FSS Teicneolaíocht agus Claochlú
HSE Technology and Transformation

Defining and Assuring Compliance of SNOMED CT Requirements

SNOMED CT Implementation Support Guide

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Contents

Glossary

ADD	Additional
API	Application Programming Interface
Concept ID	Concept identification number
CTS	Central Terminology Server/Service
Description ID	Description identification number
Digital Health Solutions	Digital health solutions use computing platforms, connectivity, software, sensors for healthcare and related issues
DoH	Department of Health
e.g.	Example
EHDS	European Health Dataspace
eP	Electronic Prescribing
EPR	Electronic Patient Record
FAQ's	Frequently asked questions
FSN	Fully specified name
HDR	Health Data Repository
HSE	Health Service Executive
ICD-10AM	The International Statistical Classification of Diseases and Related Health Problems 10th edition, Australian Modification
IE	Irish Edition
LOINC	Logic Observation Identifiers Names and Codes
LSD	Lysergic acid diethylamide
NRC	National Release Centre
PS	Patient Summary
Refset	Reference Set
RF2	Release Format 2
SCT-001	SNOMED CT reference numbers
SCTID	SNOMED CT identification code
SNOMED CT	Systemised Nomenclature of Medicine Clinical Terminology
UK	United Kingdom
US	United States of America

Introduction

The SNOMED CT Implementation Support Guide provides valuable insights, illustrations, and templates aimed at facilitating the effective implementation of SNOMED CT. It caters for all stakeholders involved in care organisations procuring Digital Health Solutions, and the internal teams or IT system suppliers tasked with designing and deploying these systems. This guide will help you successfully implement SNOMED CT within your system and ensure compliance with SNOMED CT Requirements.

This document encompasses a comprehensive guide for formulating your specific SNOMED CT system requirements and provides general guidance on ensuring compliance with SNOMED CT requirements.

This document supports vendor companies who are involved in the procurement process to gain an understanding of what the requirements are to enable SNOMED CT to deliver in their Digital Health Solution.

Structure and purpose

This document will lead you through the process of outlining the functionalities required for your SNOMED CT compliant implementation. For each requirement, it outlines the recommended assurance activities and, where relevant, provides examples of useful test data. These can serve as a foundation for developing your own comprehensive assurance plans. It comprises of four main sections:

- **The High-Level SNOMED CT Requirements;** offer an overview of the fundamental principles governing the integration of SNOMED CT within a system, along with the functionalities it should facilitate.
- **The Core Requirements Baseline;** furnishes a collection of requirement statements suitable for inclusion in the functional specification of various SNOMED CT-enabled systems. Each statement is then elaborated upon to elucidate the rationale behind it and assurance factors to take into consideration.
- **Compliance with SNOMED CT.**
- **Building on Core Requirements;** serves as a guide for formulating additional requirements specific to your organisation. This is achieved by dissecting the system into key areas reliant on SNOMED, with guidance derived from the core requirements.

Certain aspects of validating SNOMED system changes, particularly those related to reporting or clinical decision support, are overly complex. While this document aims to be a

basic guide and an accessible starting guide, please reach out to our team via our email, snomed@hse.ie for a more detailed discussion on SNOMED CT functional assurance.

Important Note

The aim of this document is to assist you in evaluating and outlining system requirements pertaining to SNOMED CT. They have been included based on their frequent appearance in specifications we have encountered or as elements commonly discussed with HSE SNOMED CT implementers.
This is intended to be used as a baseline for all procurements where clinical terminology is a requirement.

Process Flow in this Document

High Level SNOMED CT Requirements

High-level requirements might not typically appear in a detailed functional specification, but they establish the principles upon which more detailed requirements are based. Therefore, they are valuable to reference when planning and developing these detailed requirements. These should be reviewed at the start of your assurance planning and again after completing your assurance design to help ensure you begin with a clear understanding of the task with full comprehension.

These high-level requirements are recommended by the *"Digital for Care: A Digital Health Framework for Ireland 2024-20301",* as published by HIQA and endorsed by the Department of Health.

The five High-Level Requirements for SNOMED CT, which should apply to all functions across all systems, are:

• **Data Entry:** Allow users to use SNOMED CT for data entry across all system areas where clinical terms are provided for selection. Ensure that any configuration tools, such as data entry templates, must be configurable using SNOMED CT.

• **Reporting:** Enable and ensure users can use SNOMED CT in search specifications where clinical concepts define the patient records to be retrieved.

