

## Structure of SNOMED CT

Some basic principles behind its design are listed below in order to provide a foundation for understanding the SNOMED CT structure.

SNOMED is based on “concepts.” Each concept represents a unit of thought or meaning and is labeled with a unique identifier (computer readable).

The phrases in human language used to describe the concept are called “descriptions” (or synonyms). Each concept has one or more descriptions linked to it.

Each concept is interrelated to other SNOMED concepts that have logical connections to it. Relationships are used to provide a computer readable definition of the concepts. These definitions greatly enhance the value of the data collected, allowing it to be searched, retrieved, reused or analyzed in a variety of ways.

SNOMED provides a rich set of inter-relationships between concepts. Hierarchical relationships define specific concepts as children of more general concepts. For example, “kidney disease” is defined as a kind of “disorder of the urinary system.” In this way, hierarchical relationships provide links to related information about the concept. This example shows that kidney disease has a relationship to the concept that represents the part of the body affected by the disorder (i.e., the urinary system).

People often have different ways of saying the same thing. By linking synonyms to a single concept, SNOMED CT allows computer systems to recognize the common meaning of synonymous terms. Thus, physicians can use various synonyms as they are accustomed to doing, but these synonyms will map back to the same concept.

SNOMED's design is based on the premise that a detailed and specific nomenclature is essential to reflect, in computer readable format, the complexity and diversity of information found in a patient record. The design ensures clarity of meaning, consistency in aggregation, and ease of messaging. This results in a smart and structured search, with specific and relevant return of results.

For diseases/disorders, SNOMED CT uses relationships between concepts to provide logical, computer readable definitions of medical concepts. There are several types of relationships described or modeled in SNOMED CT.

### 1) "Is A" Relationship

The “Is A” relationship is used to create a hierarchical relationship between concepts, relating specific concepts to a more general category. For example:

"Injury to the optic nerve"

"is a" (kind of)

"Injury to the visual pathway"

2) "Finding Site" Relationship

The "Finding Site" relationship identifies the part of the body affected by the specific disorder or finding. For example:

"Injury of cornea"  
(has) "finding site"  
"Corneal structure"

3) "Causative agent" Relationship

The "Causative agent" relationship identifies the direct cause of the disorder or finding. The causative agent is the bacterium, virus, toxin or environmental agent that causes the disorder. For example:

"Staphylococcal eye infection"  
(has) "Causative agent"  
"Staphylococcus"

4) "Associated morphology" Relationship

The "Associated morphology" relationship identifies the abnormal physical condition that is characteristic of a given disorder or finding. For example:

"Foreign body under eyelid"  
(has) "Associated morphology"  
"Foreign body"

For medical and surgical procedures, SNOMED also uses relationships between concepts to provide logical, computer readable definitions of medical concepts. These relationships can be applied to procedures:

1) "Is A" Relationship

The "Is a" relationship is used to create a hierarchical relationship between concepts, relating specific concepts to a more general category. For example:

"LASIK"  
"Is a" (kind of)  
"Keratomileusis"

2) "Procedure Site" Relationship

The "Procedure Site" relationship identifies the part of the body acted on by the procedure. For example:

"LASIK"  
(has) "Procedure site"  
"Corneal structure"

3) "Method" Relationship

The "Method" relationship identifies the kind of procedure that is being carried out. For example:

"Removal of foreign body from eye"  
(has) "Method"  
"Removal"

"Grafting of fascia of eyelid"  
(has) "Method"  
"Transplantation"

4) "Direct Morphology" Relationship

The "Direct Morphology" relationship identifies the abnormal physical condition that is being directly addressed by the procedure. There is an implicit link between the "method" relationship and the direct morphology. The method acts on the direct morphology. For example:

"Removal of foreign body from eye"  
(has) "Direct morphology"  
"Foreign body"

5) "Direct Device" Relationship

The "Direct Device" relationship identifies the device that is involved in the core operation of the procedure. An example of the direct device relationship is as follows:

"Removal of eye prosthesis"  
(has) "Direct device"  
"Eye prosthesis"

6) "Using" Relationship

The "Using" relationship refers to any instrument, equipment or energy that is used to perform the procedure. For example:

"LASIK"  
"Using"  
"Laser light"