Top-Level Concept via at least one series of Relationships of the Relationship Type "IS A" (i.e. all other Concepts are subtypes of one Top-Level Concept).

Most Top-Level Concepts represent broad groups of clinically related concepts. These include:

- ❖ Clinical finding
- ❖ Procedure
- ❖ Observable entity
- ❖ Social context
- ❖ Body structure
- ❖ Organism
- ❖ Substance
- ❖ Physical object
- ❖ Physical force
- ❖ Event
- ❖ Environment or geographic location
- ❖ Specimen
- ❖ Situation with explicit context
- ❖ Staging and Scales
- ❖ Pharmaceutical/biological product
- ❖ Record artifact

Three Top-Level Concepts have more specific structural roles in the terminology.

- ❖ Linkage concept
- ❖ Qualifier value
- ❖ Special concept

These special concepts are discussed in the following sections. The clinical concepts are discussed in the SNOMED CT User Guide.

### **Linkage concept**

All Concepts that can be used as a Relationship Types are subtypes of the top-level concept “Linkage concept”.

### **Qualifier Value**

Subtypes of the top-level concept “Qualifier Value” are only suitable for use as the value of an attribute. A value may be used in a defining Relationship or as a qualifier in a post-coordinated expression.

### **Special Concept**

The top-level concept “Special concept” and its children provide concepts that are not part of the active clinical terminology.

The subtypes of “Special concept” are:

- ❖ Namespace concept
- ❖ Navigation concept
- ❖ Inactive concept

These are discussed in the following sections.

#### 1) Namespace Concept

These concepts describe the valid Extension namespace identifiers that have been assigned. (See “Introducing Extensions” and Appendix C – SCTID).

#### 2) Navigation Concept

These concepts are used only as nodes in a Navigation Subset. They are not suitable for data recording or aggregation.

The subtypes of “Navigation concept” are Navigation Concepts with the following characteristics:

- ❖ No “IS A” subtypes.
- ❖ No “IS A” supertypes other than “Navigation concept” (and in the case of a non-current Navigation Concept only concept “non-current concept”).
- ❖ Associated with other Concepts by Navigation Links (See “Introducing Subsets”).

#### 3) Inactive concept

These concepts are no longer considered active within SNOMED CT. There is one hierarchical level which consists of these subtypes:

- ❖ Reason not stated
- ❖ Duplicate
- ❖ Outdated
- ❖ Ambiguous
- ❖ Erroneous
- ❖ Moved Elsewhere

Each inactive concept falls into one of these six subtypes based upon its ConceptStatus value of 1, 2, 3, 4, 5, or 10. There is no further subtyping of non-current concepts. Note that concepts with a ConceptStatus value of 6 (limited) are considered active and therefore are not included in the non-current hierarchy.

## Appendix H. Cross Mappings Guide

### H.1 Introduction

SNOMED Clinical Terms® (SNOMED CT®) contains cross-mapping tables (perhaps more correctly referred to as cross-reference tables) from clinical *concepts* in SNOMED CT to categories listed in classifications such as ICD-9-CM.

These classifications are used for data aggregation and analysis and are used by health care systems and services around the world. Effective and efficient use of these files requires an understanding of the rules, conventions and principles of the classification as well as SNOMED itself.

This section describes the principles used in developing these cross mappings, the technical schema and a number of examples to communicate how the SNOMED cross mapping could be used to translate from SNOMED CT to target mapping(s).

These cross mapping files are available for the following classifications:

		<b>Version</b>
ICD-9-CM	International Classification of Diseases 9 <sup>th</sup> Revision Clinical Modification	Updated Version for 2007
ICD-O	International Classification of Diseases for Oncology Geneva, World Health Organization	Version 2 Version 3

The cross-mapping approach in SNOMED Clinical Terms is based on these general principles.

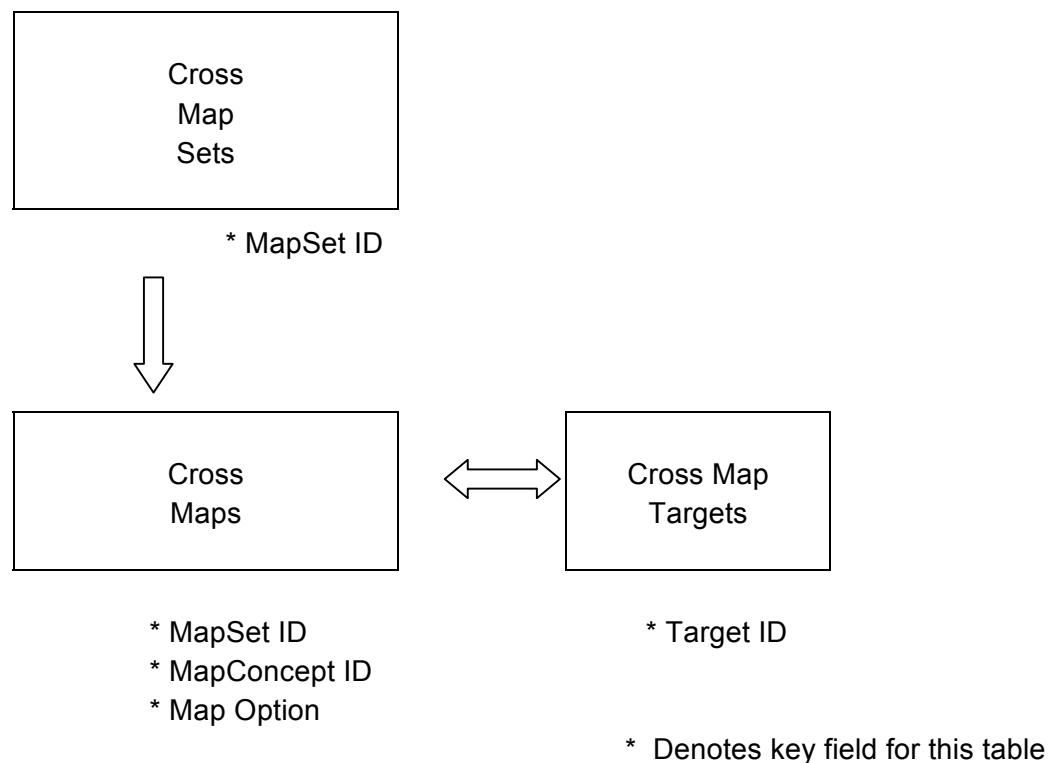
- ❖ SNOMED CT concepts always retain their meaning.
  - ✧ SNOMED CT is a concept-based reference terminology where extensive scientific expertise has been utilized to provide a rich work of medical concepts along with their descriptions, synonyms, logical descriptors and relationships to other concepts. Therefore, in developing these mappings, SNOMED concepts have retained their meaning and not the meaning suggested by a classification.
- ❖ Automated mapping is a goal.
  - ✧ The cross mapping scheme is designed to support automated cross mapping (in future releases) by striving for one-to-one mappings when possible and by providing a technical schema that supports rule-based processing.
- ❖ Implementation Review of mappings is expected.
  - ✧ The mapping files are intended as tools to jumpstart SNOMED sites in cross mapping projects. It is expected that each site will review these files and implement cross mapping functions and values specific to their needs.
  - ✧ Some concepts may be part of a SNOMED extension file and can be ignored if that extension is not used. These concepts are designed with a 10 in the partition identifier component of the concept ID.

In this appendix, these terms are used with the following intended meaning. More extensive and authoritative definitions can be found in the SNOMED CT Glossary.

Term	Meaning
<b>Concept</b>	A SNOMED CT clinical concept.
<b>Concepts Table</b>	One of the three SNOMED CT “core” tables that contains the SNOMED CT concepts.
<b>Cross Map</b>	The mapping from a single SNOMED CT concept to the Target Scheme.
<b>Cross Maps Table</b>	One of the three SNOMED CT Cross Mapping tables. This table contains the identifier for the SNOMED CT concept and a link to another table that contains the relevant Target Codes.
<b>Target Scheme</b>	A terminology, coding scheme, or classification to which some or all SNOMED CT concepts are mapped; for example, <i>ICD-9-CM</i> is a Target Scheme.
<b>Target Code</b>	A value in the Target Scheme. The Cross Map relates a SNOMED CT concept to one or more Target Codes.
<b>Cross Maps Target Table</b>	One of the three SNOMED CT Cross Mapping tables. This table contains the Target Codes.
<b>Cross Mapping</b>	One of the mappings from SNOMED CT to another classification scheme (also known as Target Scheme); for example, <i>SNOMED CT to ICD-9-CM</i> is one Cross Mapping.
<b>Cross Map Set</b>	The collection of maps for a Target Scheme. Could also be called a Cross Mapping.
<b>Cross Map Sets Table</b>	One of the three SNOMED CT Cross Mapping tables. This table contains general information about each Cross Mapping (Cross Map Set), such as the name of the Target Scheme and the version that was used for the Cross Mapping.

### Specification of cross-reference schema

The SNOMED CT structure for supporting Cross Maps includes three tables specific to the cross map function. The structure of these tables provides tremendous flexibility to support the expression and delivery of several types of cross mappings. The technical structure of these tables is summarized elsewhere in the Technical Reference Guide.



**Figure 9 – Overview of Cross Map Schema**

## H.2 SNOMED CT to ICD-9-CM Epidemiological and Statistical Map

ICD-9-CM, the International Classification of Diseases 9<sup>th</sup> Revision Clinical Modification Version, is a coding scheme sponsored by the National Center for Health Statistics (NCHS). It is used extensively in the United States for reporting and tracking of mortality, statistical reporting of diseases as well as billing and reimbursement processing. The SNOMED CT to ICD-9-CM cross-map uses the 2007 Updated Version of ICD-9-CM that includes changes that are effective as of October 1, 2006. It includes all the SNOMED CT Clinical Findings (disorders and findings).

**It is important to note that this mapping table is NOT intended for direct billing or reimbursement without additional authoritative review.**

Whenever possible, the ICD code or codes(s) with the highest level of specificity have been selected. Terms that cannot be assigned to appropriate ICD-9-CM code or codes are considered unmappable. They are denoted by a null in the Target Codes field and a zero in the MapAdvice field.

### H.2.1 Mapping Categorization Methodology

The MapAdvice field in the Cross Maps table contains the categorization methodology that provides further information about the characteristics of the map. The methodology is as follows:

Category	Description
0	Unmappable. SNOMED term cannot be assigned to an appropriate ICD-9-CM code.
1	One to one SNOMED to ICD map. The SNOMED and ICD correlates are identical or synonyms; or the SNOMED term is listed as an inclusion within the target ICD code description. <ul style="list-style-type: none"> <li>• Many SNOMED concepts can map to the same ICD target code description.</li> <li>• More than one ICD code may be required to fully describe the SNOMED concept.</li> </ul>
2	Narrow to Broad SNOMED to ICD map. The SNOMED source code is more specific than the ICD target code.
3	Broad to Narrow SNOMED to ICD map. The SNOMED code is less specific than the ICD target code.
4	Partial overlap between SNOMED and ICD. Overlap exists between correlates and additional patient information and rules are necessary to select an appropriate mapping.

### H.2.2 SNOMED CT to ICD-9-CM Cross Mapping – Examples

The following examples show the details of how this mapping is delivered.

### H.2.2.1 Sunburn of second degree

This example involves one-to-one mapping from the SNOMED Clinical Terms concept Sunburn of Second Degree to the ICD-9-CM category represented by the code '692.76.'

This concept is active in the SNOMED CT Concepts Table.

#### Concepts Table

ConceptID	Concept Status	FullySpecifiedName	CTV3ID	SNOMEDID	IsPrimitive
200834004	0	Sunburn of second degree (disorder)	M1276	DD-10319	1

The relevant classification is ICD-9-CM.

MapSet Type = 2 means that it is a multiple map in which each unique SNOMED concept maps to either one target code or a set of target codes. The SNOMED concept is never duplicated in more than one row; that is, each concept has one and only one map. However, that map can contain more than one target code.

#### Cross Maps Sets Table

MapSetID	MapSetName	MapSetType	MapSetSchemaId	MapSetSchemeName	MapSetSchemeVersion	MapSetRealmId <sup>1</sup>	MapSetSeparator	MapSetRuleType <sup>1</sup>
100046	ICD-9-CM Map	2	2.16.840.1.113883.6.5.2.1	International Classification of Diseases and Related Health Problems, 9 <sup>th</sup> Revision, Clinical Modifications.	2006			

The Map TargetId field identifies the row in the Targets Table with the target codes for this SNOMED concept. The MapAdvice field contains a value of 1 as the categorization methodology, which, for this SNOMED to ICD-9-CM mapping, means a 1:1 mapping.

#### Cross Maps Table (Maps Table)

MapSetId (taken from Maps table above)	MapConceptId	MapOption <sup>1</sup>	MapPriority <sup>1</sup>	MapTargetId	MapRule <sup>1</sup>	MapAdvice
100046	200834004	0	0	1381051		1

The TargetCodes are an approximation of the closest ICD-9-CM codes or codes (692.76) that best represent the SNOMED concept.

#### Cross Map Targets Table (Targets Table)

TargetId	TargetSchemaId	TargetCodes	TargetRule <sup>1</sup>	TargetAdvice <sup>1</sup>
1381051	2.16.840.1.113883.6.5.2.1	692.76		

<sup>1</sup> Not currently used in SNOMED CT

## H.2.2.2 Pulmonary hypertension with extreme obesity

This concept is active in the SNOMED CT Concepts Table.

### Concepts Table

ConceptID	Concept Status	FullySpecifiedName	CTV3ID	SNOMEDID	IsPrimitive
276792008	0	Pulmonary hypertension with extreme obesity (disorder)	Xa0Cx	D3-40324	1

Note: The MapSet Separator field has a value of bar.

### Cross Maps Sets Table

MapSetID	MapSet Name	MapSet Type	MapSet SchemaId	MapSet Scheme Name	MapSet Version	MapSet RealmId <sup>1</sup>	MapSet Separator	MapSet Rule Type <sup>1</sup>
100046	ICD-9-CM Map	2	2.16.840.1.113883.6.5.2.1	ICD-9-CM	2005			

The MapAdvice field contains a value of 2 as the categorization methodology, which means a narrow-to-broad mapping.

### Cross Maps Table (Maps Table)

MapSetId (taken from Maps table above)	Map ConceptId	Map Option <sup>1</sup>	Map Priority <sup>1</sup>	Map TargetId	Map Rule <sup>1</sup>	Map Advice
100046	276792008	0	0	329056		2

The TargetCodes field contains approximation of the closest ICD-9-CM codes or codes (416.8, 278.00) that best represent the concept. Note that the values are separated by a bar ( | ), as specified in the MapSet Separator field in the Cross Maps Set Table.

### Cross Map Targets Table (Targets Table)

TargetId	TargetSchemaId	TargetCodes	TargetRule <sup>1</sup>	TargetAdvice <sup>1</sup>
329056	2.16.840.1.113883.6.5.2.1	278.00 416.8		

<sup>1</sup> Not currently used in SNOMED® CT

## H.3 SNOMED to ICD-O Cross Mapping

The International Classification of Diseases for Oncology (ICD-O) is sponsored by the World Health Organization and is used for reporting the topography, morphology and behavior of neoplasms. It is widely used by cancer registries in the United States and abroad for reporting of cancer cases.

The SNOMED CT to ICD-O Topography map consists of a one-to-one mapping from concepts in the SNOMED Body Structure hierarchy to the topography concepts in ICD for Oncology (ICD-O-2 and ICD-O-3).

Cancer registries receiving SNOMED CT-encoded information from health care providers, especially anatomical pathology laboratories, will find this translation helpful. The two most important items of medical information for a cancer patient are the primary site of the tumor and morphologic or histological type of the tumor as diagnosed microscopically by a pathologist.

Reportable cancer cases can be identified by SNOMED CT codes describing tumor morphology and behavior – codes that represent reportable neoplasms. The ICD-O morphology codes are drawn from SNOMED CT. These codes are in the *SNOMEDID* field of the Concepts Table in the M8 and M9 series.

Topography codes are also needed by cancer registries to identify the site of the tumor. The topography terms of SNOMED CT are more extensive and are not identical to the topography section of ICD-O. SNOMED CT includes codes not found in ICD-O; for example, SNOMED CT has specific codes for paired anatomic structures for laterality such as left breast while ICD-O does not. In addition, SNOMED includes terms expressed more specifically than in ICD-O such as “subcutaneous and other Soft tissues of lower limb and hip” in ICD-O. And finally, SNOMED CT includes more terms than those needed to identify cancer sites; for example, “nail” is unmappable to ICD-O because the nail is not a site for neoplastic disease.

The mapping from ICD-O to SNOMED was a collaborative effort between the College of American Pathologists (CAP), the Centers for Disease Control and Prevention (CDC) and the National Cancer Institute (NCI). The IHTSDO would like to acknowledge and offer special thanks to Daniel S. Miller, MD, MPH, former head of the Division of Cancer Prevention and Control, CDC and Mary L. Lerchen, DrPH, MS, Public Health Practice Program Office, CDC who initiated this effort on behalf of cancer registries.

### H.3.1 SNOMED CT to ICD-O Cross Mapping – Example

The following example shows how this mapping is delivered.

#### H.3.1.1 Gastric fundus structure

This example involves SNOMED Clinical Terms concept *Gastric fundus structure* to the ICD-O classification represented by the code ‘C16.1.’

This concept is active in the SNOMED CT Concept Table.

#### ConceptsTable

ConceptId	ConceptStatus	FullySpecified Name	CTV3ID	SNOMEDID	Is Primitive
414003	0	Gastric fundus structure (body structure)	X7551	T-57400	1

The relevant classification is ICD-O.