• **Business Rules:** Ensure that all system functionalities based on clinical terms use the SNOMED CT terminology and its hierarchies to determine functional outcomes.

• **Interoperability:** Ensure that national data extractions, interactions, and messages provide and accept data in SNOMED CT to facilitate interoperability and national processing.

• **Content Scope:** The system must use SNOMED CT to record all structured clinical data that needs to be computable (i.e., clinical data that the system needs to understand and process algorithmically). This includes a minimum of symptoms, medications, allergies, diagnoses, clinical findings, observables, and procedures. It may also extend to family history, assessment scales, test requests, test results, and problem orientation.

For each functional requirement, consider which of the high-level requirements it pertains to and whether the planned assurance covers those aspects adequately.

Core Requirements Baseline

The following table presents a set of 40 core requirements that could be included in any functional specification for a system using SNOMED CT. Establishing a core requirement set is beneficial as it provides a common baseline upon which further requirements can be built.

Each of these 30 requirements will be described and their use, to highlight key elements to consider when designing assurance for each requirement.

[1] gov - Digital for Care: A Digital Health Framework for Ireland 2024-2030 (www.gov.ie)

The core requirements are categorised into eight fundamental areas:

1. **Versioning:** Support and ongoing maintenance of a specific edition of SNOMED.
2. **Available Content:** Curation and management of available concepts.
3. **Data Display:** Presentation of human-readable terms.
4. **Search and Select:** Tools to assist users in finding the necessary terms.
5. **Reporting:** Querying data in Digital Health solutions using SNOMED.
6. **Post-Coordination:** Management of expressions composed of multiple SNOMED CT concepts.
7. **Interoperability:** Ensuring data exchange and comprehension between systems.
8. **Historical Data Management:** Converting data from legacy coding schemes into SNOMED CT.

These categories will also be used later to help identify additional requirements that will complete your full requirements set.

Core Requirement Table

Reference	Requirement Text	Area
SCT-001	The system must use the Irish Edition of SNOMED CT i.e. SNOMED International plus the Irish Extension of SNOMED CT as the primary clinical terminology for recording clinical data in the Digital Health Solution from the Irish NRC.	Versioning
SCT-002	A single release version of the Irish Edition of SNOMED CT will be available across the entire system, or suite if the system consists of multiple products or modules.	Versioning
SCT-003	The release of the Irish Edition of SNOMED CT will always be within 18 months of the latest available Irish Edition of SNOMED CT release.	Versioning

SCT-004	The system will not permit users to choose the version of the clinical terminology or select terminologies other than SNOMED CT.	Versioning
SCT-005	The system will provide tools to assist users in editing, updating, or re-authoring artifacts affected by a new Irish Edition of SNOMED CT release, (such as fields where a value set now contains inactive concepts).	Versioning
SCT-006	The system will exclude inappropriate clinical content when entering data into the Digital Health Solution. When using the Irish Edition of SNOMED CT, the solution will not allow the entry of the following concepts or their descendants into the Patient Record: - 410663007 | Concept history attribute (attribute) | - 408739003 | Unapproved attribute (attribute) | - 900000000000441003 | SNOMED CT Model Component (metadata) |	Available Content
SCT-007	At a minimum, the system will support the entry of SNOMED CT for all instances of diagnoses, procedures, laterality, symptoms, family history, assessment tools, observables, clinical findings, allergies, and medications in the Digital Health Solutions	Available Content
SCT-008	When appropriate, the system will display only terms that are relevant to the context of the Digital Health Solution area. (e.g. only children of 71388002 | Procedure (procedure) | will be allowed when recording procedures)	Available Content
SCT-009	The system will prevent the selection of inactivated concepts or descriptions for data entry.	Available Content
SCT-010	During data entry, only terms deemed acceptable by the Irish SNOMED extension will be displayed. Previously acceptable terms remained visible for historical data.	Available Content
SCT-011	The system will support the full and un-truncated display of the Irish Edition of SNOMED CT terms up to 255 characters wherever human-readable terms are shown.	Data Display

