

# *SNOMED CT - the language of the NHS Care Records Service*

A guide for NHS staff in England



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# SNOMED CT: An overview

## *What is a clinical terminology?*

A clinical terminology is a structured collection of descriptive terms for use in clinical practice. These terms describe the care and treatment of patients and cover areas like diagnoses, symptoms, surgical procedures, treatments and drugs as well as terms used for healthcare administration (although this is not a primary focus).

By using a terminology embedded in computer applications clinical staff can record patient information in a consistent manner. The recording of clinical data can be communicated in a standard way between healthcare systems and individuals. Research organisations will be able to report on health trends based on the common terminology, confident that information collected from different NHS organisations is comparable.

## *What is SNOMED CT?*

SNOMED CT (Systematized Nomenclature of Medicine – Clinical Terms) is a joint development between the NHS and the College of American Pathologists (CAP) to develop an international clinical terminology. SNOMED CT is the healthcare industry standard of clinical terminology (see below) and is starting to be used in many countries. It is a vocabulary which aims to represent the words and phrases used in healthcare in a consistent way in association with unique codes that are recognisable by machines.

SNOMED CT is a tool which can be used by clinicians, administrators and medical researchers to improve the health of patients through improved representation of clinical information.

In April 2007 the management of SNOMED CT transferred to the International Health Terminology Standards Development Organisation (IHTSDO), with the IHTSDO assuming responsibility for the ongoing maintenance, development, quality assurance, and distribution of SNOMED CT and CAP being commissioned to support IHTSDO operations under an initial three-year contract and separately continuing to provide SNOMED-related products and services as a licensee of the terminology.

As part of the new arrangements NHS Connecting for Health (NHS CFH), a key driver in the development and establishment of the IHTSDO, now act as the host organisation of the IHTSDO National Release Centre in the UK which will be known as the UK Terminology Centre (UKTC).

Through NHS Connecting for Health's membership of the IHTSDO, the UK Terminology Centre (UKTC) functions as an affiliate of the IHTSDO and provides a central point for managing, distributing, supporting and controlling the use of SNOMED CT and related assets throughout the UK.

### ***The vision for clinical information***

All clinical computer systems within England will operate using SNOMED CT as the clinical terming/coding standard and will replace or subsume other code systems currently used in clinical medicine. There will be an increase in the quantity and quality of information that is coded. Coded information will be entered by clinicians for clinical use, wherever it will bring clinical benefit.

### ***How will SNOMED CT help?***

SNOMED CT helps organise medical language into a structured framework. It will be embedded in the applications that will be used to create the electronic patient record and used to record clinical information alongside entry of textual clinical notes. Recording information using SNOMED CT will allow the information in the patient record to be processed by computers. This in turn will enable the following:

- efficient searching of patient records
- retrieval of relevant clinical information
- point of care decision support
- automatic identification of patient risk factors
- monitoring of response to treatment
- monitoring of adverse reactions to treatment
- long term population disease or outcome analysis

- large populations of consistent data for medical research.

SNOMED CT is the enabler for the large scale benefits of the NHS Care Records Service.

### ***Additional information***

Clinical terminology is sometimes also referred to as:

- A dictionary of clinical concepts
- A thesaurus of terms
- A health lexicon
- A controlled clinical vocabulary

# SNOMED CT: Basic structure

SNOMED CT is a collection of about 400,000 medical concepts, associated with about 800,000 description terms for these concepts, and related to each other by a hierarchy (also known as a 'taxonomy') consisting of about 1,200,000 relationships. SNOMED CT is currently released every six months and the content continuously evolves to meet clinical need.

## Concepts

A concept is a clinical meaning identified by a unique numeric identifier (ConceptID) that never changes. ConceptIDs do not contain hierarchical or implicit meaning – they do not reveal any information about the nature of the concept.

Each concept has one 'fully specified name' that provides a unique and unambiguous description for a concept. It is not necessarily the most commonly used description of a concept and is more likely to be used for formal documentation such as research papers.

