



Irish National Release Centre
Vendor Engagement Procurement Specification
Document for SNOMED Clinical Terminology

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1 Introduction

This is a practical guide for Vendors and Project teams for inclusion in procurement documents to outline the requirements for SNOMED CT in an EMR or EHR.

1.1 Goals and objectives

- Provide vendors with SNOMED CT requirements that are requested of products being procured.

1.2 Target audience

- All stakeholders involved in any point of procurement of the EMR or EHR system which will include SNOMED CT, this will include persons such as project managers and clinical subject matter experts involved during the planning stages, implementation and clinical results realisation stage. The Target audience will also include business sponsors, reference set developers from NRC, clinical SME's, technical implementation support, data analysts and data managers.
- Vendor companies who are involved in the procurement process to gain an understanding of the requirements to enable SNOMED CT to deliver in their EMR or EHR system.

1.3 Requirements

The SNOMED CT requirements to be included in an EMR or EHR covered in this document are:

- Editions and Content
- User Interface
- Analytics and Reporting
- Maintenance
- Storage
- Interoperability



2 Editions and content

Vendors must work with the latest Irish Edition (which incorporates the Irish extension and International edition) version of SNOMED CT.

- The vendor should incorporate SNOMED CT as the primary clinical terminology in the EHR/ICT solution. This should include the Irish National edition and the latest International edition and any relevant local extensions, including mappings to other classifications/terminologies as per HIQA's recommendation.
- The vendor should update the Irish Edition SNOMED CT version, within 12 months of version released. This will include any changes to SNOMED CT concepts within this time period.
- The vendor is required to implement the project teams 'Reference set' developed in conjunction with the Irish NRC and any maps required into their EHR. The system must only include those SNOMED CT concepts and descriptions that are relevant to the clinician's current context of work. Avoiding irrelevant concepts and descriptions will help reduce the workload on the clinician and make it easier to find the desired term. The context setting should be done automatically by the system when it is clear that the items for a particular field should be restricted e.g. a field for procedures. Context setting to be set on factors such as clinical specialities, healthcare provider e.g a consultant or GP, and corporate requirements where different clinical practices may have different requirements for clinical data input and selection.
- The Vendor and project team should submit feedback through the Irish SNOMED NRC content request portal for requests for new content or changes to existing content. The vendors must engage with the NRC if additional content is required.
- The system must exclude inappropriate content; Certain terms must not be searchable or selectable in any clinical context as the primary code to record a clinical finding or procedure.

Examples of SNOMED CT terms (except in a post-coordinating context) that should be excluded:

Navigational terms - (e.g. Poisoning / Injury)

Organisms - (e.g. Salmonella)

SNOMED Attributes - (e.g. Cuff deflated)

Record artefacts - (e.g. Kick chart)

Physical forces - (e.g. High temperature)

Action qualifiers - (e.g. Cryosurgery)



Only appropriate SNOMED CT hierarchical terms must be available. Suppressing top level hierarchical terms from appearing for selection - including when no user configurable contextual filters are applied - is very strongly recommended.

3 User interface

It is important that SNOMED CT is implemented with a quality approach by the vendor company to ensure the end user has full access to SNOMED CT at the interface appropriate to meet Clinicians needs.

1. Use SNOMED CT for searching, display, storage, communication, knowledge linkage, querying and analytics in the following clinical domains (or specific data elements)
 - a. Problems, Diagnosis and Clinical Findings
 - b. Reason for Admission
 - c. Procedures (e.g. Planned Procedures, Performed Procedures)
 - d. Allergies
2. The system must use plain English in the user interface. The system must not use SNOMED CT concept model words or phrases in the user interface. Most users will not be familiar with this and won't necessarily understand it. The following are examples of SNOMED CT words or phrases that most users will not understand e.g.
 - Preferred term
 - Synonym
 - Concept ID
 - Concept
 - Fully specified name
3. The system must allow for the following results search function option; The system can search using any term that is 'Preferred' or 'Acceptable' in the national reference set/national edition.
4. The system should inform the user that a search is taking place in the system to inform the user that a search is running.
5. The system should allow for the following search function; Search time in the system should be performant enough to return the first 30 results in a given time period, (less than 1 second).
6. The system must allow for the following results function; Display number of results returned. The system is to display the number of results returned for each search so the end user is aware of the number of matches when they are shown say the first 20.
7. The system must allow for the following results function; Explicitly state When no results are found / When no results are returned, the system should clearly state this.