*MapSet Type = 1* means that all maps are one-to-one mappings. The SNOMED concept is never duplicated in more than one row; that is, each concept has one and only one map.

### Cross Map Sets Table

MapSetId	MapSetName	MapSetType	MapSetSchemeId	MapSetSchemeName	MapSetSchemeVersion	MapSetRealmId <sup>1</sup>	MapSetSeparator	MapSetRuleType <sup>1</sup>
102041	ICD-O-3	1	2.16.840.1.1 13883.6.5.2.	International Classification of 2 Diseases for Oncology, 3rd Edition	2001			

### Cross Maps Table

MapSetId	MapConceptId	MapOption <sup>1</sup>	MapPriority <sup>1</sup>	MapTargetId	MapRule <sup>1</sup>	MapAdvice
102041	414003	0	1	2977055		

The *TargetCodes* are an approximation of the closest ICD-O codes or codes (C16.1) that best represent the SNOMED concept.

### Cross Map Target Table

TargetId	TargetSchemeId	TargetCodes	TargetRule <sup>1</sup>	TargetAdvice <sup>1</sup>
2977055	2.16.840.1.113883.6.5.2.2	C16.1		

<sup>1</sup> Not currently used in SNOMED® CT.

## H.4 SNOMED CT – LOINC®

Please see Appendix B.5.4 for details about SNOMED CT – LOINC integration.

## H.5 Cross Mapping Rules (For Future Use)

Please contact the IHTSDO before using these specifications. Additional work has been done on a first step to a rules-based ICD-9-CM mapping that may ultimately cause some revision to the rest of this section.

### H.5.1 Introduction

The discussion of rules is included although rules are not yet used in the released SNOMED CT Cross Maps. However, this feature may be of interest to implementers.

The objective of the MapRule fields is to allow addition of machine-processable instructions that then allow automated cross mappings even in cases where there is more than one way to map a particular SNOMED CT Concept. For Concepts with several alternative Cross Maps, the rules contained in each Cross Map should be checked to determine which is most appropriate in the context of a particular patient record.

This section provides an initial syntax of mapping rules and discussion of some possible variants.

### H.5.2 Nature of the Rules

The types of rules required may vary according to the nature of the Target Scheme. However, the following general types of rule can be recognized in several different types of mapping:

- ❖ Age or sex of the person to whom the Concept is applied.
- ❖ Qualifiers associated with the mapped Concept.
- ❖ Temporal attributes of the mapped Concept.
- ❖ Coexistent conditions
  - ❖ Including pathological conditions and other conditions (e.g. pregnancy)
- ❖ Related statements:
  - ❖ Procedure applied to particular condition.
  - ❖ Condition treated by particular procedure.
  - ❖ Condition arising as a result of particular procedure.
  - ❖ Other statements of causation (e.g. condition caused by accident).

### H.5.3 Representation

Each type of rule can be expressed as a function with parameters which when evaluated returns a true or false result (similar to the NHS Casemix grouper tools). Alternatively the rules could be expressed as SQL style queries against an agreed common core data model (similar to the NHS MIQUEST Health Query Language). In either case, the end result is a decision that either accepts or rejects a particular mapping.

Whichever form of representation is used the Extensible Markup Language (XML) is suggested as a general-purpose syntax because it supports flexible expressions and facilitates parsing. Thus the content of the MapRule is an XML string that contains one or more elements. According to the form of expression each element may represent either a function with parameters or query predicate.

## H.5.4 Processing order

### H.5.4.1 Introduction

When determining which of a set of cross map options is to be used for mapping a particular Concept a further consideration is the order in which the rules are tested.

The following example is used to illustrate each of the options:

Concept "A" can be mapped to one or more of the five possible cross map codes ("V","W","X","Y","Z")

- ❖ "V" applies if the patient does not have co-existing condition "B" or "C".
- ❖ "W" applies if the patient is under aged 60 and has co-existing condition "B"
- ❖ "X" applies if the patient is aged 60 or over and has co-existing condition "B"
- ❖ "Y" applies if the patient is under aged 60 and has co-existing condition "C"
- ❖ "Z" applies if the patient is aged 60 or over and has co-existing condition "C"

In addition to the five single target code options, there are two possible combinations

- ❖ "W,Y" and "X,Z" indicating the presence of co-existing conditions "B" and "C" in either age group.

### H.5.4.2 Order Implementation processing

To allow order independent processing of Cross Maps, the rules associated with all options for mapping a Concept must be complete and mutually exclusive. For every possible occurrence of a Concept only one Cross Map must have a mapping rule that evaluates as true.

If this approach is followed, there is no opportunity to optimize the order of processing and no easy way to provide a catch-all default option to be applied if all other rules fail. Several Cross Maps may include the same function or predicate as part of their rules and this may require complex evaluations to be performed more than once.

*Example:*

Concept	Option	Rule	TargetId	TargetCodes
"A"	1	NOT Coexists "B" AND NOT Coexists "C"	101050	V
"A"	2	Age < 60 AND Coexists "B" AND NOT Coexists "C"	102056	W
"A"	3	Age >= 60 AND Coexists "B" AND NOT Coexists "C"	103053	X
"A"	4	Age < 60 AND NOT Coexists "B" AND Coexists "C"	104055	Y
"A"	5	Age >= 60 AND NOT Coexists "B" AND Coexists "C"	105059	Z
"A"	6	Age < 60 AND Coexists "B" AND Coexists "C"	106058	W, Y
"A"	7	Age >= 60 AND Coexists "B" AND Coexists "C"	107054	X, Z

### H.5.4.3 Sequential Processing

The sequential approach tests the rules of each Cross Map in a stated order until a rule is found to be true. When a true rule is identified the associated Cross Map Target is used.

One advantage of this approach is that some optimization can occur to limit the number of times that the same function or predicate is tested. A catch-all default Cross Map can be included as the last option in the sequence with a rule which always evaluates as true.

The disadvantage of this approach is that the order is significant. Therefore, whenever an alternative Cross Map is added the existing Cross Maps for that Concept must be revised and reordered in a way that achieves the intended results.

*Example*

Concept	Option	Rule	TargetId	TargetCodes
"A"	1	Age < 60 AND Coexists "B" AND Coexists "C"	106058	W, Y
"A"	2	Age >= 60 AND Coexists "B" AND Coexists "C"	107054	X, Z
"A"	3	Age < 60 AND Coexists "B"	102056	W
"A"	4	Age >= 60 AND Coexists "B"	103053	X
"A"	5	Age < 60 AND Coexists "C"	104055	Y
"A"	6	Age >= 60 AND Coexists "C"	105059	Z
"A"	7	TRUE	101050	V

#### H.5.4.4 Branching Model

The branching approach tests each element of a rule separately and if any test fails it provides a specified reference to the next Cross Map to be tested. If all the tests are true the associated Cross Map Target is used. If any test fails the specified option is tested next.

If this approach is followed significant optimization can occur so that any test is only performed once for each Concept mapped. However, one disadvantage is that addition, removal or revision of any Cross Map requires a review of the entire set of Cross Maps for that Concept. Another disadvantage is that branching logic is less transparent than sequential testing. There are greater risks of logical errors requiring debugging of different test cases.

*Example*

Concept	Option	MapRule	TargetId	TargetCodes
"A"	1	Age < 60 (ELSE 4) AND Coexists "B" (ELSE 3) AND Coexists "C" (ELSE 2)	106058	W, Y
"A"	2	TRUE	102056	W
"A"	3	Coexists "C" (ELSE 7)	104055	Y
"A"	4	Coexists "B" (ELSE 6) AND Coexists "C" (ELSE 5)	107054	X, Z
"A"	5	TRUE	103053	X
"A"	6	Coexists "C" (ELSE 7)	105059	Z
"A"	7	TRUE	101050	V

## H.6 Applying rules to Cross Map Targets

The proposed structures allow rules to be associated with Cross Map Targets instead of Cross Maps. A Cross Map Target may be the target of several Cross Maps. If there are no rules in a Cross Map any rules in the referenced Cross Map Target are tested.

This approach allows a more consistent representation of the rules that relate to generating a particular mapping. However, since each Cross Map Target is a stand-alone component that may be referenced by Cross Maps associated with several different Concepts the rules must be complete and order independent.

The decision on whether to apply the rules to the Cross Maps or the Cross Map Targets depends on the nature of the mapping of SNOMED CT. In cases where there is a clear-cut set of primary Concepts from which mappings are to be generated, it is preferable to reflect this with rules in the Cross Maps for those Concepts. In less clearly defined cases, it may be better to express the rules in the Cross Map Target.

### *Example*

Extending the illustration in the previous section, Cross Maps from Concept "B" could reference some of the same Cross Map Targets as Concept "A". However, in the case of the map from Concept "B" the co-existence of condition "A" must be tested rather than "B".

Concept "B" could be mapped to:

- ❖ "W" if the patient is under aged 60 and has co-existing condition "A" but not "C"
- ❖ "X" if the patient is aged 60 or over and has co-existing condition "A" but not "C"
- ❖ "W, Y" if the patient is under aged 60 and has co-existing conditions "A" and "C"
- ❖ "X, Z" if the patient is aged 60 or over and has co-existing conditions "A" and "C"
- ❖ An additional Target Code "S" if neither of the conditions "A" or "C" is present.

Using the sequential approach the Cross Maps for Concept "B" would be as follows:

Concept	Option	Rule	TargetId	TargetCodes
"B"	1	Age < 60 AND Coexists "A" AND Coexists "C"	106058	W, Y
"B"	2	Age >= 60 AND Coexists "A" AND Coexists "C"	107054	X, Z
"B"	3	Age < 60 AND Coexists "A"	102056	W
"B"	4	Age >= 60 AND Coexists "A"	103053	X
"B"	5	TRUE	108057	S

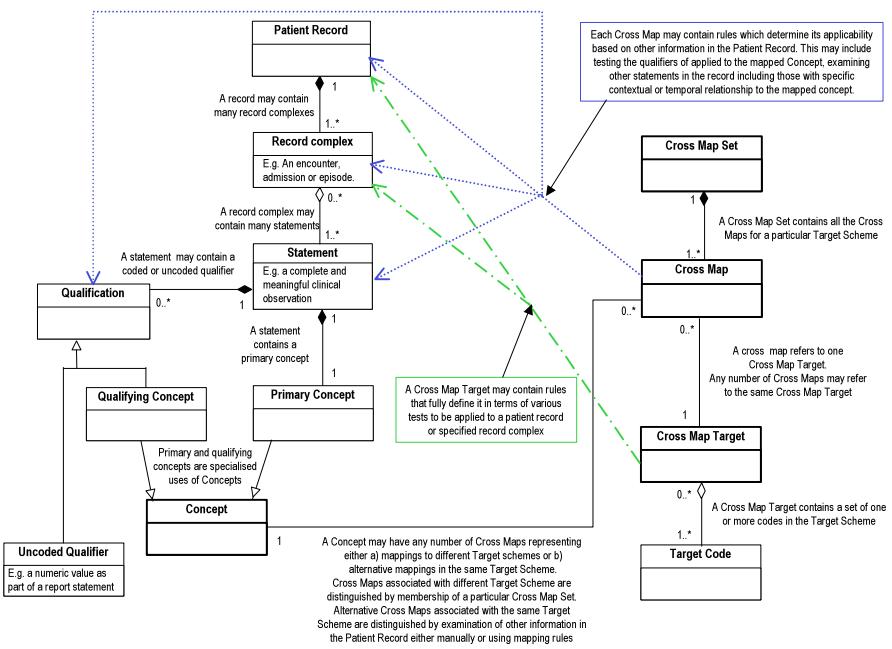
Note that the first four rows Cross Maps refer to the same four Cross Map Targets that were used in the mapping from Concept "A". However the rules differ because these are Cross Maps from Concept "B" rather than from Concept "A".

If rules are to be stated for these Cross Map Targets, these must be made complete and order independent so that they are not dependent on the Concept that initiated the mapping.

TargetId	TargetCodes	TargetRule
101050	V	Coexists "A" AND NOT Coexists "B" AND NOT Coexists "C"
102056	W	Age < 60 AND Coexists "A" AND Coexists "B" AND NOT Coexists "C"
103053	X	Age >= 60 AND Coexists "A" AND Coexists "B" AND NOT Coexists "C"
104055	Y	Age < 60 AND Coexists "A" AND NOT Coexists "B" AND Coexists "C"
105059	Z	Age >= 60 AND Coexists "A" AND NOT Coexists "B" AND Coexists "C"
106058	W, Y	Age < 60 AND Coexists "A" AND Coexists "B" AND Coexists "C"
107054	X, Z	Age >= 60 AND Coexists "A" AND Coexists "B" AND Coexists "C"
108057	S	Coexists "B" AND NOT Coexists "A" AND NOT Coexists "C"

## H.7 Mapping Model

Figure 10 is a general model of the mapping process that pulls together the table structure, patient record, and possible rules processing. The classes Concept, Cross Map Set, Cross Map, and Cross Map Target are equivalent to the tables of the same name described earlier in this section. The other classes are shown to illustrate the more detailed aspects of mapping.



**Figure 10 – A logical model of the cross mapping process**

### H.7.1 Simple one-to-one mapping

One-to-one mapping between a selected SNOMED CT Concept and single Target Code is possible in some cases.

This is represented by a single Cross Map, which is associated with the Concept and is a member of the Cross Map Set associated with that Target Scheme. The Cross Map refers to a Cross Map Target that contains only one Target Code.

### H.7.2 Simple one-to-many mapping

One-to-many mapping between a selected SNOMED CT Concept and set of more than one Target Codes is required for Target Schemes that use combinations of codes to express the same meaning as a single SNOMED CT Concept.

This is represented by a single Cross Map, which is associated with the Concept and is a member of the Cross Map Set associated with that Target Scheme. The Cross Map refers to a Cross Map Target that contains two or more Target Codes.

### H.7.3 Mapping with options

Mapping with options is required where there are several possible ways of mapping a Concept into the Target Scheme.

Multiple options may occur in two circumstances

- ❖ The Target Scheme provides more detailed representation than is offered by the SNOMED CT Concept. This may occur with SNOMED CT Concepts that are mappable if qualified in some way.
  - ✧ If the qualification required is an associated qualifying Concept or an associated numeric value then automated mapping is feasible.
  - ✧ If the qualification is provided as free text then manual intervention will be required but may be assisted by providing appropriate advice.
- ❖ The Target Scheme encodes the Concept in a manner that includes other related information about the patient. Examples of this include:
  - ✧ Classifications that subdivide disorders by age, sex or other patient characteristics.
  - ✧ Groupers that encode combinations of procedures and disorders.
  - ✧ Use of patient record context or links between statements to indicate suspected causation or other clinically significant relationships.

These requirements are represented by multiple Cross Maps associated with a single Concept with the Cross Map Set associated with the Target Scheme.

- ❖ The Concept for which Cross Maps are sought is the primary Concept of a selected *Statement* in the patient record.
- ❖ Where multiple maps are found, the rules in these Cross Maps are processed to determine which of the maps is appropriate. These rules may refer to:
  - ✧ Qualifications of the selected *Statement*
  - ✧ Other *Statements* (including relevant qualifications) that are:

- Explicitly related to the selected *Statement* (e.g. a treatment specifically undertaken for a particular condition)
  - In the same complex as the selected *Statement* (e.g. another diagnosis during the same episode or admission)
  - Temporally related to the selected *Statement* (e.g. indicating that a patient was pregnant at the time that hypertension was diagnosed)
  - Previous occurrences of the same condition or procedure described in the selected *Statement*.
  - Related only in being part of the same patient record.
- ❖ Other information in the patient record
- For example age, sex, occupation, etc.

## Appendix I. Supplementary Text Descriptions

The following table provides supplementary text descriptions for several hundred SNOMED CT concepts. Although many concepts might benefit from such descriptions, especially primitive concepts, this table contains descriptions available to date. These text descriptions can help resolve ambiguities or uncertainties about the meaning of a concept beyond what is provided by the Fully Specified Name, Preferred Term, and semantic definitions.

In addition, this table is available as a tab-delimited text file in the “Documentation” folder of the SNOMED CT release files.

