

SNOMED CT[®]

The Language of Electronic Health Records







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SNOMED CT: An overview

SNOMED CT is an acronym for Systematized Nomenclature of Medicine - Clinical Terms. It is a clinical terminology that has been developed to support the effective clinical recording of data, with the aim of improving patient care. It covers areas such as diseases, symptoms, operations, treatments, devices and medicines.

This terminology is being incorporated into electronic healthcare applications and while it is not essential for everyone in the NHS to understand SNOMED CT in depth, it is important to have a background to SNOMED CT, the potential benefits and how it may change the way we record clinical data.

This brochure provides an in-depth view of SNOMED CT and is aimed at those who may need to analyse information such as System Managers, IT Staff in trusts, Clinical Coders and Information Analysts.

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 medicines as well as terms used for healthcare administration.

A clinical terminology is sometimes also referred to as:

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

SNOMED CT is a clinical terminology which is complementary to the coding systems already in use within healthcare; such as the classifications OPCS-4.5 (Office of Population Censuses and Surveys Classification of Interventions and Procedures) and ICD-10 (International Statistical Classification of Diseases and Related Health Problems, tenth revision) which are used to categorise disorders and treatments. Classification data is used to support business planning, epidemiology and the identification of groups of patients for clinical audit.

By using a terminology embedded within in an application, clinicians can record precise clinical information into the patient's Electronic Health Record in a consistent and unambiguous manner. This then allows the clinical data to be communicated in a standard way between healthcare systems and individuals. Permitted research organisations will be able to report on health trends based on the common terminology, confident that anonymised and pseudonymised information collected from different NHS organisations is comparable.



What is SNOMED CT?

SNOMED CT (Systematized Nomenclature of Medicine – Clinical Terms) is an international healthcare clinical terminology, which has been adopted by the NHS as its clinical reference terminology of choice. 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 can be used by clinicians, administrators and medical researchers to facilitate improvements in healthcare through improved representation of clinical information.

The International Health Terminology Standards Development Organisation (IHTSDO)

The IHTSDO is responsible for the ongoing maintenance, development, quality assurance and distribution of SNOMED CT.

The UK Terminology Centre (UKTC) within NHS Connecting for Health (NHS CFH) acts as the host organisation of the IHTSDO National Release Centre in the UK.

The 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.

Requests for any change or new terms within the UK need to be made to the UKTC. All clinical content suitable for the International release is considered for addition to the “core” international SNOMED CT version. UK specific content remains in the UK extension of SNOMED CT.

Guidelines on how to request changes to SNOMED CT within the UK can be found at:

www.connectingforhealth.nhs.uk/snomed





SNOMED CT: Benefits

The advantage 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 the benefits of using SNOMED CT in a structured electronic record 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 that improved clinical data collection will bring to the patient, in terms of developing evidence bases, will become apparent when there is widespread adoption.





Some Benefits of an Electronic Record

Reduced storage costs	e.g. reduction in size/number of physical paper records.
Can be accessed in many places at the same time	e.g. can be viewed in a radiology department and simultaneously in an emergency department, by those who have the relevant permissions.
Can be transferred quickly	e.g. a record can easily be sent between hospital and GP.
It is legible	But still not necessarily understandable if the clinical language is not standardised using a standard terminology.



Some Benefits of a Structured Record

Can display logical progression of clinical data	e.g. tracking blood test results over time or displaying progression of clinical signs or tracking increasing medication doses.
Can retrieve clinical data based on situation or author	e.g. clinical notes from one particular clinic can be viewed as a sequence.
Allow clinical data items to persist longitudinally through a patient's record.	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. Structuring clinical data can highlight what information is missing from the patient's record. Together these will help improve continuity of care, reduce medical errors and decrease duplicate data entry.



Benefits of using SNOMED CT

Controlled vocabulary	Use of a controlled terminology reduces the implicit differences in contextual meaning. This increases the chance of a statement being correctly understood by other clinical staff.
Provides a consistent terminology across all care domains	This allows clinicians to communicate effectively and accurately across clinical domains and over the lifetime of a patient record.
SNOMED CT allows precise recording of clinical information	SNOMED CT probably has the best coverage of clinical concepts compared to comparable coding schemes. SNOMED CT also allows the use of alternative descriptions more familiar to users without compromising ambiguity. SNOMED CT can be extended by post-coordination to further enhance its usability and coverage.
SNOMED CT is a developing international standard	SNOMED CT has multilingual support and moves us towards the goal of a platform independent, cross cultural, cross care setting health care record.