8. The system should allow for the following results function; With no results returned, offer further assistance if the system returns no results, i.e. the system is to offer further assistance to the user.
9. Support searching for SNOMED CT concepts using any term that is preferred or acceptable in the Irish edition.
10. The vendor shall include the following for each SNOMED CT coded data element:
 - a. Upon selection of a concept, use the term entered by the user to display the selected concept; OR
 - b. Upon selection of a concept, use the preferred term from the Irish edition to display the selected concept; OR
 - c. Upon selection of a concept, use the preferred term from the specialty, care setting, regional, or institution specific language reference set to display the selected concept.
11. The system should allow for the following search function. For each SNOMED CT coded data element, allow searching and selection of concepts from the SNOMED CT refset that has been specifically bound to that data element on 'First hit' search phase. (See point 12 for expansion search when concept not present in refset).
12. The system must allow for the following results function; Provide an option to expand beyond the default context where a user is searching within the default context and the desired term cannot be found, users to be allowed to search outside of this (e.g. search beyond their current specialty across other specialties). This only applies when the context has been sensibly restricted to acceptable results.
13. The vendor shall display the most frequently selected concepts at the top of the list, for elements bound to a subset containing a maximum of 20 concepts. (The results list width to allow at least 60 characters in a line. If the SNOMED CT concept exceeds this length, it should wrap onto a second line which is indented by two characters).

These may include:

 - Terms chosen by the user (e.g. highlighting a term is a favourite)
 - Frequently used terms
 - Recently used terms
 - Local Department / Specialty terms provided at configuration
 - Conduit terms - a term that acts as a link to a collections of other terms (e.g. the term "eczema" could provide the user with a list of all SNOMED CT eczema terms).
14. As the user types each character into a SNOMED CT coded data element, limit the selection of concepts to those with a preferred or acceptable term that matches the character(s) types (using a 'word prefix any order' algorithm), and use auto-complete when only one option is available for selection. The users to be able to enter search tokens in any order (e.g. fract ankle and ankle fract) and return the same results).

15. The system must provide for word equivalence matching. The system to, by default (without any user prompting), perform word equivalence matching. By using the other descriptions and terms for a given concept, equivalent terms could be included in the results list. For example, if a clinician enters 'nose boil' the equivalent term 'nasal furuncle' could also be provided in the results. As well as working for complete terms or phrases, the equivalence matching to also work for single input words. For example, the term 'rupture of cervix' could also return the equivalent 'tear of cervix' as the equivalence tables could recognise that the single words 'tear' and 'rupture' are equivalent.
16. The system should allow for highlighting the use of word equivalence matching by the system. When a word equivalence matching is used, it may appear to users that it “breaks” the normal matching applied. For example, a result may appear that does not resemble the entered search text (e.g. they enter kidney failure and see a result that does not include both these terms, such as renal failure) which may cause confusion. System to inform users that word equivalence matching is being used by:
 - Clearly indicating where word equivalence matching is being used.
 - Providing a control to allow the user to choose whether equivalence matching is switched on or off.
17. The system should ensure searching in the following manner; three character minimum. The search to only be triggered after the user has entered a minimum of three valid characters in the search term. These characters tare not to be whitespace or blank characters.
18. The system must allow for the following search function; Provide a scrollable results list. The search results to be delivered in a small list with vertical scrolling. System to avoid horizontal scrolling.
19. The system should allow for the following results function; Visually distinguishable descriptions in results list System to ensure that individual terms in the results list are clearly distinguishable from each other.
20. The system must allow for the following results function; positioning the results list to be located in an easily noticeable, consistent relative position. It should not obstruct any text being entered nor distract the user to such an extent that it obstructs the typing of further notes. The results list to be displayed next to, or as close as possible to, the text input area (where the user entered their search term).
21. The system should allow for the following results function; Display the results as a flat list. The default method for displaying the descriptions in the result list to be in the form of a “flat list” without taxonomy. Option to display the SNOMED CT taxonomy to be available to the user.
22. The system should allow for the following results function; Provide hierarchical browsing for refinement System to allow users to refine a concept in the results list by

browsing other concepts that are hierarchically related to it. The related concepts may include the following:

- Parents of the selected concept.
- Children of the selected concept.
- Siblings of the selected concept (that is, the children of the concepts' parents).