CONCEPTID	SNOMEDID	FULLYSPECIFIEDNAME	DEFINITION
52250000	A-81050	X-ray electromagnetic radiation (physical force)	Electromagnetic radiation of wavelength between approximately 001 nm and 10 nm
56242006	A-81070	Light, electromagnetic radiation (physical force)	Electromagnetic radiation in the visible range as well as parts of the ultraviolet and infrared ranges
75184002	A-81072	Visible light, electromagnetic radiation (physical force)	Electromagnetic radiation in the visible range
55080005	A-81112	Electromagnetic radiation from radar device (physical force)	Electromagnetic radiation from a RAdio Detection and Ranging device
55566008	A-A1000	Accidental physical contact (event)	Accidental physical contact or exposure with potential or actual harmful effect
80917008	C-00224	Toxin (substance)	Toxic, noxious, or poisonous substance that is produced by a living organism
128489003	C-200A0	Sand (substance)	Fine granular particles of rock or similar material
119413000	C-20554	Mineral spirits (substance)	Hydrocarbon solvents with flash points above 38 degrees C
56703005	C-21012	Amyl alcohol - commercial (substance)	An alcohol obtained from refinement of fusel oil; contains mainly isopentyl alcohol and 2-methyl-1-butanol
88427007	C-21612	Methyl acetylene (substance)	Colorless gas with a sweet odor, used as fuel and shipped as compressed gas
62975006	C-21613	Methyl acetylene-propadiene mixture (substance)	A colorless gas with a characteristic foul odor, used as a fuel and shipped as a liquefied compressed gas
31716004	C-A6032	Frozen plasma product, human (product)	Category of human frozen plasma products, regardless of time from donation to freezing
95323007	D0-00044	Scleredema (disorder)	Hard non pitting edema and induration of the skin; a finding associated with Buschke's disease
410016009	D0-005A3	Lipodermatosclerosis (disorder)	A decrease in lower leg circumference due to recurrent ulceration and fat necrosis causing loss of subcutaneous tissue in a patient with venous stasis disease
367522007	D0-01036	Dermatitis infectiosa eczematoides (disorder)	Inflammation of skin adjacent to an infectious site by autoinnoculation; appears as eczematous plaque with or without vesicles
128045006	D0-01302	Cellulitis (disorder)	Inflammation that may involve the skin and or subcutaneous tissues, and or muscle
402567004	D0-1015C	Vesicular eczema of hands and/or feet (disorder)	Self-limited vesicular eruption of palms and soles
58759008	D0-22020	Intertrigo (disorder)	Superficial dermatitis on opposed skin surfaces
95333004	D0-22138	Eosinophilic pustular folliculitis (disorder)	A dermatosis with pruritic sterile papules and pustules that come together to form plaques with papulovesicular borders, and a tendency toward central clearing and hyperpigmentation, with spontaneous exacerbations and remissions. Histologically variable with folliculitis of follicle sheath and perifollicular dermis and spongiosis of follicular epithelium, sometimes with peripheral leukocytosis and or eosinophilia and or eosinophilic abscesses.
7119001	D0-23010	Cutaneous lupus erythematosus (disorder)	Disease of skin in someone with Lupus erythematosis, though not necessarily systemic or subacute
95336007	D0-40051	Localized lipodermatosclerosis (disorder)	Recurrent ulceration and fat necrosis, associated with loss of subcutaneous tissue and a decrease in lower leg circumference
110986000	D0-53824	Acquired digital fibrokeratoma	A keratotic cutaneous polyp containing abundant connective tissue

CONCEPTID	SNOMEDID	FULLYSPECIFIEDNAME	DEFINITION
		(disorder)	
22649008	D0-75240	Photodermatitis (disorder)	Dermatitis caused by exposure to sunlight
21143006	D0-75310	Calcaneal petechiae (disorder)	Traumatic hemorrhage into heel that persists as black dots
80406003	D1-22350	Pathological dislocation of joint (disorder)	Dislocation of joint caused by presence of another disease
23680005	D1-30000	Enthesopathy (disorder)	Disorder occurring at the site of insertion of tendons or ligaments into bones or joint capsules
109361004	D2-01280	Surgical ciliated cyst (disorder)	A cyst composed of maxillary sinus epithelium along a surgical line of entry
1648002	D2-61424	Lymphocytic pseudotumor of lung (disorder)	Tumor-like mass in lungs composed of fibrous tissue or granulation tissue with inflammatory cells
33622007	D3-16200	Round heart disease (disorder)	A spontaneous cardiomyopathy of unknown etiology that affects healthy poultry
44808001	D3-30000	Conduction disorder of the heart (disorder)	Abnormality in rhythm of heartbeat, including rate, regularity, and/or sequence of activation abnormalities
413577001	D3-80064	Arterial thoracic outlet syndrome due to cervical rib (disorder)	Thoracic outlet syndrome, either nerve or vessel compression, due to a cervical rib
95442007	D3-80506	Peripheral cyanosis (disorder)	Disorder characterized by slowing of blood flow to a body region in association with an increase in oxygen extraction from normally saturated arterial blood
128065004	D4-38016	Congenital partial portal-systemic shunt (disorder)	Congenital portal-systemic shunt in which at least some portal blood perfuses the liver
111029001	D4-40131	Acrokerato-elastoidosis (disorder)	A developmental disorder characterized by keratotic papules of skin of hands and soles with disorganization of dermal elastic fibers that does not appear to be due to trauma or sunlight
111030006	D4-40139	Howel-Evans' syndrome (disorder)	A form of diffuse palmoplantar keratoderma that occurs between the ages of 5 and 15 and may be associated with the subsequent development of esophageal cancer
109478007	D4-51098	Kohlschutter's syndrome (disorder)	Amelogenesis imperfecta, mental retardation, and epileptic seizures
128533009	D4-A0655	Micropapilla (disorder)	Congenital small optic disc with normal visual function
93040009	D4-A0806	Congenital blepharophimosis (disorder)	A decrease in size of opening of the eye, not due to eyelid fusion, but rather lateral displacement of the inner canthi
94684003	D4-A0824	Microblepharia (disorder)	Congenital abnormal vertical shortness of eyelids
75076004	D4-F1137	Amyelencephalus (disorder)	Congenital absence of the spinal cord and brain
109750005	D5-15106	Abfraction (disorder)	Noncarious lesion, where tooth is fatigued, flexed, and deformed by biomechanical loading of the tooth structure, primarily at the cervical region. These are usually wedge-shaped lesions with sharp-line angles, but sometimes are circular invaginations on occlusal surfaces.
109778006	D5-21244	Bednar's aphthae (disorder)	Symmetric excoriation of the hard palate often due to sucking in infants
109788007	D5-21613	Peripheral ossifying fibroma of gingivae (disorder)	A fibroma of the gums with calcification and possibly ossification
15270002	D5-42004	Obturation obstruction of intestine (disorder)	Complete obstruction of the intestine due to the presence in the lumen of blocking material, such as tumor, fecolith, gallstone, or foreign body
31201001	D5-45211	Knight's disease (disorder)	Infection of perianal region of skin following abrasion, which is named for the occurrence in horsemen
109817001	D5-60862	Intersigmoid hernia (disorder)	Hernia of part of the intestinal tract through the intersigmoid recess or fossa
95564001	D5-90416	Pancreatemprraxis (disorder)	Obstruction of the pancreatic duct leading to swelling of the pancreas as a whole
6595006	D6-34730	Calcinosis (disorder)	Structure with calcium deposition
84757009	DA-30000	Epilepsy (disorder)	A disorder characterized by recurrent seizures
84299009	DA-40020	Neuritis (disorder)	Inflammation of a peripheral AND/OR cranial nerve
78141002	DA-42100	Erb-Duchenne paralysis (disorder)	A disorder of the superior trunk of the brachial plexus or the fifth and

CONCEPTID	SNOMEDID	FULLYSPECIFIEDNAME	DEFINITION
			sixth cervical spinal nerves or motor roots, resulting in weakness of proximal upper extremity musculature innervated by these nerve roots
76440000	DA-48100	Equine grass sickness (disorder)	Autonomic dysfunction of unknown etiology in horses, with gut paralysis as primary manifestation
12371008	DA-70170	Ophthalmia nodosa (disorder)	A granulomatous, inflammatory disorder of the eye; reaction to vegetable or insect hairs
95692001	DA-71725	Lipidemia retinalis (disorder)	An abnormal milky appearance of arteries and veins of retina, for example due to lipids in blood greater than 5%, diabetes mellitus, or leukemia
95712005	DA-72546	Entropion uveae (disorder)	Eversion of the margin of the pupil
53889007	DA-73540	Nuclear cataract (disorder)	A cataract involving the nucleus of the lens
44248001	DA-78238	Raymond-Cestan syndrome (disorder)	Abducent nerve paralysis with contralateral hemiparesis
95837007	DC-10190	Central cyanosis (disorder)	A form of cyanosis that occurs when there is a decrease in oxygen saturation in the arterial blood, usually with an SaO <sub>2</sub> of below 75%
127062003	DC-38001	Erythrocytosis (disorder)	Peripheral blood red cell count above the normal range
64779008	DC-60000	Blood coagulation disorder (disorder)	Disorders involving the elements of blood coagulation, including platelets, coagulation factors and inhibitors, and the fibrinolytic system
86075001	DC-63000	Coagulation factor deficiency syndrome (disorder)	Includes both quantitative and qualitative disorders of procoagulants
128105004	DC-64101	Von Willebrand disorder (disorder)	Includes true von Willebrand disease with mutation at the VWF locus, as well as mimicking disorders with other mutations (pseudo VWD) and acquired von Willebrand syndrome
128115005	DC-64211	Pseudo von Willebrand disease (disorder)	Any inherited disorder mimicking von Willebrand disease but lacking mutation at the VWF locus
61653009	DD-12432	Bennett's fracture (disorder)	Fracture and dislocation of the first metacarpal and the carpal-metacarpal joint
123976001	DE-00004	Post-infectious disorder (disorder)	A disorder that follows infection but is distinct from the infection itself and its usual manifestations
19168005	DE-01200	Nosocomial infectious disease (disorder)	Infection associated with hospitalization, not present or incubating prior to admission, but generally occurring more than 72 hours after admission
127326005	DF-000D3	Non-human disorder (disorder)	Disorders which occur in animals but not in man
127346000	DF-000F9	Neurologic disorder of eye movements (disorder)	Disorders characterized by eye movement abnormalities that are the result of brain, cranial nerve, or neuromuscular junction dysfunction
417163006	DF-00776	Traumatic AND/OR non-traumatic injury (disorder)	Disorder resulting from physical damage to the body
417746004	DF-00777	Traumatic injury (disorder)	Disorder resulting from physical damage to the body
128207002	DF-00833	Giant axonal neuropathy (disorder)	An autosomal recessive condition characterized by progressive degeneration of the central and peripheral nervous system with enlargement of axons
62014003	DF-10010	Adverse reaction to drug (disorder)	All noxious and unintended responses to a medicinal product related to any dose should be considered adverse drug reactions (from US FDA "Guideline for Industry, Clinical Safety Data Management: Definitions and Standards for Expedited Reporting").
30623001	F-16340	Catch (finding)	A sudden pain, usually sharp, occurring during movement, or exacerbated by movement, and prompting cessation of movement
78064003	F-20000	Respiratory function (observable entity)	Any function involved in the exchange of oxygen and carbon dioxide between the atmosphere and the cells of the body
77329001	F-20160	Mouth breathing (finding)	Habitual breathing through the mouth, usually associated with obstruction of nasal passages
3791008	F-20370	Bohr effect, function (observable entity)	Right shift of the hemoglobin oxygen dissociation curve due to lower pH with increased carbon dioxide
11421009	F-23550	Fremitus (finding)	Vibration felt on the chest wall, either by examiner or subjective
119251002	F-24432	Reverse sneezing (finding)	An inhalation reflex stimulated by an irritation of the mucous membrane of the nose

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76777009	F-25170	Artificial respiration by electrophrenic stimulation (procedure)	Procedure that applies electrical stimulation to the phrenic nerve to achieve ventilation
24184005	F-31003	Finding of increased blood pressure (finding)	A finding of increased blood pressure; not necessarily hypertensive disorder
12763006	F-31004	Finding of decreased blood pressure (finding)	A finding of decreased blood pressure; not necessarily hypotensive disorder
85595005	F-31730	Abdominal aortic pulse, function (observable entity)	Pulse felt over the abdominal aorta
61086009	F-31760	Pulse irregular (finding)	A pulse with repeated irregularity
74478000	F-32320	Detection of cardiac shunt (finding)	Anomalous flow of blood between different parts of the circulation
67551009	F-35072	Abnormal third heart sound, S>3< (finding)	Any abnormality of the third heart sound
86484008	F-35142	Abnormal fourth heart sound, S>4< (finding)	Any abnormality of the fourth heart sound
32615007	F-35736	Austin Flint murmur (finding)	A mid-to-late diastolic murmur heard best at the cardiac apex, heard in cases of aortic insufficiency
19384000	F-35738	Graham Steell murmur (finding)	High-pitched diastolic murmur heard best at left sternal border, associated with pulmonary valve insufficiency
1735007	F-35760	Thrill (finding)	Vibration felt by examiner on the surface of the body
4592006	F-35820	Fourth sound gallop (finding)	A "galloping" sound on cardiac auscultation because of an abnormally audible fourth heart sound
49864004	F-35830	Protodiastolic gallop with abnormally audible third heart sound (finding)	A "galloping" sound on cardiac auscultation because of an abnormally audible third heart sound
42842009	F-35854	Plateau cardiac murmur (finding)	Cardiac murmur with no significant crescendo or decrescendo
40015002	F-54170	Flatus, function (observable entity)	Passage of gas by anus
119248009	F-62023	Hyperalbuminemia (disorder)	Increased serum albumin concentration
119247004	F-62024	Hypoalbuminemia (disorder)	Reduced serum albumin concentration
102704008	F-63007	Short chain fatty acid (substance)	Fatty acid with fewer than 10 carbon atoms
102705009	F-63008	Medium chain fatty acid (substance)	Fatty acid with 10 to 14 carbon atoms
102706005	F-63009	Long chain fatty acid (substance)	Fatty acid with 10 or more carbon atoms
1677001	F-8A080	Haagensen test (procedure)	Breast examination for malignancy in which patient leans forward and breasts are examined for abnormal contour
91454002	F-A7923	Pleocytosis of cerebrospinal fluid (finding)	Presence of greater than normal number of cells in the cerebrospinal fluid
17374005	F-A8870	Queckenstedt's test (procedure)	Measurement of CSF pressure following compression of jugular vein
119249001	F-C0710	Agammaglobulinemia (finding)	Absence of the gamma fraction of serum globulin
119250001	F-C0720	Hypogammaglobulinemia (finding)	Decreased concentration of the gamma fraction of serum globulin
106190000	F-C30F9	Allergic state (disorder)	Known to have allergic reactions to particular substance(s)
70730006	F-D0110	Ineffective erythropoiesis (finding)	Increased destruction of erythrocyte precursors
50857004	F-D7300	Tissue factor (substance)	Tissue factor, the high-affinity receptor and cofactor for the plasma serine protease VII/VIIa
20364005	F-F5002	Paracusis (disorder)	Altered sense of hearing, other than simple decreased hearing or deafness
184034005	F-F5074	Auditory area (sound intensity) (observable entity)	Range of sound intensity between the minimum audible intensity and the auditory pain threshold
399264008	G-0373	Image mode (observable entity)	Image mode refers to the type of image acquisition (modality). For example, most ultrasound systems use 2D, Color Flow, M Mode and Doppler modes.
399030000	G-0374	Left ventricular systolic area (observable entity)	Area measurement of the left ventricle in systole.
399109006	G-0375	Left ventricular diastolic area (observable entity)	Area measurement of the left ventricle in diastole.
399287000	G-0376	Left ventricular area fractional change (observable entity)	(Diastolic Area - Systolic Area) / Diastolic Area

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399063007	G-0377	Left ventricular semi-major axis diastolic dimension (observable entity)	Semi-major axis is the dimension from the widest minor axis to the apex of the left ventricle at end diastole.
399309003	G-0378	Left ventricular truncated semi-major axis diastolic dimension (observable entity)	Truncated semi-major axis is from widest short axis diameter to the mitral annulus plane in the left ventricle at diastole.
399293008	G-0379	Left ventricular epicardial diastolic area, psax pap view (observable entity)	Epicardial area of the left ventricle, cross section [parasternal short axis view] at the level of the papillary muscles in diastole.
399133000	G-037A	Left ventricular peak early diastolic tissue velocity (observable entity)	Myocardial tissue velocity by Pulsed Wave Doppler, typically adjacent to the mitral annulus, measured in early diastole.
399140004	G-037B	Ratio of mitral valve peak velocity to left ventricular peak tissue velocity e-wave (observable entity)	Transmitral velocity measured at the leaflet tips at the onset of diastole divided by the myocardial velocity measured at the same point in the cardiac cycle. Correlates with left ventricular filling pressure.
399007006	G-037C	Left ventricular peak diastolic tissue velocity during atrial systole (observable entity)	Myocardial tissue velocity by Pulsed Wave Doppler, typically adjacent to the mitral annulus, measured at the time of left atrial contraction.
399167005	G-037D	Left ventricular peak systolic tissue velocity (observable entity)	Myocardial tissue velocity by Pulsed Wave Doppler, typically adjacent to the mitral annulus, measured during left ventricular systole.
399051002	G-037E	Left ventricular isovolumic contraction time (observable entity)	The time interval from mitral valve closure to aortic valve opening. Measured as the interval between the mitral valve closing click and the aortic valve opening click on Continuous Wave Doppler.
399266005	G-037F	Left ventricular index of myocardium performance (observable entity)	(MCO-ET(Left Ventricle OT))/ET(Left Ventricle OT), where MCO is MV Closure to Opening time and ET is Ejection Time.
399023006	G-0380	Right ventricular peak systolic pressure (observable entity)	Right ventricular systolic pressure calculated from the peak right ventricular-right atrial systolic gradient (from the peak tricuspid regurgitation velocity using the modified Bernoulli equation) plus estimated right atrial/central venous pressure.
399154007	G-0381	Right ventricular index of myocardial performance (observable entity)	(TCO-ET(RVOT))/ET(RVOT), where TCO is TV Closure to Opening time and ET is Ejection Time.
399058008	G-0382	Ratio of aortic valve acceleration time to aortic valve ejection time (observable entity)	Ratio of Aortic Valve Acceleration Time to Aortic Valve Ejection Time
399235004	G-0383	Left atrium systolic volume (observable entity)	Volume of blood contained in the left atrium at end-systole.
399354002	G-0384	Mitral valve E-wave deceleration time (observable entity)	The time interval from the peak of the transmitral Doppler early filling velocity to the intersection with the Doppler baseline derived from the slope of the transmitral early filling wave.
399229004	G-0385	Mitral valve A-wave duration (observable entity)	Duration of the transmitral velocity wave during atrial contraction.
399062002	G-0386	Ratio of mitral valve acceleration time to mitral valve deceleration time (observable entity)	Ratio of the Mitral Valve Acceleration Time to the Mitral Valve Deceleration Time.
399104001	G-0387	Mitral valve closure to opening time (observable entity)	The time interval from the closure of the 1st Doppler spectral taken from the mitral valve to the opening of the 2nd Doppler spectral of the mitral valve.
399238002	G-0388	Ratio of pulmonic valve acceleration time to pulmonic valve ejection time (observable entity)	Ratio of Pulmonic Valve Acceleration Time to Pulmonic Valve Ejection Time
399282006	G-0389	Tricuspid valve closure to opening time (observable entity)	The time interval from the closure of the 1st Doppler spectral taken from the tricuspid valve to the opening of the 2nd Doppler spectral of the tricuspid valve.
399048009	G-038A	Main pulmonary artery peak velocity (observable entity)	Peak velocity obtained from Pulsed Wave Doppler or continuous wave Doppler, positioned in the main pulmonary artery.
399070007	G-038B	Pulmonary vein A-wave duration (observable entity)	Duration of the retrograde velocity in the pulmonary vein during atrial contraction.
399267001	G-038C	Pulmonary vein S-wave velocity time integral (observable entity)	The integral of the Doppler spectral profile of the systolic component of pulmonary venous flow.