Benefits for Point of Care Uses

<p>The ability to search records for clinical information</p>	<p>A terminology allows users to search a patient's record for specific clinical information. If clinical information is reliably coded then searches can also highlight whether a patient has undergone a particular procedure (e.g. hip replacement) or suffered from a particular disease (e.g. measles).</p>
<p>Identification of patients who match a given set of criteria</p>	<p>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 more easily, the clinical information in the patient's record should be recorded using a terminology.</p>
<p>Provision of decision support</p>	<p>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.</p>



Benefits for Aggregation Uses

Public health monitoring	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.
Outcomes analysis	There is an increasing focus on evidence based medicine in clinical practice today, but precious little usable information to base that evidence on. One of the greatest benefits 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.
Performance analysis	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.





SNOMED CT: Basic structure

The Vision for Clinical Information

All clinical computer systems within the UK are expected to operate using SNOMED CT as the clinical terming/coding standard which will eventually replace or subsume the Read Codes and some other coding schemes, currently used in healthcare. There will be an increase in the quantity and quality of information that is coded.

SNOMED CT will be largely invisible to the clinician who will enter information in a form that is familiar to them, i.e. in structured, readable English. The systems they use may do the coding for them behind the scenes. SNOMED CT is there to allow systems to process information efficiently, without relying on the user to do all the hard work.

An analogy of this could be stock in a supermarket. A shopper will look on the shelf for a tin of 'baked beans' but when it is paid for the till recognises the item simply by its barcode (i.e. a number). It is this code that is used to identify the item in all the back office functions in the supermarket. However, on the receipt it prints 'baked beans 400g' which is the human readable representation of that concept.

How will SNOMED CT help?

SNOMED CT helps organise clinical 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:

- More efficient searching of patient records
- Improved retrieval of relevant clinical information
- Point of care decision support
- Automatic identification of patient risk factors
- Alerts to drugs that will have a reaction due to underlying health problems
- 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
- Embedded clinical information to enable point of care decision support.

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



Concepts

A SNOMED CT concept is a unique clinical meaning which is 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 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 alternative descriptions. These can represent the terms that are in everyday use. There are often many synonymous descriptions for a single concept.

The three most common descriptions are:

Fully Specified Name – this provides a totally unambiguous way to name a concept, e.g. Myocardial Infarction (disorder).

Preferred Term – the most common word or phrase used by clinicians to name a concept, e.g. Myocardial Infarction.

Synonyms – these are the descriptions that have the same meaning as the Fully Specified Name but different representations, e.g. Heart Attack, Infarction of Heart.

Relationships

Every concept in SNOMED CT is placed in a hierarchy by which it is related to other SNOMED CT concepts. Individual concepts may be in more than one hierarchy.

The relationships are used to define a concept where it can be expressed in terms of other concepts (e.g. myocardial infarction IS A injury of anatomical site).

Relationships are a very powerful mechanism which allow not only grouping of closely related concepts, but also machine logical reasoning about the information in SNOMED CT. They are designed to enable aggregation of clinical information for secondary purposes without any loss of the detail required for primary clinical use.

SNOMED CT also allows concepts to be further qualified by combination with other concepts such as “myocardial infarction” being further qualified with a severity (e.g. fatal).

Additional information

SNOMED CT is a collection of about 600,000+ medical concepts, associated with about 1,750,000+ descriptions, and related to each other in a hierarchy (also known as a taxonomy) consisting of about 2,600,000+ relationships.

NOTE: These figures are totals from the International Core, UK Extension and UK Drug Extension Combined, October 2009 Release.

SNOMED CT International Edition and SNOMED CT UK Edition is currently released every six months, while the SNOMED CT UK Drug Extension is released four weekly (from February 10th 2010). All the content continuously evolves to meet clinical need.



Example: Structure of a SNOMED CT concept

CONCEPT

Concept ID – 22298006

Fully Specified Name – Myocardial infarction (disorder)

DESCRIPTIONS

Preferred Term – Myocardial infarction

Synonym – Cardiac infarction

Synonym – Heart attack

Synonym – Infarction of heart

Synonym – MI – Myocardial infarction

Synonym – Myocardial infarct

RELATIONSHIPS

Myocardial infarction **IS A**

Injury of anatomical site (concept)

Structural disorder of heart (concept)

Myocardial disease (concept)

The defining **ATTRIBUTES** are

Associated morphology (concept) with value infarct (concept)

Finding site (concept) with value myocardium structure (concept)

QUALIFIERS

Severity (concept)

Episodicity (concept)

Clinical course (concept)



SNOMED CT: Using the terminology

SNOMED CT is a multi faceted comprehensive terminology designed to support a multitude of use cases across many disciplines. It is essential that the way it is incorporated into any clinical system optimises the properties of SNOMED CT and meets the designated business requirements. It may need sophisticated user interfaces with templates, option buttons, pick lists, favourites etc.