System to clearly distinguish between the parents, siblings and children of a selected concept. This search technique may be initiated by pressing an icon, a function key and how the developer deems fits their standard UI approaches.

23. The system must allow for the following results function; Do not display SNOMED CT codes in the returned results, SNOMED CT concept ids are not to be displayed as part of the returned results in the user interface as default. System to allow user configuration to enable the SNOMED CT code to be displayed in the returned results list.
24. The system must allow for the following results function; Provide additional information per result The system to allow the user to view the Fully specified name for any concept.
25. The system must allow the entry of single or multiple search tokens. The user to be able to enter either single (e.g. diab) or multiple (e.g. com acq pneu) search tokens. The system must allow for where multiple search terms are entered apply the AND operator. When multiple search terms are entered (e.g. prod cough) the system to match terms that contain both tokens prod and cough. System to not return results for each of the single tokens.
26. The system must allow for the following search function; Option 1 Return all lexically matching concept descriptions. All returned results to be SNOMED CT concept descriptions that lexically match the entered search term. For example, if urinary infection is entered then all concept descriptions containing terms starting with urinary and infection will be returned as a matched result. This means that several descriptions for a single concept could be returned in the results list significantly increasing the number of results returned. E.g. acu sin could return the following:
 - Acute sinusitis
 - Acute inflammation of sinus
 - Acute inflammation of nasal sinus
 - Acute infection of sinusThe system could assist the user experience by highlighting (for example through colour) those descriptions of the same concept if the user selects one description. Option 2 Return one description per unique concept where that concept has at least one lexically matching description. In this option, one result per unique single concept is displayed. The result Description may be one of the following:-



- Preferred term (note this may not contain any of the search text)
 - Fully Specified Name
 - Synonym that is lexically closest to the search term (e.g. lowest Levenshtein distance from the search term). The above items could also be prefixed with additional information, such as the SNOMED CT hierarchy (taken from the Fully Specified Name).
27. The system should allow for the following results function; Highlight search tokens in the result for each result displayed, the part that matches with the search term to be highlighted. If the results list contains one of the user's favourites, this term should be highlighted so the user is made aware of this, or the term to be put at the top of the results list. Any highlighting to be done in a way that the user's attention is drawn to this result.
 28. When displaying the list of possible matches, display the concept with the shortest matching term first. The system should provide progressive matching (performance permitting). Progressive matching (where results are returned for each successive character that the user types in) to be provided where it does not impact performance.
 29. The system must allow for search STARTS WITH matching for each search token System to return results that match with the start with entered search token. For example, when pneu is entered the system to search for terms starting with pneu and not terms that contain or end with pneu.
 30. The system must allow for searching by SNOMED CT code; System to provide the ability for users to search by SNOMED CT code.
 31. The system must allow for copy and pasting; System to allow the user to copy and then paste text into the search field or Concept ID (e.g. from a guidance document).
 32. The system must not require the user to enter wildcard characters to enable partial matching. The user to not have to add any wildcard characters or symbols to the search string to denote partial matching. Partial matching should be enabled by default.
 33. The system must manage International characters; System to convert international characters to English equivalent. Where a search term is entered for example Sjög in order to locate the SNOMED CT concept Sjögren-Larsson syndrome (disorder), system to recognise ö as o and present the user with Sjogren Larsson syndrome. Users must also be able to search without having to enter foreign characters where a SNOMED CT description contains them.
 34. The system should handle entered superscript and subscript characters. The system must be able to recognise and return results where the user types in or copy and pastes superscript or subscript characters in their search term.
 35. The system must offer case-insensitivity. The system must not require the user to have to apply capitals or lower-case letters to search terms.