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399039004	G-038D	Pulmonary vein D-wave velocity time integral (observable entity)	The integral of the Doppler spectral profile of the diastolic component of pulmonary venous flow.
399367004	G-038E	Cardiovascular orifice area (observable entity)	Area of an orifice as calculated by Orifice area = Peak Instantaneous Flow Rate / Maximal Velocity of the Regurgitant jet at the Jet Orifice
399301000	G-0390	Regurgitant fraction (observable entity)	Ratio of the Regurgitant Volume to the Stroke Volume: Regurgitant Volume / Inflow Volume. The Regurgitant Volume is the retrograde flow. The Inflow Volume is total antegrade volume, which is the sum of the Regurgitant Volume and net antegrade volume.
399093001	G-0391	Medial mitral annulus structure (body structure)	Area of the mitral annulus adjacent to the left ventricular septum and outflow tract.
399086000	G-0392	Lateral mitral annulus structure (body structure)	Area of the mitral annulus adjacent to the left ventricular posterolateral wall.
399345000	G-0393	Adult echocardiography procedure report (record artifact)	Document title of adult echocardiography procedure (evidence) report.
399339008	G-0395	Apical long axis (qualifier value)	Imaging plane with the transducer at the cardiac apex, which includes the left ventricle, left atrium, aortic outflow tract and proximal aorta. Usually visualizes a small portion of the right ventricle in the near field.
399139001	G-0396	Parasternal long axis view (qualifier value)	Imaging plane with the transducer at the left sternal border oriented along the long axis of the left ventricle, which includes the left ventricle, left atrium, aortic outflow tract and proximal aorta. Usually visualizes a small portion of the right ventricle.
399306005	G-0397	Parasternal short axis view (qualifier value)	Imaging plane with the transducer at the left sternal border oriented along the short axis of the left ventricle.
399239005	G-0398	Parasternal short axis view at the aortic valve level (qualifier value)	Imaging plane with the transducer at the left sternal border oriented along the short axis of the left ventricle, at the base of the heart, IVC, atrial septum, tricuspid valve, which includes the aortic valve, right and left atria, right ventricular outflow tract and pulmonic valve, pulmonary artery, and in some patients, the LPA and RPA.
399371001	G-0399	Parasternal short axis view at the level of the mitral chords (qualifier value)	Imaging plane with the transducer at the left sternal border oriented along the short axis of the left ventricle, which includes the left ventricle at the level of the mitral chords, ventricular septum, and right ventricle. This plane is inferior to the mitral valve.
399036006	G-039A	Parasternal short axis view at the mitral valve level (qualifier value)	Imaging plane with the transducer at the left sternal border oriented along the short axis of the left ventricle, which includes the left ventricle at the level of the mitral valve leaflets, ventricular septum, and right ventricle. This plane is inferior to the aortic valve at the base of the heart.
399271003	G-039B	Parasternal short axis view at the papillary muscle level (qualifier value)	Imaging plane with the transducer at the sternal border oriented along the short axis of the left ventricle, which includes the left ventricle at the level of the papillary muscles, and right ventricle. This plane is inferior to the cordae.
398998003	G-039C	Right ventricular inflow tract view (qualifier value)	View of the Portion of the right ventricle adjacent to the tricuspid valve, the inflow portion of the RV. Common acronym: RVIT.
399195005	G-039D	Right ventricular outflow tract view (qualifier value)	View of the portion of the right ventricle adjacent to the pulmonic valve, the outflow portion of the RV. Common Acronym: RVOT.
399310008	G-039E	Subcostal long axis view (qualifier value)	Imaging plane with the transducer at the subcostal space (inferior to sternum) oriented along the long axis of the left ventricle, which includes the left ventricle, left atrium, right ventricle and right atrium, septum between left and right ventricles, and septum between the left and right atria.
399200001	G-039F	Subcostal short axis view (qualifier value)	Imaging plane with the transducer at the subcostal space oriented along the short axis of the left ventricle, either at the aortic valve level (base of heart) or more inferior plane of section through the left ventricle
399106004	G-03A0	Suprasternal long axis view (qualifier value)	Imaging plane with the transducer in the suprasternal notch, oriented along the long axis of the ascending aorta, aortic arch vessels, and proximal descending aorta.
399145009	G-03A1	Suprasternal short axis view (qualifier value)	Imaging plane with the transducer in the suprasternal notch, oriented along the short axis of the aortic arch. This plane of section visualizes a cross-section of the aorta, long axis of the RPA, and in

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			the pediatric patient, the left atrium and four pulmonary veins.
399064001	G-03A2	2D mode ultrasound (qualifier value)	2D, B-mode, B-scan image type
123038009	G-8000	Specimen (specimen)	Material (structure, substance, device) removed from a source (patient, donor, physical location, product)
399232001	G-A19B	Apical two chamber view (qualifier value)	Imaging plane with the transducer at the cardiac apex, which includes the left ventricle and left atrium.
399214001	G-A19C	Apical four chamber view (qualifier value)	A coronal imaging plane with the transducer at the cardiac apex which includes the left ventricle, left atrium, right ventricle and right atrium.
260674002	G-C048	Direction of flow (attribute)	The flow of an anatomic orifice. The orifice may be an opening such as a valve or stenosis. The direction may be valve retrograde flow (regurgitation) or antegrade flow.
119246008	J-14126	Imam (occupation)	Muslim prayer leader
388445009	L-000A9	Genus Equus (organism)	Horse, donkey, mule genus
68014009	L-88105	Canis familiaris (organism)	Domestic dog subspecies
125085001	L-8A122	Equus asinus asinus (organism)	Equus subspecies
125086000	L-8A144	Equus caballus gmelini X Equus caballus caballus (organism)	Intersubspecies equine hybrid
78678003	L-8B100	Sus scrofa (organism)	Domestic pig subspecies
388393002	L-8B1FB	Genus Sus (organism)	Swine genus
125093001	L-8B951	Bison bison X Bos taurus indicus X Bos taurus taurus (organism)	Intergenus hybrid of cattle
125094007	L-8B952	Bos taurus indicus X Bos taurus taurus (organism)	Intersubspecies cattle hybrid
125095008	L-8B953	Bos javanicus X Bos taurus indicus (organism)	Interspecies hybrid of cattle
388168008	L-8BA18	Genus Bos (organism)	Cattle genus
125097000	L-8C306	Capra hircus (organism)	Domestic goat
125099002	L-8C336	Ovis aries (organism)	Domestic sheep species
125101009	L-8C338	Merino sheep superbreed (organism)	Merino sheep breed group
125102002	L-9210A	Anas platyrhynchos (organism)	Mallard duck species
396620009	L-921FA	Genus Anas (organism)	Duck genus
15778005	L-92220	Anser (organism)	Goose genus
70881005	L-92222	Anser anser anser (organism)	Greyleg goose subspecies
125104001	L-9222A	Anser anser (organism)	Greyleg goose species
47290002	L-93790	Gallus gallus (organism)	Junglefowl
125105000	L-9379A	Gallus (organism)	Junglefowl genus
125671007	M-01444	Rupture (morphologic abnormality)	Disruption of continuity of tissue, not necessarily due to external forces; may be due to weakness in the tissue or excessive internal pressures
128176002	M-01471	Cutaneous patch (morphologic abnormality)	Skin lesion, greater than 2 cm, flat, colored; differs from a macule only in size
128177006	M-01472	Cutaneous plaque (morphologic abnormality)	Skin lesion, greater than 2 cm, flat, colored; differs from a macule only in size
27925004	M-03010	Nodule (morphologic abnormality)	A 1 to 5 cm firm lesion raised above the surface of the surrounding skin; differs from a papule only in size
25694009	M-03130	Papule (morphologic abnormality)	A small, solid lesion, less than 1 cm in diameter, raised above the surface of the surrounding skin and hence palpable
112629002	M-04013	Macule (morphologic abnormality)	A flat lesion, less than 2 cm in diameter, not raised above the surface of the surrounding skin
19130008	M-10000	Traumatic abnormality (morphologic abnormality)	A structure damaged by an external force
384709000	M-10005	Sprain (morphologic abnormality)	Injury to a ligament due to movement of joint beyond normal range
161006	M-11000	Thermal injury (morphologic	Injury due to increased heat

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		abnormality)	
48333001	M-11100	Burn injury (morphologic abnormality)	Generic burn injury, including that due to excessive heat, as well as cauterization, friction, electricity, radiation, sunlight, and other causes
105594005	M-11106	Thermal burn (morphologic abnormality)	Burn injury due to excessive heat
127559009	M-31318	Everted margin (morphologic abnormality)	The structure representing the everted margin of a part
189411005	M-35011	Antemortem thrombus (morphologic abnormality)	Antemortem blood clot in the cardiovascular system
64305001	M-36320	Urticaria (morphologic abnormality)	A raised, erythematous papule or cutaneous plaque, usually representing short-lived dermal edema
82515000	M-36750	Vesicle (morphologic abnormality)	A small (less than 1 cm) fluid-filled lesion, raised above the plane of surrounding skin
339008	M-36760	Blister (morphologic abnormality)	A fluid-filled, raised, often translucent lesion, greater than 1 cm in diameter
47002008	M-41601	Pustule (morphologic abnormality)	A vesicle filled with leukocytes
128419007	M-55090	Pathologic mineralization (morphologic abnormality)	Deposition of mineral in normally non mineralized tissue
18115005	M-55420	Pathologic calcification, calcified structure (morphologic abnormality)	Deposition of calcium in normally non calcified tissue
122869004	P0-00081	Measurement procedure (procedure)	An observation, by some objective method, of amount, number, quantity, size, level, extent, or magnitude, resulting in an ordinal or quantitative value
118661008	P0-00098	Physician service (procedure)	Service provided by physician
14734007	P0-00100	Administrative procedure (procedure)	Procedure related to the administrative aspects of health care, including admission, discharge, transfer, disposition, referral, business, legal, financial, quality review, peer review, data reporting, notification, and so forth
363687006	P0-0099C	Endoscopic procedure (procedure)	An inspection done with an endoscope
197157006	P0-0099D	Photography of patient (procedure)	An observation that generates a recording made from energy of the light spectrum
169283005	P0-009A0	Medical photography (procedure)	An observation that generates a recording made from energy of the light spectrum
386053000	P0-009B4	Evaluation procedure (procedure)	Determination of a value, conclusion, or inference by evaluating evidence
387713003	P0-009C3	Surgical procedure (procedure)	Planned structural alteration of the body, usually requiring disruption of a body surface (usually skin or mucosa)
410614008	P0-00A65	Construction (procedure)	The act of building something
410619003	P0-00A66	Application (procedure)	Introduction of a substance or device to the surface of the body
409063005	P0-00B19	Counseling (procedure)	Psychosocial procedure that involves listening, reflecting, etc. to facilitate recognition of course of action / solution.
409073007	P0-00B27	Education (procedure)	Procedure that is synonymous with those activities such as teaching, demonstration, instruction, explanation, and advice that aim to increase knowledge and skills, change behaviors, assist coping and increase adherence to treatment.
416118004	P0-00B68	Administration (procedure)	Introduction of a substance to the body
119265000	P0-04001	Assisting (procedure)	Helping the body perform a function it normally does on its own
119270007	P0-04003	Management procedure (procedure)	A plan or recommendation for services, based on an evaluation
122545008	P0-04006	Stimulation procedure (procedure)	Procedure to arouse the body or any of its parts or organs to increase functional activity
32485007	P0-10000	Hospital admission (procedure)	Performance of the steps necessary to admit a patient to a hospital
58000006	P0-20000	Patient discharge (procedure)	Performance of the steps necessary to discharge a patient from a location of care delivery
107724000	P0-20301	Patient transfer (procedure)	Performance of the steps necessary to transfer a patient between locations of care delivery
633004	P0-80000	Chart review by physician (procedure)	A chart evaluation performed by a physician

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107727007	P0-80001	Chart related administrative procedure (procedure)	An administrative procedure that involves a medical record chart
107728002	P0-80002	Chart evaluation by healthcare professional (procedure)	An evaluation of a medical chart by a health care professional
86078004	P0-80500	Quality of care procedure (procedure)	A procedure that assesses the quality of health care service delivery
50659003	P0-80600	Medical audit procedure (procedure)	A quality of care determination performed retrospectively
16817006	P0-80660	Medical service audit (procedure)	A medical audit of direct care providers
15367004	P0-80690	Ancillary service audit (procedure)	A medical audit of ancillary services (such as physical therapy, dietary)
15807005	P0-806A0	Financial audit (procedure)	A financial procedure that assesses a financial situation
57430006	P0-80800	Chart evaluation by non-healthcare professional (procedure)	A chart-related administrative procedure that checks a chart for completion and accuracy and conformance to chart policy
54455007	P0-80820	Chart review, verification of charges (procedure)	A financial audit to review and/or verify charges
29064005	P0-80850	Chart opening (procedure)	A chart-related administrative procedure that involves opening the chart
6035001	P0-80860	Chart abstracting (procedure)	A chart related administrative procedure that involves abstracting information from the chart
42965003	P0-80890	Chart completion by medical records (procedure)	A chart related administrative procedure done by the medical records department
118662001	P0-90003	Medicolegal procedure (procedure)	An administrative legal procedure
118629009	P0-A0201	Functional training (procedure)	Procedure aimed at enhancing functioning, frequently includes repetition of actions to develop, re-create or maintain physiological/cognitive processes.
118635009	P1-00031	Revision (procedure)	Repeating a prior procedure to correct or improve the results
34896006	P1-01000	Incision (procedure)	Making a cut in something
76145000	P1-01001	Exploratory incision (procedure)	An incision done for the purpose of performing an exploration
122458006	P1-01002	Exploration procedure (procedure)	An observation of the body or a body part done by inspection and/or palpation
122459003	P1-01003	Dissection procedure (procedure)	A separation of different structures along natural cleavage lines by dividing the connective tissue framework
19484001	P1-01008	Decompressive incision (procedure)	An incision that relieves abnormal pressure on a structure
122460008	P1-01009	Reexploration procedure (procedure)	A repeated exploration
122461007	P1-01012	Evacuation procedure (procedure)	Removal of the contents of a body cavity or container
122462000	P1-01013	Drainage procedure (procedure)	Evacuation of liquid contents by gravity
70302008	P1-01020	Transection (procedure)	A division made transversely across a long axis
118630004	P1-01027	Division (procedure)	An incision that separates something into two or more parts
387651008	P1-010A1	Exploration with a probe (procedure)	An exploration done using a probe
85921004	P1-01100	Puncture procedure (procedure)	A procedure done by piercing or penetrating with a pointed object or instrument
86088003	P1-01130	Centesis (procedure)	A puncture into a space with an aspiration of that space
65801008	P1-03000	Excision (procedure)	Removal done with a cutting instrument
79095000	P1-03002	Complete excision of organ (procedure)	Complete excision and removal of an entire body organ
118292001	P1-03003	Removal (procedure)	To take something off or out, to get rid of, to eliminate
20418004	P1-03004	Wedge resection (procedure)	Excision of a wedge-shaped piece of tissue (often but not necessarily for diagnostic examination)
118636005	P1-0300B	Expulsion (procedure)	Evacuation using positive pressure
81723002	P1-03030	Amputation (procedure)	Excision of normal topography
15440009	P1-03038	Disarticulation (procedure)	Amputation through a joint without cutting of bone
14509009	P1-03053	Evisceration (procedure)	Radical excision of tissues and organs of a body cavity
39250009	P1-03056	Enucleation (procedure)	A removal of an anatomic or pathologic structure in entirety without breakage