SCT-012	Concept IDs and Description IDs will be visible in Digital Health Solutions data and can be toggled on or off by users with a single button always available in the interface when viewing patient records.	Data Display
SCT-013	The system will require a minimum search string of three characters, and the search will only be triggered once the user has entered a three-character term, excluding whitespaces or blank characters.	Search and Select
SCT-014	The system will perform searches independent of the order of search tokens (e.g., "Skin Cancer" and "Cancer Skin" will return the same results).	Search and Select
SCT-015	The system will default to partial matching in search results and will not require the entry of wildcard characters.	Search and Select
SCT-016	The system will default to returning search results in ascending order of term length.	Search and Select
SCT-017	The system will enable searches using Concept ID and Description ID.	Search and Select
SCT-018	The system will permit users to paste strings into the search box of the term browser.	Search and Select
SCT-019	The system will facilitate real-time progressive matching of term results.	Search and Select
SCT-020	Following the return of search results, the system will permit users to browse through IS A relationships.	Search and Select
SCT-021	The system will use the Irish Edition of SNOMED CT for all hierarchical searching, reporting, and analysis of clinical data stored in the Digital Health Solution.	Reporting
SCT-022	The system will guarantee that inactivated concepts are accessible for reporting, graphing, grouping, and analytics by implementing the Irish Edition of SNOMED CT Query Table.	Reporting
SCT-023	All reporting, graphing, grouping, and analytical functions will automatically operate at the Concept ID level by default.	Reporting
SCT-024	If a SNOMED CT post-coordinated expression is recorded and supported, all attribute value relationships must be	Post-coordination

	stored alongside the focus concept in the Digital Health Solution	
SCT-025	Before being committed to the digital health solution post-coordination will undergo validation against the SNOMED CT Concept Model.	Post-coordination
SCT-026	The system will facilitate the transmission and reception of clinical data using SNOMED CT for various data exchanges, including record transfer, electronic discharge, data migration, data warehousing, and national data returns.	Interoperability
SCT-027	The system will prohibit concepts from local or proprietary SNOMED CT extensions from being used in any interoperability beyond the local system or suite of systems.	Interoperability
SCT-028	The system will facilitate the reception, filing, and onward propagation of all incoming valid Irish Edition of SNOMED CT codes, including those beyond the locally selectable range, without any loss of quality.	Interoperability
SCT-029	The system will facilitate the mapping of historical data from legacy terminologies to SNOMED CT, which will encompass data previously entered using local code systems.	Historical Data Management
SCT-030	The system will facilitate fully automated mapping of data from legacy terminologies using national mapping tables provided by the Irish Edition of SNOMED CT Release Centre.	Historical Data Management
SCT-031	The system will automatically update value sets referenced in user-defined artefacts according to SNOMED CT hierarchical statements.	Versioning
SCT-032	The system will replace all inactive codes with new ones based on the history substitution table, which identifies valid replacements for inactive concepts and provides metadata about each substitution. When a single inactive concept is replaced by multiple codes, all replacement concepts will be added to the value set.	Versioning

SCT-033	The system will generate a report for super-users and system administrators, detailing the changes caused by the new SNOMED CT release. This report will include: - All user artifacts affected by the update. - The nature of the changes (e.g. increased value set options, reduced value set options, changes due to concept inactivation). The report will also provide links to the definition module entry for each item, facilitating easy access for manual review and editing. The SNOMED NRC will assist in these reporting measures of details of inactivation's and replacement concepts.	Versioning
SCT-034	The system will alert super-users and system administrators to any value sets that are empty or have had their member numbers increased by more than 20%, requiring manual review of these items before they can be used.	Versioning
SCT-035	In an app, if a SNOMED CT term exceeds 45 characters, a yellow ellipsis icon will be displayed next to the text box. Pressing this icon will trigger auto-scrolling for the term. Alternatively, users can enable auto scrolling by default in their settings, eliminating the need to press the icon.	Data Display
SCT-036	When code display is activated, the relevant codes will be shown in parentheses to the right of the term text, following the format (ConceptID / Description ID).	Data Display
SCT-037	When hovering over any SNOMED CT term in the Digital Health Solutions the status bar at the bottom of the screen will display: - The Fully Specified Name of the concept - The Preferred term (if the term in the Digital Health Solution is not the preferred term) - The Concept ID - The Description ID	Data Display
SCT-038	Users will be able to input SNOMED CT Expression Constraint Language syntax directly into the reporting module, either by typing or pasting.	Reporting

SCT-039	All SNOMED CT data will incorporate a Human Readable string corresponding to the term displayed to users in the sending system, used for handling degradation if the primary code is not recognised by the receiving system and for the receiving system to design manual or secondary checks if needed.	Interoperability
SCT-040	All systems will verify their SNOMED CT version against the Central Terminology Service, (CTS). (Currently in HSE procurement process 2024). In case of any disparity, they will request new SNOMED database rows following the guidelines outlined in the Terminology Server API Documentation.	Interoperability

Compliance with SNOMED CT

A Note on SNOMED

SNOMED CT represents a distinct iteration of SNOMED. While earlier versions remain present within the HSE, it is crucial to exclusively employ the latest iteration, of SNOMED CT. Henceforth in this document, whenever "SNOMED" is mentioned, it refers to SNOMED CT.