36. The system should ensure that the text entry field can hold sufficient characters. The text entry field should be able to display at least 60 characters and hold up to 255 characters in total. If the user types beyond the 60 character visible limit, the field scrolls from left-to-right (but without a scroll bar), in order to ensure that the last character that the user has typed is visible. The user should be able to direct the cursor to the beginning of the search string by using the keyboard.
37. The system must allow for the following search function; Displaying results longer than 2 lines.
- Option 1 - Display the full SNOMED CT concept without truncation. The concept should always be displayed in full – without truncation. This would mean that the concept should wrap to as many lines as it needs in the results list. Wrapping to 3 lines would ensure that 94% of SNOMED CT descriptions (Preferred terms and Synonyms of active terms) would be displayed in full.
- Option 2 - Truncate the SNOMED CT concept. If the concept text length exceeds two lines, the system to display all that it can over the two lines and then add an ellipsis („...“) at the end of the text to indicate that it has been truncated. If this is done, the user is to be given the ability to see the concept text in full by another mechanism, such as a tool-tip or pop-up display.
38. For each free text data element that records clinical information (e.g. Past history, Clinical notes) use SNOMED CT-enabled techniques (e.g. Natural Language Processing) to suggest possible SNOMED CT encoding (including appropriate contextual information), for selection and confirmation by the user.
39. The system must ensure it is clear which text entry fields are for data input. System to clearly distinguish in the user interface between those fields which are for SNOMED CT data input and those which are not (e.g. normal text entry fields). The SNOMED CT search entry field should be placed where the user can easily find it. If users recognise in advance that a field is designated for SNOMED CT data, they can modify their typing behaviour accordingly.
40. The system should show in the text entry field that a concept has been encoded, Users are to be able to distinguish between text in the search text entry field that has been encoded, and text that has simply been typed into (which has yet to be encoded). This can be done by styling the text or the text entry field differently when it contains an encoded field or just normal text.
41. The system should allow for the following results function; Re-selecting a result once a concept has been selected from the results list and this has been added to the search text entry field, the user is still to be able to easily go back to the results list and select a different concept. When the user does return to the results list, they should not have to re-enter their original search text. They should also not have to re-start the search. The results list to still present the results from the previously entered search text. In

addition, any other settings that the user had made (e.g. changed the default ordering, opted for taxonomy browsing, searching across other specialties and so on) to also be presented as they were previously.

42. The system should provide auto-completion as a user option. Auto-completion offers suggestions to finish the words being typed in by the user. In some cases, it can improve the user experience of searching by reducing the number of keystrokes a user has to make and to help reassure them that the system “understands” their intentions. Where this feature is offered it is recommended that it is possible for the user to switch this off if this is not their preferred approach.
43. The system should allow for the following results function; Provide ability to apply different ordering to results list in order to find the wanted concept, system to provide the user the ability to switch between ordering strategies. At all times, it should be clear to the user which ordering strategy is in use.
44. The system should allow for the following results function; Prioritise some descriptions by putting them to the top of the results list. Some descriptions are more likely to be chosen by the user, they should be given a higher priority than other descriptions by placing them at the top of the results list making them easier for users to locate. Some examples of these could be the following type of matches:-
 - Exact matches
 - Near matches
 - Frequently used termsThere may also be different variations of “Frequently used terms”, those based upon frequency of terms chosen by the user, or by the local department, or frequency of use within a particular specialty. In the case of a locally produced list, this would need to be managed by the supplier who created it.
45. Support the capture of SNOMED CT post-coordinated expressions using predefined expression templates and automatically-generated interface terms – for laterality, allergies and family history.
46. Use SNOMED CT concept identifiers stored in the EHR to suggest patient-specific clinical knowledge to the clinician and to test clinical decision support rules.
47. Use SNOMED CT codes stored in the EHR, together with SNOMED CT and other map-enabled coding systems (e.g. SNOMED to ICD-10) to suggest appropriate codes for the clinician to select (if required).
48. The system must not require nor allow the user to choose the clinical terminology. The clinical terminology type should be automatically set – the user should not be asked or offered to choose a different one.
49. The system must allow for multiple search options. If, additional search options are provided, these to be offered as an advanced function. These can be made available



through various techniques such as function keys and on-screen icons; and should be consistent with the general UI approach in the application.