CONCEPTID	SNOMEDID	FULLYSPECIFIEDNAME	DEFINITION
86273004	P1-03100	Biopsy (procedure)	Removal of tissue for diagnostic examination
8889005	P1-03101	Excisional biopsy (procedure)	Biopsy that removes an entire lesion, with or without surrounding tissue
70871006	P1-03102	Incisional biopsy (procedure)	Biopsy that involves incision and removal of part of a lesion or organ, rather than excision of the entire lesion or organ
119283008	P1-03103	Open biopsy (procedure)	Biopsy by open approach, as opposed to percutaneous or endoscopic methods
14766002	P1-03130	Aspiration (procedure)	Extraction using negative pressure
36777000	P1-03140	Debridement (procedure)	Removal of devitalized tissue
68688001	P1-03150	Curettage (procedure)	Scraping done with a curette
29923002	P1-03153	Shaving (procedure)	A scraping away of thin sections
56757003	P1-03154	Scraping (procedure)	Removal from a surface by repeated strokes of an edged instrument
107733003	P1-04FFF	Introduction (procedure)	Introduction of object AND/OR substance into or onto body, including injection, implantation, infusion, perfusion, transfusion, irrigation, instillation, insertion, placement, replacement, packing, intubation, catheterization, cannulation
59108006	P1-05000	Injection (procedure)	Administration using positive pressure and a needle or other equipment to drive a substance into the body
14792009	P1-05015	Tattooing (procedure)	An injection of indelible pigments
119268003	P1-05025	Inflation (procedure)	Insufflation of a hollow organ or body cavity with gas, causing it to distend or swell
36576007	P1-05030	Infusion (procedure)	An injection that is continuous
67889009	P1-05050	Irrigation (procedure)	Administration that washes with a stream of liquid
68641000	P1-05060	Insufflation (procedure)	An injection of a gas or powder into a body cavity by positive pressure
55870005	P1-05070	Instillation (procedure)	Administration of a liquid, drop by drop, into or onto the body
122463005	P1-05080	Embolization procedure (procedure)	An injection of some substance into the circulation to occlude vessels, either to arrest or prevent hemorrhaging or to devitalize a structure or organ by occluding its blood supply
71861002	P1-05500	Implantation (procedure)	Introduction of a non biologic device
3137001	P1-05501	Reimplantation (procedure)	Implantation that is being revised
52765003	P1-05530	Intubation (procedure)	An insertion of a tubular device into a canal, hollow organ, or cavity
4365001	P1-08000	Surgical repair (procedure)	Restoring, to the extent possible, the natural anatomical structure
122464004	P1-08005	Augmentation procedure (procedure)	Procedure to increase the size, shape, or volume of a body structure
59719002	P1-08060	Exteriorization (procedure)	To expose the inner surface of a structure to the external surface of the body
118627006	P1-08061	Marsupialization (procedure)	A construction of a pouch, achieved by resecting the anterior wall of a cyst or other enclosed cavity and suturing the cut edges of the remaining wall to adjacent edges of skin
112695004	P1-08400	Reparative closure (procedure)	A repair that unites structures
50015006	P1-08413	Closure by staple (procedure)	A closure done by stapling
70751009	P1-08420	Ligation (procedure)	To bind with a ligature
56275003	P1-08421	Suture ligation (procedure)	A ligation where the surgical suture serves as a ligature
1431002	P1-08460	Fixation (procedure)	The act or operation of holding, suturing, or fastening in a fixed position
122868007	P1-08490	Staple implantation procedure (procedure)	An implantation of a staple
122465003	P1-08601	Reconstruction procedure (procedure)	A reparative construction that builds or rebuilds a structure that should normally be present
78817002	P1-08610	Construction of anastomosis (procedure)	A construction of an opening between two hollow structures, organs, or spaces, be they real or artificial
88834003	P1-08611	Construction of shunt (procedure)	A construction of an alternate route of passage of a bodily substance
75506009	P1-08612	Construction of stoma (procedure)	A construction of an abnormal passage between a cavity or hollow organ and the surface of the body

CONCEPTID	SNOMEDID	FULLYSPECIFIEDNAME	DEFINITION
4116001	P1-08613	Construction of window (procedure)	A construction of openings or fenestrae
118626002	P1-08617	Construction of interposition anastomosis (procedure)	An anastomosis that places a tubular structure between the cut ends of a previously contiguous tubular structure
87193006	P1-08700	Fusion-stabilization and immobilization (procedure)	A fixation that joins together two body parts, rendering them immobile with respect to each other
122501008	P1-08702	Fusion procedure (procedure)	Procedure to cause two adjacent structures to be structurally joined together
122502001	P1-08703	Anchoring procedure (procedure)	Procedure to fix a mobile or flexible structure to a rigid or inflexible structure
82254000	P1-08710	Refixation (procedure)	A fixation that is being revised
64597002	P1-0C000	Destructive procedure (procedure)	Eradicating all or a portion of a body part
9667001	P1-0C002	Surgical avulsion (procedure)	A removal done by tearing away or forcible separation
2677003	P1-0C015	Stripping (procedure)	A removal done by peeling, often using a stripper
119266004	P1-0C025	Coagulation (procedure)	A destruction of tissue by means that results in condensation of protein material
119271006	P1-0C027	Obliteration (procedure)	A destruction of a natural space or lumen by induced fibrosis or inflammation
27411008	P1-0C080	Cauterization (procedure)	A destruction of tissue by burning or searing with a thermal instrument, an electric current, or a caustic substance
43802008	P1-0C200	Thermocautery (procedure)	A cauterization done with thermal energy
60726007	P1-0C400	Crushing (procedure)	A destruction done by injurious pressure. Note that this pressure can be mechanical, as in squeezing between two hard bodies, or can be a pressure wave, as is used to crush internal stones.
82413005	P1-0C410	Litholapaxy (procedure)	A crushing of calculi (stone).
5845006	P1-0C430	Emulsification procedure (procedure)	A destruction achieved by turning a solid into an emulsion
64874008	P1-0C504	Chemodenervation (procedure)	A denervation done using chemicals
3324009	P1-0C620	Laser beam photocoagulation (procedure)	A photocoagulation using a laser beam
77465005	P1-0D000	Transplantation (procedure)	To move body tissue or cells from donor site to recipient site
53088000	P1-0D010	Autogenous transplantation (procedure)	A transplantation where the donor and recipient spots are part of the same organism
27782009	P1-0D012	Syngeneic transplantation (procedure)	A transplantation where the donor and recipient spots are part of genetically identical organisms
50223000	P1-0D016	Allogeneic transplantation (procedure)	A transplantation where the donor and recipient spots are from antigenically distinct individuals of the same species
48537004	P1-0D100	Bypass graft (procedure)	A construction of a shunt using either biologic or synthetic material
75152009	P1-0D200	Transposition procedure (procedure)	An autogenous transplantation that does not entirely sever the topographic object from the donor spot, at least until it is united at the recipient spot
19207007	P1-0E000	Manipulation (procedure)	Skilled dextrous action of the hands directly applied to a body part
74923002	P1-0E100	Mobilization (procedure)	A procedure that mobilizes or frees up an abnormally fixed structure
66391000	P1-0E150	Traction (procedure)	The act of exerting a pulling force
112696003	P1-0E200	Manual reduction (procedure)	A repair done via manipulation
62972009	P1-0E300	Extraction (procedure)	Removal done by pulling
10012005	P1-0E350	Expression (procedure)	An expulsion done by manipulation
62057008	P1-0E410	Dilation and stretching (procedure)	A dilation and a stretching
122546009	P1-0E411	Stretching procedure (procedure)	Enlarging or distending a structure, increasing its internal wall stress
2802005	P1-0E420	Manual dilation and stretching (procedure)	A dilation and stretching done by manipulation
9421007	P1-0E450	Bougienage (procedure)	A dilation done with a bougie
122467006	P1-0E501	Fitting procedure (procedure)	A measurement or adjustment of a device or biologic material to the right shape or size so as to conform correctly when introduced or transplanted
118659004	P1-10887	Tenosuspension (procedure)	Procedure to anchor a tendon to act as a suspensory ligament

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7108004	P1-10C04	Osteoclasis (procedure)	A destruction that purposefully results in a fracture of bone
81099000	P1-13860	Cervical arthrodesis (procedure)	The stiffening of one or more cervical joints by operative means
70502009	P1-17A45	Pollicization of a digit (procedure)	The act of making a thumb out of a digit (finger or toe)
46809006	P1-19376	Ostectomy, excision of tarsal coalition (procedure)	Excision of the fibrous, cartilaginous, or bony fusion of two or more of the tarsal bones
359593004	P1-19A3E	Midtarsal fusion (procedure)	Arthrodesis of one or more of the tarsal joints
32350008	P1-41D60	Intermediate delay of small flap at scalp (procedure)	Delayed transfer flap-a flap graft that is partially raised from the donor bed to permit collateral circulation of the pedicle
57554003	P1-48120	Periprosthetic capsulotomy of breast (procedure)	Division of a fibrous capsule surrounding a prosthetic breast implant
90991008	P1-48303	Periprosthetic capsulectomy of breast (procedure)	Excision of a fibrous capsule surrounding a prosthetic breast implant
85768003	P1-78331	Excision of median bar of prostate by transurethral approach (procedure)	Median bar-a fibrotic structure across the neck of the prostate causing urethral obstruction
77066003	P1-79370	Excision of hydatid of Morgagni in male (procedure)	Excision of appendix of testis-vestige of Mullerian duct
28644007	P1-82308	Vaginal enterocectomy (procedure)	Excision of an enterocoele, a posterior vaginal hernia
32998005	P1-8280B	Latzko operation on vagina (procedure)	Repair of vesicovaginal fistula
60753006	P1-82826	McIndoe operation for construction of vagina (procedure)	Construction of an artificial vagina consisting of a mold covered with a split-thickness skin graft
64853007	P1-82827	Williams-Richardson operation for construction of vagina (procedure)	A vulvovaginoplasty procedure described by Williams to create a vaginal canal
174000	P1-82833	Harrison-Richardson operation on vagina (procedure)	Vaginopexy according to Williams and Richardson is an abdominal colposuspension by strips from external oblique
40587007	P1-82909	Pereyra procedure including anterior colporrhaphy (procedure)	Pereyra procedure: Needle suspension and suture of bladder neck for stress incontinence
112928008	P1-86E22	Crede maneuver (procedure)	A method of external massage of the uterus to promote delivery of the placenta
57551006	P1-A4824	Iridotasis (procedure)	Stretching of the iris to increase the outflow of aqueous from the eye in glaucoma patients
3700004	P1-A5344	Erysiphake extraction of cataract by intracapsular approach (procedure)	Intracapsular extraction of cataract using an erysiphake—an instrument used to aspirate a cataract
54305003	P1-A5820	Lens couching procedure (procedure)	Obsolete procedure involving displacement of lens into vitreous for treatment of cataract
84100007	P2-01000	History taking (procedure)	A clinically oriented interview of a patient or someone familiar with the patient
32166003	P2-01060	History taking, self-administered, questionnaire (procedure)	A history taken by a self-administered questionnaire
5880005	P2-01400	Physical examination procedure (procedure)	An observation of the body or a body part using one of the five human senses (e.g., inspection, palpation, percussion, auscultation)
32750006	P2-01500	Inspection (procedure)	An exploration using the sense of sight, done with the eyes
113011001	P2-01510	Palpation (procedure)	An exploration using the sense of touch
75180006	P2-01550	Percussion (procedure)	A listening of the sounds produced in response to tapping the body surface
37931006	P2-01560	Auscultation (procedure)	A listening to spontaneously generated body sounds
103741002	P2-01570	Optical transillumination (procedure)	An inspection by the passage of light through tissues or a body cavity
16076005	P2-08000	Prescription (procedure)	A legal order to dispense and possibly prepare a substance or physical object
1366004	P2-22100	Inhalation therapy procedure (procedure)	An administration into the respiratory tract by inspiration
4764004	P2-22223	Jet ventilation procedure (procedure)	Jet ventilation phasically directs a high-velocity jet of humidified gas into the endotracheal tube at rapid frequencies, entraining additional fresh gas during insufflation
40617009	P2-22902	Artificial respiration (procedure)	An assistance of respiration

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11140008	P2-22905	Respiratory assist, manual (regime/therapy)	An artificial respiration done manually
23426006	P2-25010	Measurement of respiratory function (procedure)	A procedure on the respiratory tract that observes pulmonary function
76572000	P2-25250	Measurement of lung volume (procedure)	A pulmonary function test that measures lung volumes
9134004	P2-30600	Ballistocardiography (procedure)	Obsolete method for determining cardiac output by measuring recoil of body due to cardiac contraction
91480001	P2-40300	Iontophoresis procedure (regime/therapy)	An administration into the tissues of an ionic substance by means of an electric current
225426007	P2-4510F	Administration of therapeutic substance (procedure)	Introduction of a substance to the body
5447007	P2-68000	Transfusion (procedure)	An infusion of blood or blood product
239332003	P3-6018D	Percutaneous test for allergy (procedure)	An immune system procedure that observes for evidence of hypersensitivity
252512005	P3-60197	In vivo test of hypersensitivity (procedure)	An immune system procedure that observes for evidence of hypersensitivity
118640001	P5-C0900	Radioimmunotherapy (procedure)	Radiation therapy using radiolabelled antibodies
12894003	P7-00040	Functional assessment (procedure)	An evaluation of the performance of an organ, organ system, or body part
71937005	P7-10000	Physiatric manipulation (regime/therapy)	A manipulation done by a physiatrist
16992002	P7-11000	Osteopathic manipulation (procedure)	A manipulation done by an osteopath
46947000	P7-12000	Chiropractic manipulation (procedure)	A manipulation done by a chiropractor
15420002	P8-80770	Reline lower partial denture, laboratory (procedure)	Refitting a denture by replacing the denture base while keeping the occlusal relationship of the teeth the same
44764005	P8-85460	Crown, porcelain fused to noble metal (procedure)	Crowning preparation and covering of the natural crown of a tooth with a veneer consisting of a metal, plastic resin, or porcelain or combinations
255482005	R-40491	Left upper segment (qualifier value)	At location of left laterality and superior
255496004	R-4049E	Right lower segment (qualifier value)	At location (or vessel branch as in pulmonary vein) of right laterality and inferior
255499006	R-404A0	Right upper segment (qualifier value)	At location (or vessel branch as in pulmonary vein) of right laterality and superior
246464006	R-42019	Function (observable entity)	Any function or property that is not mainly morphologic or structural, including both measurable and observable features and physiologic actions
264068005	R-4214B	Left lower segment (qualifier value)	At location of left laterality and inferior
312004007	R-42E61	Retrograde direction (qualifier value)	The state of reverse blood flow through a valve or orifice
125681006	S-11033	Single person (finding)	Not currently married
33553000	S-11040	Widowed (finding)	An unmarried person whose spouse has died
44667005	T-02660	Skin structure of hand, including finger (body structure)	Skin region including some skin of finger AND some additional non finger skin
9385004	T-03660	Subcutaneous tissue structure of hand, including finger (body structure)	Subcutaneous tissue including some tissue of finger AND some additional non finger tissue
84157002	T-11039	Structure of epiphyseal line (body structure)	The location of the epiphyseal growth plate subsequent to its ossification
108372004	T-12762	Entire tarsal bone (body structure)	Any bone that is part of the tarsus
91739007	T-13007	Endomysium (body structure)	Fine connective tissue sheath around a muscle fiber
122504000	T-15624	Manubriosternal synostosis (body structure)	The connection between the manubrium and sternum that has progressed from a symphysis to bony union (synostosis)
122497003	T-17441	Flexor tendon of wrist (body structure)	Tendons involved in flexing the wrist joint, excluding flexor tendons that pass through the wrist that flex the fingers
6553002	T-21370	Inferior nasal turbinate structure (body structure)	Shell-shaped structure of lateral inferior nasal cavity, including bone and covering mucous membrane

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60962000	T-21380	Middle nasal turbinate structure (body structure)	Shell-shaped structure of lateral middle nasal cavity, including bone and covering mucous membrane
65289004	T-21390	Superior nasal turbinate structure (body structure)	Shell-shaped structure of lateral superior nasal cavity, including bone and covering mucous membrane
33415007	T-21391	Supreme nasal turbinate structure (body structure)	Shell-shaped structure of lateral nasal cavity above the superior nasal turbinate, including bone and covering mucous membrane
3377004	T-21420	Structure of agger nasi (body structure)	Ridge on the lateral internal nasal wall due to the ethmoidal crest of the maxilla
81040000	T-44000	Pulmonary artery structure (body structure)	Includes pulmonary trunk, left and right main pulmonary arteries, and all their branches
128261004	T-44004	Mediastinal pulmonary artery (body structure)	Includes pulmonary trunk and left and right main pulmonary arteries
69105007	T-45010	Carotid artery structure (body structure)	One of the common carotid, internal carotid, or external carotid arteries
38809004	T-48300	Structure of vein of thorax (body structure)	Vein located within the thorax
91539005	T-48501	Structure of right pulmonary vein (body structure)	One of the great vessels draining venous blood from the right lung
27706005	T-48502	Structure of left pulmonary vein (body structure)	One of the great vessels draining venous blood from the left lung
122972007	T-48581	Pulmonary venous structure (body structure)	Any vein draining the lungs, including pulmonary veins proper and their tributaries
128553008	T-49215	Structure of antecubital vein (body structure)	A vein located in the antecubital fossa
51289009	T-50100	Digestive tract structure (body structure)	Entire digestive tract including mouth, esophagus, stomach, and intestines
122865005	T-50101	Gastrointestinal tract structure (body structure)	Esophagus, stomach, small intestine, and large intestine together as a single entity
62834003	T-50110	Upper gastrointestinal tract structure (body structure)	Esophagus, stomach, and duodenum
5668004	T-50120	Lower gastrointestinal tract structure (body structure)	Jejunum, ileum, colon, rectum, and anal canal
34810001	T-51010	Structure of vestibule of mouth (body structure)	The part of the oral cavity external to gums and teeth and internal to cheeks and lips
71617008	T-51020	Structure of oral cavity proper (body structure)	The part of the oral cavity internal to the teeth and bounded posteriorly by the palatoglossal arch
47975008	T-53130	Structure of root of tongue (body structure)	The part of the tongue that is on the floor of the mouth, and is not covered by mucous membrane
47975008	T-53130	Structure of root of tongue (body structure)	The pharyngeal part of the tongue, forming the anterior wall of the oropharynx
3100007	T-54026	Clinical crown of tooth (body structure)	Portion of tooth exposed above gums, the part above the clinical root
11326003	T-54061	Structure of coronal pulp of tooth (body structure)	Part of the pulp of tooth that is within the crown portion of the pulp cavity
38954004	T-545A1	Carnassial tooth structure (body structure)	Tooth adapted to shear flesh
68028003	T-56500	Crop (body structure)	Dilated part of esophagus for food storage in birds
118652008	T-58049	Crypt of Lieberkühn (body structure)	Denotes the pits or crypts, but not the glands that lie beneath them
3789000	T-58140	Enterocrin cell (cell)	Endocrine cell of the gut
128180007	T-59261	Pelvic appendix (body structure)	Appendix which is oriented posteriorly and inferiorly in the pelvic cavity
122489005	T-70001	Urinary system structure (body structure)	Organs of urine formation and secretion
49549006	T-A0050	Visual system structure (body structure)	The eye, ocular adnexa, afferent visual pathways, efferent visual pathways, and pupil innervation pathways
1231004	T-A1110	Meninges structure (body structure)	The three membranes that surround the brain and spinal cord,