## Descriptions

In addition to the fully specified name, every concept in SNOMED CT has a number of descriptions. These can represent the terms that are in everyday use. There are often many synonymous descriptions for a single concept.

## Relationships

Every concept in SNOMED CT is placed in a hierarchy by which it is related to other SNOMED CT concepts. Individual medical concepts may be in more than one hierarchy created for different clinical purposes. A relationship is assigned only when that relationship is always known to be true.

The relationships are used to define a concept where it can be expressed in terms of other concepts (eg laparoscopic appendicectomy IS A appendicectomy USING A laparoscope).

Relationships can also define how a concept may be sensibly further refined or qualified. Relationships are a very powerful mechanism which allows not only grouping of closely related concepts, but also machine logical reasoning about the information in SNOMED CT. It is designed to enable aggregation of medical information for secondary purposes without any loss of the detail required for primary clinical use. Relationships are primarily intended to allow machine processing and will only uncommonly be presented to the clinical users of the NHS Care Records Service (NHS CRS).

### ***Post coordination***

In clinical documentation one commonly combines many facts and ideas to describe a medical disorder or procedure (for example 'abrasion of the left elbow'). SNOMED CT allows a very similar combination of concepts in a process called 'post coordination', in which a focus concept may be qualified to produce a more specific clinical concept.

### ***Training***

In order to understand how best to use systems which use SNOMED CT, there is a need both for general awareness and for specifically tailored training sessions. Training will be required for NHS staff who will be using SNOMED CT directly and indirectly.

## An example of the structure of a SNOMED CT concept

### **Concept:**

- ConceptID: 22298006
- Fully specified name: myocardial infarction (disorder)

### **Descriptions:**

- Preferred term: myocardial infarction
- Synonym: cardiac infarction
- Synonym: heart attack
- Synonym: infarction of heart

### **Relationships:**

- **Defining relationships (is a)**
  - Concept: structural disorder of heart
    - Associated morphology: Infarct
    - Finding site: myocardium structure
  - Concept: injury of anatomical site
    - Associated morphology: infarct
    - Finding site: myocardium structure
  - Concept: myocardial disease
    - Associated morphology: infarct
    - Finding site: myocardium structure
- **Allowable qualifiers**
  - Qualifier: onset
  - Qualifier: severity
  - Qualifier: episodicity
  - Qualifier: course

# SNOMED CT: Using the terminology

As SNOMED CT is such a comparatively large and complex terminology there are issues surrounding the best way to make use of it. Much of the work in this area focuses on two aspects, the user interface, and clinically relevant subsets of SNOMED CT.

## *The user interface*

The way in which clinical staff enter coded information into the electronic patient record will depend on the type of information being entered.

For example, the documentation of a diagnosis made in accident and emergency might be recorded by the clinician entering a search term like 'myoc inf' and selecting a result such as 'myocardial infarction' from a list of matching descriptions. This search might be constrained to a particular type of clinical information (eg diagnoses, procedures, symptoms) or to a particular clinical situation (eg chest x-ray findings), it might be unconstrained, it might be a mixture of all three.

In other situations clinical information may be captured through a form, for example the recording of a patient's Glasgow Coma Scale. In this case the SNOMED CT coding will be most likely linked to check-boxes or drop down lists in the background.

In most instances the set of possible clinical data items that might be recorded in this context are likely to be managed as a 'subset' of SNOMED CT.

## *What are SNOMED CT subsets?*

A SNOMED CT subset is a group of concepts, descriptions and/or relationships chosen to be relevant for use in a given circumstance or scenario.

Subsets are in fact one of a number of different types of SNOMED CT 'meta data' that are used to guide and enhance how the clinician interacts with SNOMED CT and how the information captured is then subsequently stored, acted on or analysed (other types of meta data include cross maps, ordered, sets constraint rules and information models).