50. The system must allow for; control of the clinical data input and selection process entirely by mouse, entirely by keyboard, entirely by touchscreen, and a combination of any 3. The system to allow the user to trigger the search, navigate the results list and select a result using the keyboard/ mouse or touchscreen, this would include:
- Allow the key to trigger the search.
 - When the result list is populated, the user to be able to directly give focus to and navigate up/down the results list with arrow keys or mouse.
 - Allow the key or double click to select a term from the results list and populate the search text field.
51. The system should allow for the following results function; Display the selected concept as the encoded concept. When the user has selected a concept from the results list, the system to replace the user-typed “original” search text with the SNOMED-CT description.



4 Analytics and reporting

SNOMED CT's structured data benefits from the ontology to gain clinical insights into patient data, which otherwise would be unavailable with unstructured data. SNOMED CT uses maps already coded to help move towards the rich analysis in local systems as well as in national and international classifications for statistical reporting. As referenced from ([Example EMR EHR Requirements Guide - SNOMED CT Example EMR/EHR Requirements Guide - SNOMED Confluence \(ihtsdotools.org\), accessed 28/07/2022](#)), see list below.

1. Use maps from local code systems to SNOMED CT to enable ad hoc querying, reporting and analysis of legacy clinical data or for national or local reporting purposes.
2. Utilise maps to national and international classifications to enable analysis and reporting of data, including legacy and current data.
3. Applications supporting data reporting, extraction and/or clinical decision support rules shall (where appropriate) use SNOMED CT's defining relationships in the determination of the correct results or outcomes.
4. The system should allow for the following function; Provide support for retrieval, querying, reporting, and analysis over EHRs/ICT solutions using both hierarchical and attribute relationships in SNOMED CT.



5 Maintenance

It is necessary for vendors to incorporate changes from the International and the Irish Edition of SNOMED CT into systems to have long term implementation and end user satisfaction success. As referenced from SNOMED International ([Example EMR EHR Requirements Guide - SNOMED CT Example EMR/EHR Requirements Guide - SNOMED Confluence \(ihtsdotools.org\) accessed 28/07/2022](#)), see below:

1. Vendors must ensure that the version of the given SNOMED CT edition being used within the solution is no more than 2 versions (n-2) behind the most current version. The Vendor must have the ability to take in RF2 files and Refsets. Components that may change between versions may include:
 - a. Concepts: new concepts added, concepts made inactive.
 - b. Descriptions (with terms): new terms added, terms made inactive, terms changed (minor typing mistakes may have been corrected).
 - c. Relationships: new relationships, relationships made inactive, additional inferred relationships from classifying the terminology.
 - d. Refsets: new refsets, new members to a refset, members made inactive within a refset, a refset made inactive.
 - e. The system must allow for those SNOMED CT concepts that are inactive must not be searchable or selectable by the user when picking codes. System to allow the user to visualise inactive codes remain available to support querying over historical clinical data only.
2. Ensure all subsets and maps used in user interfaces, reports, queries, etc. are maintained with each new version of SNOMED CT to ensure continued clinical validity.
3. If the vendor is required to create a SNOMED CT extension, they must follow the general principles of SNOMED CT, including allocating globally unique identifiers, concept permanence (i.e. never reusing the same concept id for a different concept), and maintaining a robust audit trail for all inactivation's (including when the code was inactivated and what codes have replaced it).



6 Storage

The SNOMED CT concept identifier is a mandatory requirement:

1. Vendors must store SNOMED CT concepts in the health record.
2. Vendors must store the SNOMED CT concept identifier (or SNOMED CT expression) together with the term selected by the user in the EHR/ICT solution for SNOMED CT coded data element.
3. Vendors must ensure that the context of each SNOMED CT concept identifier or expression is clearly represented in either the information structure or the terminology (but not both).
4. Vendors must ensure that all inactivated concepts, descriptions and relationships remain available to support querying over historical clinical data.