Fundamental Standards vs System Compliance

The adoption of SNOMED within the HSE serves as a foundational standard, encompassing all functions related to the input, retrieval, or exchange of clinical data concerning patient

care and management. The comprehensive scope of this standard is recommended in the '*Digital for Care: A Digital Health Framework for Ireland 2024-2030*'.

Asserting that all HSE systems must adhere to SNOMED is like mandating that a product designed for storing and presenting measurements must consistently employ the metric system. It is evident that a product displaying lengths in centimetres but weights in ounces does not fully conform to the metric system's fundamental standard. While it may comply with length measurements, it falls short in terms of weight measurements. Similarly, a product still using inches for data input and display but capable of converting data to centimetres, when necessary, offers access to the metric system through a specific function, yet does not adopt metric as its foundational standard. The principles for evaluating compliance with SNOMED in clinical systems mirror this analogy.

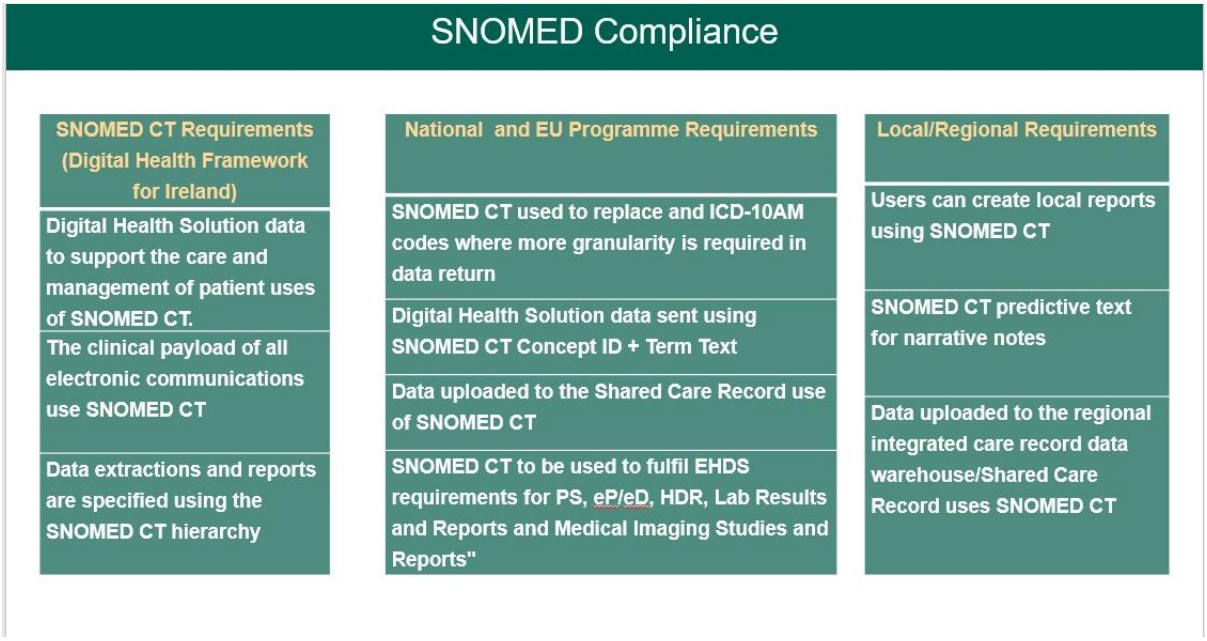
The SNOMED fundamental standard encompasses a diverse array of system functions, with the specific set of functions to consider varying based on individual requirements regarding clinical data input, processing functions, and communication of clinical data.

It is presumed that any system proclaiming itself as "SNOMED compliant" without further clarification fully satisfies every aspect of its architecture and functionality governed by SNOMED's fundamental standard, ranging from data input at the point of care to interoperability with other systems.

Systems exhibiting partial compliance with SNOMED, such as a Digital Health Solution system capturing data using SNOMED while still relying on local codes or string matching for reporting, should refrain from labelling themselves as "SNOMED compliant." However, they may indicate that only those specific functions within their product adhere to the SNOMED fundamental standard.