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			consisting of the dura mater, arachnoid, and pia mater. The pia and arachnoid in combination are referred to as the leptomeninges.
35764002	T-A1600	Brain ventricle structure (body structure)	The four ventricles of the brain, including the two lateral ventricles, the third ventricle, and the fourth ventricle
35328001	T-A9814	Structure of hepatic plexus (body structure)	An unpaired autonomic plexus that is part of the celiac plexus that lies on the hepatic artery and its branches in the liver
82200002	T-A9815	Structure of splenic plexus (body structure)	An autonomic plexus that is a subdivision of the celiac plexus that accompanies the splenic artery
64157005	T-A9816	Structure of gastric plexus (body structure)	Autonomic plexi that are part of the celiac plexus that lies on the greater and lesser curvatures of the stomach
2504000	T-A9817	Structure of pancreatic plexus (body structure)	An autonomic plexus that is a subdivision of the celiac plexus and accompanies the pancreatic arteries
49412003	T-A9818	Adrenal plexus (body structure)	An autonomic plexus that is a subdivision of the celiac plexus that accompanies the adrenal artery
48563009	T-A9819	Structure of renal plexus (body structure)	An autonomic plexus that is a subdivision of the celiac plexus that accompanies the renal artery
21684005	T-A981A	Structure of ureteral plexus (body structure)	An autonomic plexus that is derived from the celiac plexus, more specifically renal and hypogastric plexi, that accompanies the ureteric artery to the ureter
86064000	T-A981B	Structure of testicular plexus (body structure)	An autonomic plexus that is a subdivision of the aortic plexus, or derived from it, that accompanies the testicular artery
15398002	T-A981C	Structure of ovarian plexus (body structure)	An autonomic plexus that is a subdivision of the aortic plexus, or derived from it, that accompanies the ovarian artery
53224005	T-A9820	Superior mesenteric plexus structure (body structure)	An autonomic plexus that branches from the aortic plexus, that sends nerves to intestines and with the vagus forms subserous, myenteric, and submucous plexus
4150005	T-A9821	Celiac nervous plexus structure (body structure)	An autonomic plexus that is a superior subdivision of the aortic plexus that runs anterior to the aorta at the level of the celiac trunk T12; contains celiac ganglia and most visceral afferents pass through it
74636004	T-A9822	Structure of aorticorenal ganglia (body structure)	A part of the celiac ganglion that is semidetached and contains sympathetic neurons that innervate the kidney
79869003	T-A9830	Inferior mesenteric plexus structure (body structure)	An autonomic plexus that branches from the aortic plexus, that sends nerves to descending colon, sigmoid, and rectum along the path of the inferior mesenteric artery
24981001	T-A9831	Structure of superior rectal plexus (body structure)	An autonomic plexus that branches from the inferior mesenteric plexus; accompanies superior rectal artery to rectum
69854003	T-A9840	Structure of Auerbach's plexus (body structure)	A subdivision of the enteric plexus that lies within the tunica muscularis of the intestinal tract
8595004	T-A9841	Structure of Meissner's plexus (body structure)	Part of the enteric plexus situated in the intestinal submucosa
68305005	T-A9842	Structure of iliac plexus (body structure)	Autonomic plexus derived from the aortic plexus, accompanying iliac arteries
34109009	T-A9843	Structure of femoral plexus (body structure)	An autonomic plexus accompanying the femoral artery and derived from the iliac plexus
47881004	T-A9850	Inferior hypogastric plexus structure (body structure)	An autonomic plexus formed by the junction of the hypogastric nerve and the splanchnic nerve on each side; supplies pelvic viscera
53892006	T-A9851	Structure of hypogastric nerves (body structure)	Nerves in the pelvis that connect the superior hypogastric plexus to the inferior hypogastric plexus
13559005	T-A9860	Structure of superior hypogastric plexus (body structure)	A continuation of the aortic plexus that leads to the right and left hypogastric nerves
26701009	T-A9861	Structure of pelvic ganglia (body structure)	Sympathetic and parasympathetic ganglia within pelvic plexi
17630002	T-A9862	Medial rectal plexus (body structure)	A subdivision of inferior hypogastric plexus, maybe derived from it, that supplies nerves to the rectum
69079004	T-A9864	Prostatic sympathetic plexus (body structure)	Autonomic plexus that runs through the capsule of the prostate and is derived from the inferior hypogastric plexus, and supplies the cavernous nerves of the erectile tissue of penis

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4905007	T-A9866	Structure of uterovaginal plexus (body structure)	Autonomic plexus with ganglia derived from inferior hypogastric plexus, that supplies uterus, vagina, ovary, erectile tissue of vestibule, and urethra
2044003	T-A9867	Structure of vaginal nerves (body structure)	Nerves running from uterovaginal plexus to vagina that are both sympathetic and parasympathetic
81036009	T-A9868	Structure of vesical plexus (body structure)	An autonomic plexus derived from inferior hypogastric plexus to supply sympathetic nerve fibers to urinary bladder, ureter, ductus deferens, and seminal vesicle
36364006	T-A9869	Structure of cavernous nerves of penis (body structure)	Two nerves that supply sympathetic and parasympathetic innervation to vascular structures of corpus cavernosum, stimulating erection; derived from prostatic plexus
43671000	T-A986A	Structure of cavernous nerves of clitoris (body structure)	Nerves that supply sympathetic and parasympathetic innervation to erectile tissue of clitoris; derived from uterovaginal plexus
56190005	T-AA003	Structure of external axis of eyeball (body structure)	A line segment connecting anterior pole of cornea to posterior pole of sclera
86588008	T-AA008	Structure of muscular fascia of eyeball (body structure)	Fascia enclosing the extrocular muscles
24736005	T-AA00B	Structure of soft tissues of orbit (body structure)	Soft tissues enclosed within orbital region
26386000	T-AA079	Vitreous cavity structure (body structure)	The eye cavity that contains the vitreous
47538007	T-AA081	Vitreous body structure (body structure)	Composite structure of hyaluronic acid gel within a stromal network of collagen fibrils
19359003	T-AA083	Hyaloid canal structure (body structure)	A canal that runs from optic disc to lens that contains the hyaloid artery in the fetus
30110007	T-AA084	Structure of hyaloid fossa (body structure)	A depression of the anterior surface of the vitreous body where the lens fits
76729009	T-AA100	Fibrous tunic of eye structure (body structure)	Outer coating of eyeball; has parts cornea and sclera
27941003	T-AA101	Structure of anulus tendineus communis (body structure)	Orbital structure; a fibrous ring that is the origin of the rectus muscles
31808004	T-C4310	Entire intrapulmonary lymph node (body structure)	Lymph node within the lung
65690001	T-C4340	Structure of paratracheal lymph node (body structure)	Lymph node along the trachea; may be in either the thorax or the neck
11899006	T-C4365	Structure of esophageal lymph node (body structure)	Lymph node along the esophagus, may be in either the mediastinum or the neck
113343008	T-D0060	Body organ structure (body structure)	An anatomical structure that consists of the maximal set of organ parts so connected to one another that together they constitute a self-contained unit of macroscopic anatomy, distinct both morphologically and functionally from other such units. Together with other organs, an organ constitutes an organ system or a body part. An organ is divisible into organ parts but not organs (examples: femur, biceps, liver, heart, aorta, sciatic nerve, ovary).
118760003	T-D0066	Entire viscus (body structure)	A large organ in the thorax, abdomen, or pelvis
71905009	T-D1209	Infrapalpebral fold structure (body structure)	The sulcus (furrow) below the lower eyelid
122861001	T-D1217	Sublingual space (body structure)	A potential space in the floor of the mouth; the part of the submandibular space above the mylohyoid muscle
122498008	T-D1219	Submaxillary space structure (body structure)	A potential space of the floor of the mouth; part of the submandibular space below the mylohyoid muscle
122499000	T-D121A	Submental space (body structure)	A potential space of the floor of the mouth; the medial part of the submaxillary space
122500009	T-D121B	Masticator space (body structure)	A potential space containing the pterygoid and masseter muscles
49928004	T-D1602	Structure of anterior portion of neck (body structure)	Neck anterior to the vertebral column, including pharynx, larynx, and anterior surface
16982005	T-D2220	Shoulder region structure (body structure)	The body part defined by the shoulder joint and its surrounding structures

<b>CONCEPTID</b>	<b>SNOMEDID</b>	<b>FULLYSPECIFIEDNAME</b>	<b>DEFINITION</b>
29836001	T-D2500	Hip region structure (body structure)	The body part defined by the hip joint and surrounding structures, including the region from the iliac crest to the thigh
8389004	T-D6242	Structure of obstetrical canal (body structure)	The birth canal; consists of uterine cervix, vagina, and vulva
53120007	T-D8000	Upper limb structure (body structure)	Upper extremity, including shoulder, arm, forearm, wrist, and hand
40983000	T-D8200	Upper arm structure (body structure)	Upper extremity between shoulder and elbow
76248009	T-D8300	Entire elbow region (body structure)	The body part defined by the elbow joint and surrounding structures
8205005	T-D8600	Wrist region structure (body structure)	The body part defined by the wrist joint and surrounding structures
61685007	T-D9000	Lower limb structure (body structure)	Lower extremity, including hip, thigh, leg, ankle, and foot
83038001	T-D9040	Femoral region structure (body structure)	Anterior region of the thigh
72696002	T-D9200	Knee region structure (body structure)	The body part defined by the knee joint and its surrounding structures
30021000	T-D9400	Lower leg structure (body structure)	Lower extremity from knee to ankle
54134001	T-F1200	Extraembryonic membranes structure (body structure)	The membranes which surround the embryo but are not involved in formation of the embryo itself

## Appendix J. SNOMED CT Allowed Attributes and Values

Domain and range for attributes is covered in depth in the User Guide.

Attributes connect concepts together and build relationships. They are the bridges between SNOMED CT's main hierarchies – e.g., Clinical Finding and Procedure – and supporting hierarchies like Organism, Substance, and Body Structure. The hierarchies that an attribute can be applied to are sometimes referred to as the attribute's "domain."

Each attribute can take values only from a particular value hierarchy. For example, values for the Finding Site attribute must come from the *Acquired body structure* or *Anatomical structure* hierarchies. The set of allowable values are sometimes referred to as the attribute's "range."

Example: *Pneumonia* has Finding-Site *Lung Structure*

In this example, the attribute Finding Site is allowable for a concept in the Clinical Finding hierarchy such as *Pneumonia*. The value *Lung Structure* is a valid value for this attribute since it is in the *Anatomical structure* hierarchy.

Defining attributes must be useful for aggregated analysis of outcomes, decision support, knowledge-based practice guidelines, etc. in a clinical setting. Therefore, defining attributes in SNOMED CT are assigned to those hierarchies where retrieval of clinical data is most useful and relevant (e.g., procedure, findings, and diseases.) Other hierarchies, such as Social Context, Body Structure, Substance, Organism, Observable Entities, and Physical Object are supporting hierarchies. Their concepts serve as the attribute values for the concept definitions of the main hierarchies.

Table 1 contains the allowable Defining Attributes that can be applied to each hierarchy or domain. Note that each item in the Domain column refers to the hierarchy where the attribute applies. Each item in the Attribute column refers to a single concept that resides in the Attribute hierarchy.

**Table 1**

DOMAIN	ATTRIBUTE
Attribute	Null
Body structure	Laterality
Clinical finding	After
	Associated morphology
	Associated with
	Causative agent
	Clinical course
	Due to
	Episodicity
	Finding informer
	Finding method
	Finding site
	Has definitional manifestation
	Has interpretation
	Interprets
	Occurrence

DOMAIN	ATTRIBUTE
	Severity
	Subject of information
Disease	Pathological process
Situation with explicit context	Associated finding
	Associated procedure
	Finding context
	Procedure context
	Subject relationship context
	Temporal context
Environments and geographical locations	Null
Event	After
	Associated with
	Causative agent
	Due to
	Occurrence
Observable entity	Null
Organism	Null
Pharmaceutical / biologic product	Has active ingredient
	Has dose form
Physical force	Null
Physical object	Has active ingredient
Procedure	Access
	Component
	Direct device
	Direct morphology
	Direct substance
	Has focus
	Has intent
	Has specimen
	Indirect device
	Indirect morphology
	Measurement method
	Method
	Priority
	Procedure device
	Procedure morphology
	Procedure site
	Procedure site - Direct
	Procedure site - Indirect

DOMAIN	ATTRIBUTE
	Property
	Recipient category
	Revision status
	Scale type
(descendents of Surgical Procedure only)	Surgical Approach
	Time aspect
	Using device
	Using access device
	Using energy
	Using substance
Administration of treatment via specific route	Route of administration
Qualifier value	Null
Social context	Null
Special concept	Null
Specimen	Specimen procedure
	Specimen source identity
	Specimen source morphology
	Specimen source topography
	Specimen substance
Staging and scales	Null
Substance	Null

Table 2 contains the allowable Values that can be applied to each Attribute. Note that each item in the Attribute column refers to a single concept that resides in the Attribute hierarchy. Each item in the Allowable Values (Range) column refers to an entire hierarchy.

**Table 2**

ATTRIBUTE	RANGE
Access	Surgical access values (qualifier value)
After	Clinical finding (finding)
	Procedure (procedure)
Associated finding	Clinical finding (finding)
	Event (event)
Associated morphology	Morphologically abnormal structure (morphologic abnormality)
Associated procedure	Procedure (procedure)
Associated with	Clinical finding (finding)
	Event (event)
	Organism (organism)
	Pharmaceutical / biologic product (product)
	Physical force (physical force)

ATTRIBUTE	RANGE
	Physical object (physical object)
	Procedure (procedure)
	Substance (substance)
Causative agent	Organism (organism)
	Pharmaceutical / biologic product (product)
	Physical force (physical force)
	Physical object (physical object)
	Substance (substance)
Component	Cell structure (cell structure)
	Observable entity (observable entity)
	Organism (organism)
	Substance (substance)
Clinical course	Courses (qualifier value)
Direct device	Device (physical object)
Direct morphology	Morphologically abnormal structure (morphologic abnormality)
Direct substance	Substance (substance)
Due to	Clinical finding (finding)
	Event (event)
	Procedure (procedure)
Episodicity	Episodicities (qualifier value)
Finding context	Finding context value (qualifier value)
Finding informer	Performer of method (person)
	Subject of record or other provider of history (person)
Finding method	Procedure (procedure)
Finding site	Acquired body structure (body structure)
	Anatomical structure (body structure)
Has active ingredient	Substance (substance)
Has definitional manifestation	Clinical finding (finding)
Has dose form	Type of drug preparation (product)
Has focus	Clinical finding (finding)
	Procedure (procedure)
Has intent	Intents (nature of procedure values) (qualifier value)
Has interpretation	Findings values (qualifier value)
	Result comments (qualifier value)
Has specimen	Specimen (specimen)
Indirect device	Device (physical object)
Indirect morphology	Morphologically abnormal structure (morphologic abnormality)
Interprets	Evaluation procedure (procedure)
	Laboratory procedure (procedure)

<b>ATTRIBUTE</b>	<b>RANGE</b>
	Observable entity (observable entity)
Laterality	Left (qualifier value)
	Right (qualifier value)
	Right and left (qualifier value)
	Side (qualifier value)
	Unilateral (qualifier value)
Measurement method	Laboratory procedure categorized by method (procedure)
Method	Action (qualifier value)
Occurrence	Periods of life (qualifier value)
Pathological process	Autoimmune (qualifier value)
Priority	Priorities (qualifier value)
Procedure context	Context values for actions (qualifier value)
Procedure device	Device (physical object)
Procedure morphology	Morphologically abnormal structure (morphologic abnormality)
Procedure site	Acquired body structure (body structure)
	Anatomical structure (body structure)
Procedure site – Direct	Acquired body structure (body structure)
	Anatomical structure (body structure)
Procedure site – Indirect	Acquired body structure (body structure)
	Anatomical structure (body structure)
Property	Property of measurement (qualifier value)
Recipient category	Community (social concept)
	Donor for medical or surgical procedure (person)
	Family (social concept)
	Group (social concept)
	Person (person)
Revision status	Part of multistage procedure (qualifier value)
	Primary operation (qualifier value)
	Revision - value (qualifier value)
Route of administration	Route of administration value (qualifier value)
Scale type	Narrative value (qualifier value)
	Nominal value (qualifier value)
	Ordinal OR quantitative value (qualifier value)
	Ordinal value (qualifier value)
	Qualitative (qualifier value)
	Quantitative (qualifier value)
	Text value (qualifier value)
Severity	Severities (qualifier value)
Specimen procedure	Procedure (procedure)

<b>ATTRIBUTE</b>	<b>RANGE</b>
Specimen source identity	Community (social concept)
	Device (physical object)
	Donor (qualifier value)
	Environment (environment)
	Family (social concept)
	Person (person)
Specimen source morphology	Morphologically abnormal structure (morphologic abnormality)
Specimen source topography	Acquired body structure (body structure)
	Anatomical structure (body structure)
Specimen substance	Substance (substance)
Subject of information	Community (social concept)
	Donor (qualifier value)
	Family (social concept)
	Group (social concept)
	Person (person)
Subject relationship context	Person (person)
Surgical Approach	Procedural approach (qualifier value)
Temporal context	Temporal context value (qualifier value)
Time aspect	Time frame (qualifier value)
Using device	Device (physical object)
Using access device	Device (physical object)
Using energy	Physical force (physical force)
Using substance	Substance ( substance)

## Glossary

This glossary is intended to be an informative source of reference relating to various terms used in this and other documents connected with SNOMED Clinical Terms.