7 Interoperability

In alignment with HIQA recommendations in 2014 and 2017, SNOMED CT was recommended as one of the technical standards that enables eHealth Interoperability, (HIQA, 2017, HIQA, 2014). SNOMED CT ensures safe, unambiguous sharing of patient data between healthcare institutions with the use of SNOMED CT concept identifiers at the foundation of this.

1. Vendors must use SNOMED CT concept identifiers and/or SNOMED CT expressions to populate SNOMED CT coded data elements for all relevant message exchanges.
2. Vendors must use SNOMED CT to share data, based on national/local data standards.
3. The system should have the capacity to take in mappings to other terminologies/classifications where available such as ICD-10, ICPC2, LOINC, Orphanet codes, and make the mappings available in the relevant contexts. This may include on-screen display and inclusion in generated documents, reports and data extracts.



8 8 Document Control

8.1 Revision History

Version	Author	Date	Changes
V0.1	Theresa Barry	02/09/2018	
V0.2	Rory Davidson	18/09/2018	
V0.3	Ian Green	19/09/2018	
V0.4	Theresa Barry	30/09/2018	
V0.5	Theresa Barry	12/11/2018	
V0.6	Theresa Barry	13/12/2018	
V0.7	Brian Dunne and Mary Gaskin	14/12/2018	
V0.8	Theresa Barry	18/12/2018	
V0.9	Theresa Barry	06/12/2019	
V1.0	Theresa Barry	28/07/2022	



8.2 Approvals

Name	Latest version signed off	Sign off date
SNOMED Governance Group (Appendix 1)	06/02/2019	06/02/2019
Rory Davidson and Ian Green, (SNOMED International)	19/08/2018	19/09/2018
SNOMED Governance Board	05/10/2022	05/10/2022



9 Additional resources

- SNOMED CT Document Library (<http://snomed.org/doc>). This includes guides on 'Search and data entry guide' and 'Data analytics with SNOMED CT'.
- The Irish National Release Centre for SNOMED CT website has additional information, [SNOMED CT - eHealth Ireland](#)



10 References

- Health Information and Quality Authority, (2014, May, 25). *Recommendations on SNOMED CT terminology 2014*. Retrieved from URL: <https://www.hiqa.ie/reports-and-publications/health-information/hiqa-recommendations-snomed-ct>
- Health Information and Quality Authority, (2017, Aug, 14). *Develop eHealth Interoperability Standards for Ireland: A Consultation Document*. Retrieved from URL: [How have codes of practice etc been developed internationally \(hiqa.ie\)](#)
- SNOMED International, (2019, Jul, 30). *SNOMED CT Example EMR EHR Requirements Guide*. Retrieved from URL: <https://confluence.ihtsdotools.org/display/DOCREQTS/>



11 Appendices

11.1 Appendix 1 – SNOMED Governance Group Membership

- Kevin O Carroll Standards and Technology Manager, HIQA, Chair
- Niall Sinnott, Head of eHealth and Information Policy. Dept of Health, Vice-Chair & General
- Assembly Representative for Ireland
- Peter Connolly, Head of Enterprise Architecture, Office of CIO, HSE.
- Helen Lambert, Compliance, Assurance and IG Lead, Enterprise Architecture, Office of CIO, HSE
- Lilly Walsh, Business Architecture Lead, Enterprise Architecture, Office of CIO, HSE
- Theresa Barry, Clinical Terminology Architecture Lead, Enterprise Architecture, Office of CIO, HSE &
- Member Forum Representative for Ireland
- Anne O Donoghue, Health and Research Board, HSE
- Eamon Coyne, Technical Architecture Lead, Enterprise Architecture, Office of CIO, HSE
- Prof Richard Greene, Clinical Lead for Electronic Health Records, HSE
- Dr Conor O Shea, National Co-ordinator GPIT group, Irish College of General Practitioners &
- Management team, Council of Clinical Information Officers, eHealthIreland
- Martin Tully, Information Architecture Lead, Enterprise Architecture Lead Office of CIO, HSE