Three Sources of SNOMED CT Requirements

Attempting to conceptualise what "full compliance" with the SNOMED CT standard entails, a potential model seen in diagram provided below. *"The Digital for Care: A Digital Health Framework for Ireland (2024-2030)",* outlines certain crucial requirements within its specification, inclusive of SNOMED CT, serving as the primary source and laying the groundwork upon which all other requirements must be constructed. Additionally, other HSE-wide standards such as messaging, or data extraction may constitute the secondary source. Lastly, the local requirements of care organisations, established during system commissioning, form the third source. All these components would need to adhere to the fundamental standard of SNOMED CT before claiming "full compliance."



A system that employs SNOMED terms for data input but fails to populate Digital Health Solutions do not meet the requirement of the" *Digital for Care: A Digital Health Framework for Ireland, (2024-2030)",* rendering it SNOMED compliant at that data input level only. It would need to align with the expectations which assumes SNOMED is the fundamental standard within the system.

Another crucial aspect demonstrated in this diagram involves local or regional requirements. Different care organisations may have varied needs concerning SNOMED CT, even if they deliver similar types of patient care. The same clinical terminology is required across local and regional systems to ensure interoperability.
SNOMED CT is the recommended EU standard for digital health solutions to help fulfil European Health Data Space, (EHDS), requirements for Patient Summary/ePrescriptions and eDispensations/Hospital Discharge Reports/Lab results and Reports & Medical Imaging Studies and Reports.

Maintaining Compliance in future

SNOMED CT compliance is not a static achievement; rather, it is a continuous process that requires ongoing consideration. As system and user requirements evolve, new elements may emerge to which the SNOMED CT standard applies.
Compliance is a shared responsibility between system providers and data owners.
Thus, when evaluating SNOMED compliance, it is essential to consider both the capabilities of the software product and the local configuration. A compliant software product may not

necessarily be implemented in a compliant manner within an organisation. Therefore, there could be a disparity between product compliance and organisational compliance.
Whether through software updates, configuration changes, or the creation of new user artifacts like reports, workflows, or templates, it is crucial to ensure ongoing adherence to the fundamental standards supporting the information needs of the HSE.
Furthermore, a system previously certified as SNOMED compliant by another HSE organisation, such as a HSE Hospital or a Voluntary Hospital, should not automatically be considered compliant with the needs of all HSE users, care settings, or use cases indefinitely. Previous compliance assessments were based on historical requirements specific to that organisation at that time and may not reflect current interpretations of SNOMED CT compliance. Thus, while past compliance achievements serve as a baseline for current compliance assessments, they do not provide a complete and up-to-date indication of compliance.

Versioning

SNOMED CT, like medical knowledge, represents a continuously expanding and evolving body of information. In Ireland SNOMED CT consists of two extensions that are combined with the international core SNOMED CT.
Updates to clinical extensions of the Irish Edition of SNOMED CT are done 6 monthly. It is essential for any system using the Irish Edition of SNOMED CT to stay current with these updates. However, this must be done in a controlled manner to ensure that system updates and maintenance do not disrupt care support.
The versioning requirements are in place to ensure the appropriate use of SNOMED CT extensions and to maintain their currency, both for local implementation and for broader interoperability needs within the HSE.
The versioning requirements focus on the availability, updating, maintenance, and control of SNOMED CT releases within the system. Many of these requirements involve restrictions on certain actions, which are typically challenging to script for functional testing and depend more on the system's inherent design.
However, there are specific elements with associated functions that need to be assured. Therefore, versioning is included here to ensure completeness.
This document refers to the current implementation of SNOMED CT using a Release Format 2, (RF2 file), however the HSE is currently in procurement of a Central Terminology Service, (CTS) in 2024. A CTS will allow versioning to be controlled via an Application Programming

Interface, (API), which will control version updates, thus reducing burden on local sites using SNOMED versioning workload.

Reference	Requirement Text	Area
SCT-001	The system must use the Irish Edition of SNOMED CT i.e. SNOMED International plus the Irish Extension of SNOMED CT as the primary clinical terminology for recording clinical data in the Digital Health Solution from the Irish NRC.	Versioning
Reason	This requirement encompasses two key aspects: • SNOMED CT is a globally recognised vocabulary comprising terms available in multiple languages, with different countries using distinct combinations of extensions and language files layered on top of the core 'International' SNOMED CT release. In the Irish context, the appropriate edition to be used is the Irish Edition of SNOMED CT, which includes the International Core release and 2 extensions: IE and Drug extension. • When specifying SNOMED CT as the principal clinical terminology rather than the exclusive terminology, we allow flexibility for suppliers and organisations to use additional terminologies as needed. This may include local code systems for administrative purposes or non-clinical data beyond the scope of SNOMED CT. The future CTS as mentioned above will allow for multiple values sets to be configured and used through the HSE CTS API.	
Assurance factors	This requirement consists of two elements: using the Irish edition of SNOMED CT and ensuring its primacy in the system when recording in a Digital Health Solution. Therefore, we will divide the assurance into two parts. Irish Edition of SNOMED CT: This includes the SNOMED CT International Edition, (also known as the ‘core’) The Irish Extension and the Irish Drug extension. Implementers are likely to have all extensions, although	