The User Interface

The way in which clinical staff enters coded information into the electronic patient record will depend on the nature of the processes being undertaken and this will inevitably influence the content that might be pertinent to that situation. 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 (e.g. diagnoses, procedures, symptoms) or to a particular clinical situation (e.g. chest x-ray findings), or it might be unconstrained, or it might be a mixture of all three. How search terms are entered will be specific to the application as some will require wildcard characters for searching, e.g. myocardial inf*.

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.

Subsets

In some 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. A subset is a selection of SNOMED CT concepts, descriptions or relationships from the full terminology that is appropriate to a particular deployment or requirement. The subset may represent the specific needs of a particular specialty, an organisation, a user group, or a language for instance. Subsets support user interaction with systems by restricting the terms for user interfaces such as menus or pick lists, and can also support translation to alternative languages and dialects.

Different types of subset are used to represent aspects such as:

- Descriptions or concepts for particular organisations or specialties
- Structure and ordering of descriptions and concepts to aid user navigation
- Language and dialect variants.

Subsets are often developed in response to a request from a professional body, for a particular business requirement, or to support a particular function like emergency medicine. Each subset requires a defined owner who must provide a clear purpose and scope for the subset as well as a demonstration of the benefits this will bring – these are crucial to ensure the subset is kept relevant and up to date.

After development, testing and acceptance of the subset, it may be incorporated in the regular scheduled release of the SNOMED CT UK edition.



Common User Interface

The Common User Interface (CUI) team focus on user scenarios involving clinicians encoding notes using SNOMED CT. The guidance produced covers tactical and strategic solutions such as single concept matching, form entry and free text matching. The CUI team create User Interface standards aimed at software vendors to the NHS. The guidance documents describe how to embody usability and safety principles appropriate for clinical users in the NHS to help reduce training requirements for clinicians when moving between different clinical applications.

For more information please view the CUI guidance catalogue:

www.cui.nhs.uk

SNOMED CT Browsers

In Electronic Patient Records applications that use SNOMED CT may use a built in browser to assist clinicians in accessing, selecting and recording the most appropriate concept for the patient record. This browser will be application specific, however, some users may have a need to investigate the content of SNOMED CT further and can do this using an independent browser which will give them access to the whole of SNOMED CT and not be specific to any particular application.

For a list of the currently available SNOMED CT browsers see:

www.connectingforhealth.nhs.uk/snomed/browser

Training

The detail of who will require SNOMED CT training is dependent on the role of the healthcare provider and the healthcare application being used. It is expected that everyone involved in the recording, retrieval or analysis of patient information will come across SNOMED CT in some form.

It is anticipated that end users of applications such as doctors, nurses, pharmacists, allied health professionals and clinical administrative staff will encounter SNOMED CT through applications software. The application-specific training they receive will provide sufficient detail to enable a clear understanding of how the software works with SNOMED CT.

People needing a specific and more detailed knowledge of SNOMED CT's structure and reporting capabilities will include clinical coders, information analysts, health record managers, information managers and managers of clinical databases.

To facilitate the introduction of SNOMED CT, a range of options for individuals to learn more about SNOMED CT have been developed (see Contacts at the end of this document for further details).



SNOMED CT: Link to Classifications

What difference will SNOMED CT make to Secondary Uses?