### *Examples of use of SNOMED CT subsets:*

- Organising SNOMED CT into relevant chunks which act as 'favourites' for the end user.
- Constraining choices, where required, to particular defined categories (eg national data sets, cancer registry data sets).
- Encouraging structured clinical data entry by ensuring, for example, diagnoses are entered as diagnoses (appendicitis), symptoms as symptoms (right iliac fossa pain), and procedures as procedures (appendicectomy).
- To support background processes that might trigger decision support (eg conditions that contraindicate the use of a drug).
- To achieve a consistent representation of disease where important. SNOMED CT has the potential for great flexibility - but it is sometimes necessary to agree a set of standard criteria against which to measure a patient.

## Characteristics of SNOMED CT subsets:

### ***Subsets are not necessarily mutually exclusive:***

- The contents of subsets may overlap.
- Subsets might be formed from the joining of smaller subsets.

### ***A subset can be as generic or specific as needed:***

- Radiologists and radiographers might want a 'diagnostic imaging' subset.
- Radiologists and nuclear medicine specialists might want a 'radionuclide imaging' subset.
- Radiologists and nuclear medicine specialists in conjunction with neurologists might want a 'neuro-imaging radionuclide procedure subset'.

### ***Subsets have no limit on their size:***

- A subset of concepts for a particular clinical speciality may contain many thousands of members (eg all surgical procedures).
- A subset of concepts that covers the set of procedures used in a particular speciality or discipline may contain several hundred members (eg radiology investigations).
- A subset of concepts applicable to fields in a structured message may have less than a hundred members (eg smoking status).
- A subset of concepts or descriptions applicable to a clinical protocol, template or data entry field may contain very few members (eg symptoms that trigger a chest pain protocol).

There has so far been some national subset development as part of the National Programme, for example pathology and diagnostic imaging. The SSeRP team have identified it is important that there is a clearly defined process for the prioritisation of national subset development where there is biggest clinical need and the mechanism by which these nationally developed subsets can be agreed by the NHS.

### ***How is a subset created, distributed and maintained?***

Subsets, in their most basic form, can just be a list of SNOMED CT codes. There are various tools which assist in the construction of subsets, but basic subsets can be built in a spreadsheet. The tools used to search SNOMED CT and select the codes for a subset vary depending on individual circumstances. Some of the currently available SNOMED CT browsers are listed. Clinical systems will have an integrated tool to allow selection of terms from SNOMED CT.

Subsets can be created for national use or for local need. If a subset is to be nationally distributed there is a mechanism to ensure coordinated national releases synchronise with the release of new versions of SNOMED CT. Local subsets may be created by extending or restricting an existing national subset and may enable some local configuration of the applications provided as part of the NHS CRS. Such subsets will need to be kept up to date.

To ensure synchronous release of all national subsets, they will be distributed via the Terminology Reference Data Update Distribution service (TRUDs) along with all other SNOMED CT content.

Using SNOMED CT for a particular specialist application may require the creation of a subset, for example to facilitate the capture of information relevant to that speciality. Other clinical groups may be working to develop such a subset already, or it may be that the particular specialist application may be best served by a more complex form of a SNOMED CT subset. To coordinate and guide subset development the SSeRP team has a Subset Development Project. Contact the SSeRP team ([sserp@nhs.net](mailto:sserp@nhs.net)) to discuss issues and get guidance on subset development. There is also a planned registry of current subsets and subsets in development, details of which are available from the SSeRP.

### ***Common User Interface***

The key issues in user interfaces and how these link to workflow related issues are being looked at by the Common User Interface team within NHS CFH.

**For further information contact:**

Peter Johnson ([peterjohnson@nhs.net](mailto:peterjohnson@nhs.net))

***Some of the currently available SNOMED CT browsers:***

CliniClue Browser (<http://www.cliniclue.co.uk>) local installation, evaluation licence

Lexplorer by Hli (<http://www.snomed.cfh.nhs.uk/lexplorer/>) web based, requires Athens login

Snoflake by Dataline (<http://snomed.dataline.co.uk/>) web based, free registration

CaTTS by BT (<http://www.jdet.com/>) web based, demonstration only

MyCroft by Apelon (<http://www.apelon.com/products/mycroft.htm>) local installation, NHS licence

NCI Browser (<http://nciterms.nci.nih.gov/NCIBrowser/Dictionary.do>) web based, generic browser

# SNOMED CT: Benefits

The benefit of recording information in a standard terminology such as SNOMED CT is linked to the benefits of the electronic care record and the benefits of recording clinical information in a structured form.