Active Concept	A Concept that is intended for active use. This is determined by the ConceptStatus. Concepts with status value "Current" (0) or "Limited" (6) are always regarded as active. Concepts with status "Pending Move" (11) are regarded as active if the Concept is not yet accessible in the new target Namespace. (see also Inactive Concept)
Active Description	A Description that is intended for active use. This is determined by a combination of the DescriptionStatus, the DescriptionType in the Language or Dialect in use and the ConceptStatus of the associated Concept.  Descriptions are active when the following conditions apply Associated with an Active Concept, AND DescriptionStatus "Current" (0), "Limited" (6) or "Pending Move" (8) AND DescriptionType <u>not</u> unspecified (0) in a chosen Language/Dialect (see also Inactive Description)
Base Subset	A Subset used as a starting point the Subset Definition of another Subset.
Canonical form	A table that contains the Canonical form expressions for all SNOMED CT Concepts. This table contains some (but not all) of the attributes present in the Relationships Table. It only contains the Defining characteristics required to distinguish a Concept from its most proximate Primitive supertype Concepts. The set of "is a" subtype Relationships excludes Relationships to Fully defined (non-primitive) Concepts and includes instead appropriate additional Relationships to the most proximate supertypes.
Canonical Table	A table that contains the Canonical form expressions for all SNOMED CT Concepts. This table contains some (but not all) of the attributes present in the Relationships Table. It only contains the Defining characteristics required to distinguish a Concept from its most proximate Primitive supertype Concepts. The set of "is a" subtype Relationships excludes Relationships to Fully defined (non-primitive) Concepts and includes instead appropriate additional Relationships to the most proximate supertypes.
ChangeType	A field in the Component History Table that indicates the nature of a change to a Component made in a specified release of SNOMED CT.
CharacteristicType	A field in the Relationships Table that indicates whether a Relationship specifies a Defining characteristic, a qualifying characteristic or a context-specific characteristic.

Check-digit	A digit used to check the validity of an SCTID. The check-digit is the final (right most) digit of the SCTID and it is calculated using the algorithm described in Appendix F.
Child/Children	See Subtype.
Clinical Terms Version 3	See CTV3.
Component	An identifiable item in the main body of SNOMED CT, or in an authorized Extension. Each Component is a uniquely identifiable instance of one of the following: <ul style="list-style-type: none"><li>❖ Concept</li><li>❖ Description</li><li>❖ Relationship</li><li>❖ Subset</li><li>❖ Subset Member</li><li>❖ Cross Map Set</li><li>❖ Cross Map Target</li><li>❖ History Component</li></ul>
Component History	A record of an addition or change in the status of a SNOMED CT Component in a particular Release Version. Each item of Component History is represented by a row in the Component History Table.
Component History Table	A data table consisting of rows each of which represents an item of Component History. The Component History Table is part of the History Mechanism. See specification of Component History Table [6.2.2].
ComponentId	A general term used to refer to the primary identifier of any SNOMED CT Component. ComponentIds include ConceptIds, DescriptionIds, RelationshipIds, SubsetIds, CrossMapSetIds and TargetIds. All ComponentIds follow the form of the SCTID specification.
Concept	A clinical idea to which a unique ConceptId has been assigned. Each Concept is represented by a row in the Concepts Table.
Concept equivalence	Concept equivalence occurs when a post-coordinated expression has the same meaning as a pre-coordinated Concept or another post-coordinated expression.
ConceptId	A SNOMED Clinical Terms Identifier that uniquely identifies a Concept.
ConceptId1	A field in the Relationships Table and Canonical Table that refers to the first of two related Concepts. The first Concept is defined or qualified by a Relationship to the second Concept.
ConceptId2	A field in the Relationships Table and Canonical Table that refers to the second of two related Concepts. The second Concept

	defines or qualifies the first Concept.
Concepts Table	A data table consisting of rows, each of which represents a Concept. See also the specification of the Concepts Table.
ConceptStatus	A field in the Concepts Table that specifies whether a Concept is in current use. Values include “current”, “duplicate”, “erroneous” “ambiguous” and “limited”.
Context Concept Subset	A Subset used to specify the Concepts that form part of a context-domain.
Context Description Subset	A Subset used to specify the Descriptions that form part of a context-domain.
Context Domain	A context-domain is a set of values that are, or may be, used in an identifiable logical setting in an application, protocol, query or communication specification. A context-domain may be very broad (e.g. procedures or diagnoses) or very narrow (e.g. procedures performed by a specialty or possible values for a field in specific message).
ContextId	A field in the Subsets Table that specifies the context within which a Context Concept Subset or Context Description Subset is valid.
Context-specific characteristic	A Relationship to a target Concept that provides information about the source Concept that is true at a particular time or within a particular country or organization. Contrast with Defining characteristic and Qualifying characteristic. Referred to in CTV3 as a ‘Fact’.
Core Tables	See SNOMED CT Core Tables.
Cross Map	A reference from a Concept to a Cross Map Target. A Cross Map is part of a Cross Map Set A Concept may have a single Cross Map or a set of alternative Cross Maps. Each Cross Map is represented as a row in the Cross Maps Table.
Cross Map Set	A set of Cross Maps that together provide a valid way of mapping some or all SNOMED CT Concepts to a specified Target Scheme. Alternative Cross Map Sets may exist for the same Target Scheme, if business rules or guidelines alter the appropriateness of particular mappings to that scheme. Each Cross Map Set is represented as a row in the Cross Map Sets Table.
Cross Map Sets Table	A data table consisting of rows each of which represents a Cross Map Set. See the specification of the Cross Map Sets Table.
Cross Map Target	A code or set of codes in a Target Scheme that together represent an appropriate mapping from a clinical statement expressed using SNOMED CT. Some Cross Map Targets may be derived from two or more associated statements and in these cases the

	combination can be expressed as a set of associated rules. Each Cross Map Target is represented as a row in the Cross Map Targets Table.
Cross Map Targets Table	A data table consisting of rows each of which represents a Cross Map Set. See the specification of the Cross Map Targets Table.
Cross Maps Table	A data table consisting of rows each of which represents a Cross Map. See the specification of the Cross Maps Table.
CTV3 Clinical Terms Version 3	One of the source terminologies, along with SNOMED RT, used to develop SNOMED CT. CTV3 is UK Crown Copyright, distributed by the United Kingdom National Health Service Information Authority, and integrated into SNOMED CT. Also known as "Version 3 of the Read Codes." See also Read Code.
CTV3ID	A field in the Concepts Table that contains the Clinical Terms Version 3 identifier (Read Code) for that Concept.
Data migration	Steps taken to enable legacy data to be accessible as part of a system that uses SNOMED CT. Options for Data migration include actual conversion of the data or provision of methods for accessing the data in its original form.
Defining characteristic	A Relationship to a target Concept that is always true from any case of the source Concept. Example: “‘Topography (site)’ = ‘Liver’” is a Defining characteristic of the Concept ‘Liver biopsy’. Contrast with qualifying characteristic and context-specific characteristic. Referred to in CTV3 as an ‘Atom’.
Descendants	All subtypes of a concept, including subtypes of subtypes. For example, if a concept has four children, then descendants = those children plus all the concepts that are descended from those four children. See also Subtype.
Description	A row in the Descriptions Table. Each Description is assigned a unique DescriptionId and connects a Term and a Concept.
DescriptionId	A SNOMED CT Identifier that uniquely identifies a Description.
Descriptions Table	A data table consisting of rows, each of which represents a Description. See the specification of the Descriptions Table [B.2].
DescriptionStatus	A field in the Descriptions Table that specifies whether a Description is in current use. Values include “current”, “duplicate”, “erroneous” “inappropriate” and “limited”.
DescriptionType	A field in the Descriptions Table that specifies whether a Description is a Fully Specified Name, Preferred Term, or Synonym. The DescriptionType is language dependent and may be changed

	by applying a Language Subset. It may be “undefined” in the released Descriptions Table in which case the Description is not used unless an appropriate Language Subset is applied.
Dialect	A language modified by the vocabulary and grammatical conventions applied to the language of a particular geographical or cultural environment.
Dualkey	A key used to facilitate textual searches of SNOMED CT that consists of the first three letters of a pair of words in a Description. All possible pairs of words in each Description may be paired irrespective of their relative position in the Description. Dualkeys are represented as a row in the Dualkeys Table.
Dualkey Table	A table in which each row represents a Dualkey. See specifications of the DescDualKey Table [B.7.3.1] and ConcDualKey Table [B.7.3.2]
Duplicate Term	A Term that occurs in several Active Descriptions. Duplicate Terms are valid in SNOMED CT since the intention is to provide natural terms used by clinicians rather than to apply formalized phraseology. The formalized form is provided by the Fully Specified Name and these are not permitted to be duplicated. Although Duplicate Terms can be identified by string matching, a Duplicate Terms Subset is specified to indicate the presence and likely priority of duplicates when undertaking a search.
Duplicate Terms Subset	A Subset Type that identifies Duplicate Terms and allows a priority to be specified between these for use in searches.
Equivalence	See Word Equivalents, Phrase equivalence and Concept equivalence.
Excluded Word	A word that in a given language is so frequently used, or has so poor a discriminating power, that it is suggested for exclusion from the indices used to support textual searches of SNOMED CT. Excluded Words are represented as a row in the Excluded Words Table
Excluded Words Table	A data table in which each row represents an Excluded Word. See specification of the Excluded Words Table [B.7.1].
Expression	A collection of references to one or more concepts used to express an instance of a clinical idea. An expression containing a single concept identifier is referred to as a <i>pre-coordinated expression</i> . An expression that contains two or more concept identifiers is a <i>post-coordinated expression</i> . The concept identifiers within a <i>post-coordinated expression</i> are related to one another in accordance rules expressed in the SNOMED CT Concept Model. These rules allow concepts to be: <ul style="list-style-type: none"> <li>• combined to represent clinical ideas which are subtypes of all the referenced concepts, e.g. "tuberculosis" + "lung infection"</li> <li>• applied as refinements to specified attributes of a more</li> </ul>

	<p>general concept, e.g. "asthma" : "severity" = "severe"</p> <p><b>Notes:</b> See "SNOMED CT Guide - Abstract Models and Representational Forms". This has been released as an External Draft in July 2005.</p>
Extension	<p>A data table or set of data tables that is created in accordance with the structures and authoring guidelines applicable to SNOMED CT but which may not be edited, maintained and distributed by the IHTSDO.</p> <p>SNOMED CT Components are identified using SCTIDs, which are structured to ensure that Extensions are recognizable and can be traced to an authorized originator.</p>
Extra- Relationship	<p>A Relationship between two Concepts distributed as part of an Extension.</p> <p>An Extra-Relationship may relate SCT Concepts and/or Extra-Concepts.</p>
Extra-Concept	A Concept distributed as part of an Extension.
Extra-Description	<p>A Description which is distributed as part of an Extension.</p> <p>An Extra-Description may apply a Term to an SCT Concept or to an Extra-Concept.</p>
Extra-Subset	<p>A Subset distributed as part of an Extension.</p> <p>The members of an Extra-Subset may include SNOMED CT- Concepts, Extra-Concepts, SNOMED CT- Descriptions and Extra- Descriptions.</p>
Fully defined	<p>A Concept is Fully defined if its Defining characteristics are sufficient to differentiate a concept relative to its immediate supertype(s). A Concept which is not Fully defined is Primitive. For example, if the Concept "Red car" is defined as [is a=car] + [color=red] this is Fully defined but the same definition applied to the Concept "Red sports car" is Primitive.</p>
Fully Specified Name	<p>A phrase that describes a Concept uniquely and in a manner that is intended to be unambiguous.</p> <p>This phrase is in the FullySpecifiedName field of the Concepts Table and is also in the Descriptions Table.</p>
Historical Relationship	<p>A Relationship that refers from an Inactive Concept to an Active Concept that duplicates, corrects, replaces or disambiguates it.</p> <p>Note that Historical Relationships are used in a way similar to References for Descriptions. However, as part of the Relationships Table they are more readily accessible for computation and retrieval of legacy data.</p>
History Mechanism	<p>A SNOMED CT distribution table that contains information about the history of changes to one of the core SNOMED CT tables.</p> <p>The History Mechanism is supported by two distribution tables:</p> <ul style="list-style-type: none"> <li>❖ Component History Table</li> <li>References Table (Future Use)</li> </ul>

Inactive Concept	A Concept that is not intended to be actively used. This is determined by the ConceptStatus. Concepts with status values other than "Current" (0), "Limited" (6) and "Pending Move" (11) are regarded as inactive. Concepts with status "Pending Move" (11) are regarded as inactive if the Concept is accessible in the new target Namespace as of the release date. Inactive Concepts remain in SNOMED CT to support legacy data recorded when these Concepts were in active use. (see also Active Concept)
Inactive Description	A Description that is not intended to be actively used. . This is determined by a combination of the DescriptionStatus, the DescriptionType in the Language or Dialect in use and the ConceptStatus of the associated Concept. Descriptions are inactive if one or more of the following apply Associated with an Inactive Concept, OR DescriptionStatus not "Current" (0), "Limited" (6) or "Pending Move" (8) OR DescriptionType unspecified (0) in a chosen Language/Dialect Inactive Descriptions remain in SNOMED CT to support legacy data recorded when these Descriptions were in active use. (see also Active Description)
InitialCapitalStatus	A field in the Descriptions Table that specifies whether the capitalization of the first character is significant. If the value of this field is "1" then the first character should remain either in upper or lower case as released. Otherwise the case of the first character may be changed to suit its context in a sentence.
International Release	The required international components of the SNOMED CT terminology, along with related works and resources, maintained and distributed by the IHTSDO.
is a ISA "is a" relationship	The RelationshipType that defines a supertype-subtype Relationship between two Concepts. Usually expressed as subtype "is a" supertype -- For Example, Blister with infection IS A Infection of skin.
IsPrimitive	A field in the Concepts Table that indicates whether a Concept is Primitive or Fully defined.
Keyword	A field containing a potential search text in one of the WordKey Tables or a word excluded for key generation in the Excluded Words Table.
Kind-of-Value	The nature of a value that may be associated with a Concept. For example, the concept "systolic blood pressure reading" can label a numeric value. The Kind-of-Value that it labels is a pressure.
Language	A vocabulary and grammatical form that has been allocated an ISO639-1 language code. See also Dialect.

Language Subset	A Subset that specifies the various Terms according to a language or dialect and the DescriptionType for each Term.
LanguageCode	A field that indicates the Language and, optionally, Dialect applicable to a row in the Subsets Table, Descriptions Table or to an Excluded Words Table.
LinkId	A field in the Subsets Table
MapAdvice	A field in the Cross Maps Table, may contain human-readable advice on mapping.
MapConceptId	A field in the Cross Maps Table containing the identifier of the Concept that is the subject of the map.
MapOption	A field in the Cross Maps Table, which specifies the order in which Cross Maps are tested for automated processing of cross mapping rules.
Mapping Mechanism	A mechanism for mapping to other terminologies and classifications. The Mapping Mechanism is supported by three distribution tables: <ul style="list-style-type: none"> <li>❖ Cross Map Sets Table</li> <li>❖ Cross Maps Table</li> <li>❖ Cross Map Targets Table</li> </ul>
MapPriority	A field in the Cross Maps Table that specifies which Cross Maps are most likely to apply to the associated Concept. The value 0 indicates a default map.
MapRule	A field in the Cross Maps Table that may contain a computer processable representation of a rule that determines when this map should be used.
MapSetId	A SNOMED CT Identifier that uniquely identifies a Cross Map Set.
MapSetName	A field in the Cross Map Sets Table that names that Cross Map Set.
MapSetRealmId	A field in the Cross Map Sets Table that indicates the Realm in which a set of Cross Maps is applicable.
MapSetRuleType	A field in the Cross Map Sets Table that indicates whether any computer processable rules are present in the associated Cross Maps or Cross Map Targets and, if so, what form of expression is used to represent these rules.
MapSetSchemeld	A field in the Cross Map Sets Table, which identifies the classification or coding-scheme that is the target of a Cross Map Set.
MapSetSchemeName	A field in the Cross Map Sets Table that contains the plain text name of the classification or coding-scheme that is the target of a Cross Map Set.
MapSetSchemeVersion	A field in the Cross Map Sets Table that identifies the version of the classification or coding-scheme that is the target of a Cross Map Set.