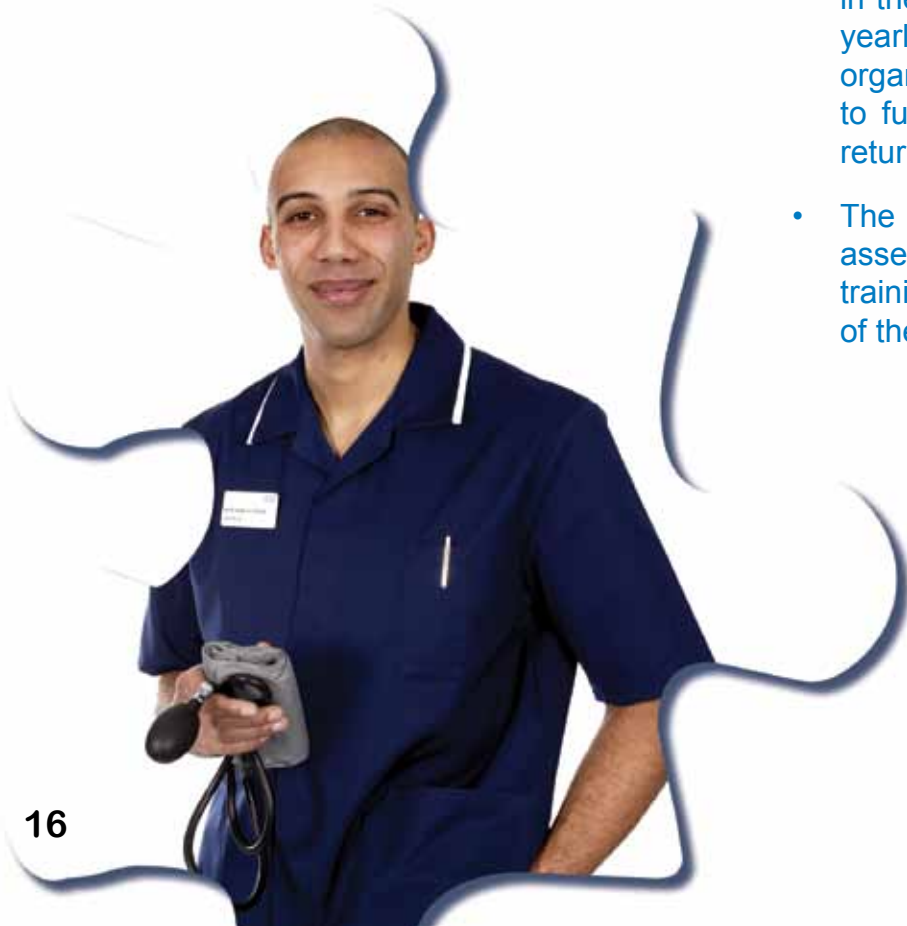
Trusts continue to have a mandatory requirement for the collection and reporting of data using the NHS Information Standard classifications ICD-10 (for diagnoses) and OPCS-4 (for interventions and procedures). Data collected is used to produce Hospital Episode Statistics (HES) which supports the Secondary Uses Service (SUS).

The introduction in 2003/2004 of NHS Financial Flows mean that the classifications provide the underlying data for the Department of Health Payment by Results (PbR).

SNOMED CT will allow the collection of data at the point of care by clinicians. It is envisaged that this improved quality of information in the Electronic Health Record (EHR) will result in an improvement in the quality of clinical coding which supports the Secondary Uses Service (SUS).

What does this mean for Clinical Coders?

- ICD-10 and OPCS-4 continue to be the NHS Information Standards for classification of diagnostic, intervention and procedure data for Admitted Patient Care datasets
- Cross-maps (the target ICD-10 and OPCS-4 codes required to represent a source SNOMED CT concept) are centrally assigned by the NHS Classifications Service to reflect the standards, rules and conventions of the classifications
- These cross-maps can only ever be semi-automatic and where appropriate default and alternative codes are provided
- This means that the classification expertise of a clinical coding professional will be required to include context (if available in the clinical record) for the final classification code(s) assigned
- The cross-maps are included as artefacts in the UK Terminology Centre (UKTC) twice yearly release and are designed to allow organisations who implement SNOMED CT to fulfil mandatory requirements for central returns
- The NHS Classifications Service are assessing SNOMED CT awareness and training needs for the continued development of the coding professional.





SNOMED CT: Contacts

National contacts

For information on the UK Terminology Centre (UKTC) and its products and services:

www.connectingforhealth.nhs.uk/snomed

For enquiries regarding the maintenance or other general queries, with the exception of content submissions contact the Data Standards helpdesk:

datastandards@nhs.net

For requests for change to existing content or the addition of new content please use the SNOMED CT content submission portal:

www.uktcregistration.nss.cfh.nhs.uk/requests/myRequests.jsf

For enquiries regarding training and training materials available contact the UK Training Lead:

snomedtraining@nhs.net

For further information on clinical classifications and their services:

www.connectingforhealth.nhs.uk/clinicalcoding

International contacts

For information on the International Health Terminology Standards Development Organisation (IHTSDO) and its governance, products and services:

www.ihtsdo.org

Further Information

The Technology Office provides leadership and guidance on standards, security and business and technical architecture to suppliers, programmes and the NHS as a whole.

The UK Terminology Centre sits within Data Standards and Products which is part of the Technology Office.

For more information about the various training materials available please visit:

www.connectingforhealth.nhs.uk/snomed

For information about:
SNOMED CT workshops, seminars and tailored presentations
please contact the UK Training Lead for SNOMED CT by emailing:

snomedtraining@nhs.net