In secondary care where recording is traditionally paper based, there is a culture change required to record information successfully using SNOMED CT in a structured electronic record. The benefits of doing so will be seen in the improvements in patient care, resulting from better access to quality clinical information and the improved planning that can be based on that information.

In primary care where uptake of structured electronic records is already advanced, much of the benefit of using SNOMED CT as the terminology within the patient record will be seen as improved sharing of information across care settings. The longer term benefits to the patient that improved clinical data collection will bring in terms of developing evidence bases will become apparent when there is widespread adoption.

<b>Benefits of an electronic record</b>	
Reduced storage costs	
Can be accessed from many places	<i>eg can be viewed in a radiology department and simultaneously in ED, by those who have the relevant permissions.</i>
Can be transferred quickly	<i>eg a record can easily be sent between hospital and GP.</i>
It is legible	<i>but still not necessarily understandable!</i>

<b>Benefits of a structured record</b>	
Can display logical progression of clinical data	<i>eg tracking blood test results over time or displaying progression of clinical signs or tracking increasing medication doses.</i>
Can retrieve clinical data based on situation or author	<i>eg clinical notes from one particular clinic can be viewed as a sequence.</i>
Allows clinical data items to be transmitted longitudinally through a patient's record	<i>As important information is placed in a structure (such as a problem list or treatment plan), that information can be retained easily and tracked through the course of a patient's illness.</i>
	<i>Structuring clinical data can highlight what information is missing from the patient's record.</i>
	<i>Together these will help improve continuity of care, reduce medical error and decrease duplicate data entry.</i>

### **Benefits of using a clinical terminology**

<p><b>Controlled vocabulary</b></p>	<p><i>Use of a controlled terminology reduces the implicit contextual meaning in clinical statements. This increases the chance of a statement being correctly understood by other clinical staff.</i></p>
<p><b>Point of care uses:</b></p>	
<p><b>The ability to search records for clinical information</b></p>	<p><i>Searching for clinical information in a patient’s record is dependent on using a terminology. If clinical information is reliably coded then searches can also determine when something has not been previously documented (eg the left bundle branch block is new onset).</i></p>
<p><b>Identification of patients who match a given set of criteria</b></p>	<p><i>Patients who have a certain set of clinical features need to be identified for a number of reasons. This may be to identify patients who are eligible for a particular screening programme, or a clinical trial, or to detect patients who are at a high risk of developing a given disease. To identify patients who fall into a given category automatically, the clinical information in the patient’s record must be recorded using a terminology.</i></p>
<p><b>Provision of decision support</b></p>	<p><i>With encoded clinical information in the patient’s record, computers can assist the decisions made by healthcare professionals by providing contextually relevant information at the point of care, or by providing automated alerts or checks.</i></p>
<p><b>Aggregation uses:</b></p>	
<p><b>Public health monitoring</b></p>	<p><i>Encoding clinical information allows for the monitoring of diseases and disease trends at a population level. The more usable clinical information we have, the more proactive we can be at tackling health issues or managing disease outbreaks.</i></p>
<p><b>Outcomes analysis</b></p>	<p><i>There is an increasing focus on evidence based medicine in clinical practice today, but precious little usable information to base that evidence on. The biggest single benefit of a consistent terminology across the NHS will be the public health benefit to patients that will arise from the development of good evidence bases from coded clinical data.</i></p>