MapSetSeparator	A field in the Cross Map Sets Table that contains a character that acts as a separator between target codes in the Cross Map Targets Table.
MapsetType	A field in the Cross Map Sets Table that indicates whether the Cross Maps associated with this Cross Map Set are all simple one to one maps or include, one to many and/or choices of alternative maps.
MapTargetId	A field in the Cross Maps Table, which refers to the TargetId of a row in the Cross Map Targets Table that contains a target scheme mapping for a specified Concept.
MemberId	A field in the Subset Members Table, which refers to the ComponentId of the Concept, Description or other Component that is a member of a specified Subset.
MemberStatus	A field in the Subset Members Table, which indicates the inclusion, exclusion, priority or order of an identified Subset Member in a specified Subset.
Migration	See Operational migration, Data migration and Predicate migration.
Moved Elsewhere	A Status value applicable to a Component that has been moved to another Namespace. Concepts or Descriptions may be moved from an Extension to the SNOMED CT core, from the core to an Extension or between one Extension and another. Moves occur if responsibility for supporting the Concepts changes to another organization.
Namespace Namespace-identifier	A block of identifiers allocated for use by an organization creating Extensions to SNOMED CT. The Namespace-identifier is part of the SCTID and its structure is described in Appendix C.
Namespace Concept	A Concept that exists to represent a SNOMED CT Namespace-identifier. All Namespace Concepts are direct subtypes of the Concept "Namespace Concept" which is a subtype of the Top-Level Concept "Special Concept". Namespace Concepts are used as the target of Historical Relationships and References when a Component is moved from one Namespace to another.
Navigation	The process of locating a Concept by traversing Relationships or Navigational links. For example, moving from a supertype Concept to more refined Concepts, from a specific Concept to a more general Concept or from a Concept to its Defining characteristics. Navigation Links allow navigation to follow intuitive routes through SNOMED CT even where there are no direct supertype or subtype Relationships.
Navigation Concept	A Concept that exists only to support Navigation. A Navigation Concept is not suitable for recording or aggregating information. All Navigation Concepts:

	<ul style="list-style-type: none"> <li>❖ Are direct subtypes of the concept “Navigational Concept”</li> <li>❖ Have not other supertype or subtype Relationships</li> <li>❖ Are linked to other Concepts only by Navigational Links</li> </ul>
Navigation Link	<p>An association between two Concepts that supports Navigation between Concepts. Navigation Links generate a hierarchy which has three distinct differences from the subtype hierarchy defined by “IS A” Relationships this hierarchy:</p> <p>Does not effect the semantic definitions of Concepts;</p> <p>Specifies a display order Concepts within a set of Concepts linked to a common parent.</p> <p>Navigation Links are distributed as a Navigation Subset.</p> <p>Alternative Navigation Subsets may be specified and applied to vary the navigational hierarchy to meet the needs of particular groups of users.</p>
Navigation Subset	A Subset that specifies sets of Navigation Links between Concepts.
NHS Information Authority NHS IA	Located in the United Kingdom, the National Health Service Information Authority partnered with the College of American Pathologists in the development of SNOMED CT.
Operational migration	Steps taken to enable an organization that either used a previous coding scheme (or no clinical coding scheme) to make use of SNOMED CT.
Partition-identifier	<p>A pair of digits that indicate whether an SCTID identifies a Concept, Description, Relationship, Subset, History, or Extension component.</p> <p>The partition-identifier consists of the second and third digits from the right of the SCTID.</p>
Pending Move	<p>A Status value applicable to a Component that is thought to belong in a different Namespace but which is maintained with its current SCTID while awaiting addition to the new Namespace.</p> <p>A new Concept and associated Descriptions may be added with this Status where a missing SNOMED CT Concept is urgently required to support the needs of a particular Extension. Existing Concepts can also use this status when it is recognized that they should be moved to another namespace (organization) or to the core namespace.</p> <p>See also Moved Elsewhere.</p>
Phrase equivalence	<p>Two words or phrases with a similar meaning. For example, “renal calculus” and “kidney stone”.</p> <p>See Word Equivalents.</p>
Post-coordination	<p>Representation of a clinical idea using a combination of two or more concept identifiers.</p> <p>A combination of concept identifiers used to represent a single clinical idea is referred to as a post-coordinated expression (see expression). Many clinical ideas can also be represented using a</p>

	<p>single SNOMED CT concept identifier (see pre-coordination). Some clinical ideas may be represented in several different ways. SNOMED CT technical specifications include guidance of logical transformations that reduce equivalent <i>expressions</i> to a common <i>canonical form</i>.</p> <p>Example: SNOMED CT includes the following concepts:</p> <ul style="list-style-type: none"> <li><i>Fracture of bone (conceptId= 125605004)</i></li> <li><i>Finding site (conceptId= 363698007)</i></li> <li><i>Bone structure of femur (conceptId= 181255000)</i></li> </ul> <p>SNOMED CT also includes a pre-coordinated concept for this procedure</p> <ul style="list-style-type: none"> <li><i>Fracture of femur (conceptId= 71620000)</i></li> </ul> <p>It is possible to represent "fracture of femur" in different ways:</p> <ul style="list-style-type: none"> <li>71620000 (pre-coordinated expression)</li> <li>125605004 : 363698007 = 181255000 (post-coordinated expression).</li> </ul> <p><b>Note:</b> In an HL7 representation a SNOMED CT expression is represented in a single HL7 attribute using the HL7 CD (Concept Descriptor) data type.</p>
Pre-coordination	<p>Representation of a clinical idea using a single concept identifier. A single concept identifier used to represent a specific meaning is referred to as a pre-coordinated expression (see expression). SNOMED CT also allows the use of post-coordinated expressions (see <i>post-coordination</i>) to represent a meaning using a combination of two or more concept identifiers.</p> <p>However, including commonly used concepts in a pre-coordinated form makes the terminology easier to use. For examples see post-coordination.</p>
Predicate migration	Steps taken to enable pre-existing data retrieval predicates (including queries, standard reports and decision support protocols) to be converted or utilized in a system using SNOMED CT.
Preferred Term	The Term that is deemed to be the most clinically appropriate way of expressing a Concept in a clinical record. Preferred Term is one of the three types of terms that can be indicated by the DescriptionType field.
Primitive	A Concept is Primitive if its Defining characteristics are insufficient to define it relative to its immediate supertype(s). For example, if the Concept "Red sports car" is defined as [is a=car] + [color=red] this is Primitive but the same definition applied to the Concept "Red car" is Fully defined.
Qualifying characteristic	<p>A Relationship to a target Concept that specifies a possible qualification of the source Concept.</p> <p>Example: "Revision status" = 'Conversion from other type of arthroplasty' is a possible qualifying characteristic of 'Hip replacement'</p>

	Contrast with defining characteristic and context-specific characteristic. Referred to in CTV3 as a 'Qualifier'.
Read Code	A five-character code allocated to a concept of term in CTV3. Note that codes allocated in Read Codes Version 2 and the Read Codes 4-Byte Set are also included in CTV3. In the case of 4-byte codes the original code is prefixed by a full stop ('.') .
Read Codes 4-Byte Set	The first version of the clinical coding scheme developed by Dr James Read. The Read Codes 4-Byte Set is UK Crown Copyright distributed by NHS IA, and integrated into SNOMED CT.
Read Codes Version 2	The second version of the clinical coding scheme developed by Dr. James Read. Read Codes Version 2 is UK Crown Copyright distributed by NHS IA, and integrated into SNOMED CT.
Realm	A sphere of authority, expertise or preference that influences the range of Concepts and Descriptions required, or the frequency with which they are used. A Realm may be a nation, organization, professional discipline, specialty or individual user. See also Realm Concept Subset.
Realm Concept Subset	A Subset of Concepts applicable to a particular Realm.
Realm Description Subset	A Subset of Descriptions applicable to a particular Realm.
Realm Relationship Subset	A Subset of Relationships applicable to a particular Realm (for future use).
RealmId	A field in the Subsets Table that identifies the Realm within which the specified Subset is applicable.
Reason	A field in the Component History Table which provides a text description of the reason for a change in the Status of a Component.
Reference	An association between a non-current SNOMED CT Component and a current Component that duplicates it, replaces it or is related to it. Each Reference is represented by a row in the References Table.
ReferencedId	A field in the References Table that identifies the current Component which replaces it or is duplicated by a non-current Component.
References Table	A data table consisting of rows each of which represents a Reference. The References Table is part of the History Mechanism.
ReferenceType	A field in the References Table that indicates whether a specified non-current Component was replaced by, duplicated by, similar to or an alternative form of the referenced current Component.
Refinability	A field in the Relationships Table, which indicates whether it is permissible to refine the value of a Defining characteristic or qualifying characteristic to represent a more refined Concept.

Relationship	An association between two Concepts (each identified by a ConceptId). The nature of the association is indicated by a RelationshipType Each Relationship is represented by a row in the Relationships Table.
Relationship group	Relationships, for a concept that are logically associated with each other. The RelationshipGroup field in the Relationships Table is used to group these rows together for a concept. For example, where a particular type of prosthesis is inserted a joint, the Defining characteristics describing the prosthesis type would be in one group whereas those describing the location or laterality of the joint would be in another group.
Relationship Type Type of Relationship	The nature of a Relationship between two Concepts. Relationship Types are represented in SNOMED CT by Concepts. The RelationshipType field indicates the nature of the Relationship by referring to the appropriate ConceptId.
RelationshipId	A SNOMED CT Identifier that uniquely identifies a Relationship.
Relationships Table	A data table consisting of rows, each of which represents a Relationship.
Release Version	An identifiable set of SNOMED CT tables distributed on or after a particular date for use in SCT Enabled Applications. Each Release Version is referred to by the ISO format date of which this set of files was distributed (or was scheduled for distribution). Thus release version "20030131" refers to the version released on January 31, 2003.
ReleaseVersion	A field in the Component History Table which indicates the SNOMED CT release in which a Component was added or changed.
Retired Concept	Concepts that are no longer considered current are called "non current" or "inactive" rather than "retired."
Root Concept	A single special Concept that represents the root of the entire content of SNOMED CT. All other Concepts are related to this Concept via at least one series of Relationships of the Relationship Type "ISA" (i.e. all other Concepts are regarded as subtypes of the Root Concept).
SCT Enabled Application	A software application designed to support the use of SNOMED CT.
SCT-Concept SCT-Description SCT-Relationship SCT-Subset SCT-History	A Concept, Description, Relationship, or Subset distributed by the IHTSDO as part of SNOMED CT. The prefix "SCT-" is used only where it is necessary to distinguish clearly between elements distributed by the IHTSDO and Extensions (denoted by the prefix " <i>Extra-</i> "). For further information refer to the glossary entries for the unprefixed names.

<b>SNOMED®</b>	The <b>Systematized Nomenclature of Medicine</b>
SNOMED Clinical Terms SNOMED CT®	The clinical terminology maintained and distributed by the IHTSDO.
SNOMED CT Core Tables	Refers to the SNOMED CT Concept, Relationship and Description Tables.
SNOMED CT Derivative	Documentation, subsets, cross-mappings, extensions, and other files.
SNOMED CT Identifier SCTID	A unique identifier applied to each Concept, Description or Subset. The SCTID includes a check-digit and a partition-digit. See specification of SCTID in Appendix C.
SNOMED International	SNOMED International is the version of SNOMED® that was first released in 1993 and which, as version 3.5 released in 1998, was the immediate predecessor of SNOMED RT. SNOMED International was also the name of the organization (now SNOMED Terminology Solutions) within the College of American Pathologists that was responsible for SNOMED CT until the transfer of the terminology to the IHTSDO in 2007.
SNOMED Reference Terminology SNOMED RT	The latest version of SNOMED® prior to the collaborative effort to develop SNOMED Clinical Terms. One of the source terminologies, along with CTV3, used to develop SNOMED CT. SNOMED RT was sponsored by the College of American Pathologists (CAP).
SNOMEDID	A field in the Concepts Table that contains the SNOMED RT identifier for the Concept.
Status	The Status of a Component indicates whether it is in current use and, if not, provides a general indication of the reason that it is not recommended for current use. The Status of a Concept is referred to as ConceptStatus and the Status of a Description is referred to as DescriptionStatus.
Subset	Subsets represent groups of Components that share specified characteristics that affect the way they are displayed or otherwise accessible within a particular realm, specialty, application or context.
Subset Definition	A series of clauses that specifies the nature of a Subset and determines its membership. A Subset Definition is an alternative form of representation applicable to many Subsets. See also Subset Definition File.
Subset Definition Clause	A statement that refers directly or indirectly to one or more Concepts, Descriptions or Relationships and indicates whether the referenced item(s) should be removed from or added to a specified Subset. In the case of additions to a Subset the clause also specifies the MemberStatus to be assigned to those additions.
Subset Definition File	A file containing a series of clauses that define the nature and

	membership of a Subset. The Subset Definition File is an XML document that contains the Subset Definition for a single Subset. A Subset Definition File can be used to generate the appropriate Subsets Table row and Subset Members Table rows to represent a Subset. Therefore applications need not support this alternative form of Subset representation.
Subset Member	A Concept, Description, Relationship or another Subset that is part of a specified Subset.
Subset Members Table	A data table consisting of rows each of which refers to a single Subset Member.
Subset Type Type of Subset	An indication of the type of component that may be a member of a Subset.
Subset Version	A version number assigned to a particular release of a Subset.
SubsetId	A SNOMED CT Identifier that uniquely identifies a Subset.
SubsetName	A field in the Subsets Table that contains a human readable name for the Subset.
SubsetOriginalId	A field in the Subsets Table that identifies the first version of the Subset on which this Subset is based. For the first version of a Subset the SubsetOriginalId and SubsetId fields contain the same value. For each subsequent version the Subset Version is incremented and a new SubsetId is allocated but the SubsetOriginalId field retains the same value in all versions.
Subsets Table	A data table consisting of rows each of which represents a Subset.
Subtype	A specialization of a concept, sharing all the definitional attributes of the parent concept, with additional granularity. For example, bacterial infectious disease is a subtype of infectious disease. Bacterial septicemia, bacteremia, bacterial peritonitis, etc. are subtypes of bacterial infectious disease (and infectious disease as well). In short, the concepts in a hierarchy that are directly related to a parent concept via the “IS A” relationship. Distinguished from “Descendants” which explicitly includes subtypes of subtypes. Subtype is usually intended to refer to only the concepts that are immediately under the subject concept – that is, one level down in the hierarchy.
Synonym	A Term which is an acceptable alternative to the Preferred Term as a way of expressing a Concept.
Target Code	A code or other identifier within a Target Scheme.
Target Scheme	A terminology, coding scheme or classification to which some or all SNOMED CT Concepts are cross-mapped. Mappings from SNOMED CT to a Target Scheme are represented by one or more Cross Map Sets.
TargetAdvice	A field in the Cross Map Targets Table that may contain human readable advice on the circumstances in which this Cross Map

	Target is applicable.
TargetCodes	A field in the Cross Map Targets Table that contains one or more codes or identifiers in the target scheme or classification. If there is more than one Target Code they are separated by a separator specified in the associated row of the Cross Map Sets Table
TargetId	A SNOMED CT Identifier that uniquely identifies a Cross Map Target.
TargetRule	A field in the Cross Map Targets Table that may contain computer processable rules specifying the circumstances in which this Cross Map Target is applicable.
TargetSchemeld	A field in the Cross Map Targets Table that identifies the target coding scheme or classification to which this Cross Map Target applies.
Term	A text string that represents the Concept. The Term is part of the Description. There are multiple descriptions per Concept.
Terminology server	Software that provides access to SNOMED CT (and/or to other terminologies). A Terminology server typically supports searches and Navigation through Concepts. A server may provide a user interface (e.g. a browser or set of screen controls) or may provide low-level software services to support access to the terminology by other applications. See the SNOMED CT Technical Implementation Guide.
Top-Level Concept	A Concept that is directly related to the Root Concept by a single Relationship of the Relationship Type "ISA". All other Concepts are descended from one Top-Level Concept via at least one series of Relationships of the Relationship Type "ISA" (i.e. all other Concepts are subtypes of one Top-Level Concept).
Unicode	A standard character set, which represents most of the characters used in the world using a 16-bit encoding. Unicode can be encoded in using UTF-8 to more efficiently store the most common ASCII characters.
UTF-16	A standard method of directly encoding Unicode using two bytes for every character. See also UTF-8.
UTF-8	A standard method of encoding Unicode characters in a way optimized for the ASCII character set. UTF-8 is described in [Appendix E].
Word Equivalent	A word or abbreviation that is stated to be equivalent to one or more other words, phrases or abbreviations for the purposes of textual searches of SNOMED CT. Word Equivalents and Phrase equivalents are represented as rows in the Word Equivalents Table.
Word Equivalents Table	A data table in which each row represents a Word Equivalent.
WordBlockNumber	A field in the Word Equivalents Table, which links together several

	rows which have an identical or similar meaning.
WordKey Table	A data table relating each word used in SNOMED CT (other than Excluded Words) to the Descriptions.
WordRole	A field in the Word Equivalents Table, which specifies the usual usage of this word, abbreviation or phrase, or the usage in which it has a similar meaning to the text in one or more other rows of the table that share a common WordBlockNumber.
WordText	A field in the Word Equivalents Table, which contains a word, phrase, acronym or abbreviation that is considered to be similar in meaning to the text in one or more other rows of the table that share a common WordBlockNumber.
WordType	A field in the Word Equivalents Table, which specifies whether this row contains a word, phrase, acronym or abbreviation