Performance analysis	<i>As medicine moves towards evidence bases, fitness to practice and clinical revalidation are similarly moving towards performance related measures. Clinical coding can help this process.</i>
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<b>Benefits of using SNOMED CT</b>	
Provides a consistent terminology across all care domains	<i>This allows clinicians to communicate effectively and accurately across clinical domains and over the lifetime of a patient record.</i>
SNOMED CT allows precise recording of clinical information	<i>SNOMED CT has consistently the best coverage of clinical concepts out of all coding systems. By using many descriptions for a single clinical concept it allows tailoring for individual care settings whilst maintaining consistency.</i>
	<i>SNOMED CT can be extended by post coordination to further enhance its usability and coverage, and is the only terminology with enough clinical richness to support the development of clinical knowledge bases.</i>
SNOMED CT has an inherent structure	<i>This provides for an unambiguous description of an individual concept in a logical way and allows application of logical processing and machine reasoning of clinical information.</i>
SNOMED CT is a developing international standard	<i>SNOMED CT has multilingual support and moves us towards the goal of a platform independent, cross cultural, cross care setting health care record.</i>

# SNOMED CT: Classifications

## ***What difference will SNOMED CT make to secondary uses?***

At present trusts organise resources, run audits and are paid by grouping ICD and OPCS codes into Healthcare Resource Groups (HRG). This is done by a clinical coding team in each unit usually after the patient has left the hospital.

SNOMED CT will, in time, allow the extraction of commissioning and planning data directly from information collected at the point of care by clinicians. More work however, is required to prove this process, as information collected for clinical purposes may not always support administrative purposes.

As the patient data will be collected at the point of care and form part of the clinical record, it is envisaged the quality of clinical coding will therefore improve.

## ***What does this mean for clinical coders?***

- The current system of ICD-10 and OPCS-4 classification is not going to be disappearing overnight.
- The cross mapping of SNOMED CT to ICD-10 or OPCS-4 can only ever be a semi automatic process. The subtleties and nuances of ensuring payment is received for clinical activities performed in the trust is a skilled job and cannot be performed by machine.
- Coders will continue to be responsible for the clinical classification coding and trust payment.

- Coders will be supported by new tools that help with some of the simpler translations of SNOMED CT to ICD-10 and OPCS-4.
- NHS CFH Informatics and the NHS Classifications Service are assessing the training and support coders require under the Education, Training and Development unit with NHS CFH.
- Support for clinical uses of SNOMED CT and maintenance of SNOMED CT subsets is potentially an enormous opportunity for people who understand the issues surrounding coded medical information and are skilled at performing complex data analysis.
- If the process of populating HRGs from SNOMED CT can be proved, there will be additional benefits in rationalising the many coding schemes currently used in medicine. Identifying and quantifying the benefits is addressed as part of the SNOMED CT roadmap the SSeRP team are supporting.

### ***Additional Information***

NHS coding systems in use in  
the NHS Care Records Service  
(clinical and non-clinical)

SNOMED CT

National Administrative Codes Service  
(NACS)

ICD10

OPCS-4.4

Read

NHS Data Dictionary

Spine Directory Service (SDS)

dm+d

### **2002 Wanless Report**

The review recommends that stringent standards should be set from the centre to ensure that systems across the UK are fully compatible with each other (6.21)

# SNOMED CT: Contacts

## *National contacts*

- UK Terminology Centre (UKTC) (NHS Data Standards & Products)  
<http://www.ihtsdo.org.uk>  
<http://www.connectingforhealth.nhs.uk/snomed>  
Helpdesk - [datastandards@nhs.net](mailto:datastandards@nhs.net)  
National Training Support - Jo Oakes ([jo.oakes@nhs.net](mailto:jo.oakes@nhs.net))
- SNOMED CT in Structured electronic Records Programme (SSeRP) - [sserp@nhs.net](mailto:sserp@nhs.net)  
The SSeRP has been developed to support the implementation of SNOMED CT based structured records. This includes education and training plans and subset guidance.

## *Regional contacts*

- For details of regional contacts please contact the SSeRP mailbox - [sserp@nhs.net](mailto:sserp@nhs.net)

## *International contacts*

- International Health Terminology Standards Development Organisation (IHTSDO) - <http://www.ihtsdo.org>
- Snomed International - <http://www.snomed.org/snomedct>





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