	there can be exceptions. To test that all elements are available in the system, identify a concept, description, and relationship from each area and ensure it is accessible in your SNOMED CT browser SNOMED CT - Home (ihtsdotools.org) (or other data entry UI). Knowing which concepts belong to which extension is essential after loading SNOMED CT. For reference, the following module IDs can identify the distinct parts of SNOMED a component is from: • 900000000000207008 - SNOMED CT International core • SNOMED CT Irish Edition ID 11000220105 Primacy of SNOMED CT: This allows alternatives to exist but requires SNOMED CT to be the default first option where appropriate, which applies whenever clinical data is being entered in Digital Health Solutions. To assure this requirement, define all data entry functions of the system and ensure they default to SNOMED CT. Since the code for these elements is typically shared, this process should be manageable.	
SCT-002	A single release version of the Irish Edition of SNOMED CT will be accessible throughout the system, or across the suite if the system consists of multiple products or modules.	Versioning
Reason	In a scenario where different versions of SNOMED CT are present within a system or if different components of the same system are not aligned with the same SNOMED CT release, there is a risk that data entered in one part of the system may not be interpretable in another. This discrepancy could potentially result in operational challenges or clinical safety concerns and should be prevented.	
Assurance factors	Ensuring this requirement is primarily a matter of system design rather than functional testing, although functions that assist with SNOMED installation and validation can be used to test certain aspects. This might involve checking for multiple active rows for the same component, ensuring the effective times for each	

	component are as expected, or verifying row counts against import files for a specific SNOMED CT release. This requirement can also be met by designing a system that inherently cannot handle more than one live SNOMED CT version. This approach might not need additional assurance beyond stating that the architecture simply does not support multiple versions due to database table validation or other built-in architectural elements. For a suite of systems, the process is more complex and might require some form of a central table of live versions that can be queried for assurance. Additionally, system functions that manage discrepancies in versions between systems, such as user warnings or the prevention of certain services for clinical safety reasons until versions are synchronised, may need to be included. The specific assurance required will depend on the associated functions being developed and is outside the scope of this document.	
SCT-003	The version of the Irish Edition of SNOMED CT will always remain within 18 months of the latest available Irish Edition of SNOMED CT release.	Versioning
Reason	Like how different components of your system must use the same SNOMED CT version, it is imperative to maintain consistency across the entire HSE by ensuring all systems are aligned with the same or the same SNOMED CT version. This requirement guarantees that no HSE system lags by more than 18 months compared to others. While all data exchanges will include built-in clinical safety measures to carefully handle any received data that cannot be comprehended, aligning systems with the same or a closely previous version minimises the likelihood and associated complexity of requiring these mechanisms.	

	The timeframe specified in this requirement will vary significantly across different implementations, depending on the complexity of functions reliant on SNOMED CT and the extent of data interoperability to and from the system. For example, if a system futures requirement stipulates an 8-week timeframe rather than 6 months. The frequency specified in your requirement must be considered accordingly.	
Assurance factors	The Irish Extension is released 6 monthly, and the Irish Drug Extension is the same. You need to ensure that your live version of SNOMED CT is updated within the maximum required timeframe, which is 18 months. For actual requirements, the timeframe might be more constrained; for instance, the National Medicinal Drug Catalogue requires frequent releases which requires SNOMED CT to be within 6 months of a release to keep the entire system synchronised. Ensuring your ability to handle updates primarily involves applying a new delta release or replacing the old SNOMED CT snapshot with a new one. However, maintaining associated system artifacts and functions affected by these changes is more complex. We will discuss this in more detail in Reference SCT-005. From an assurance planning perspective, it may be beneficial to test both the physical update functions and the associated internal artifact maintenance requirements simultaneously, particularly if there is only a single test system instance.	
SCT-004	The system will not permit users to choose the version of the clinical terminology or select terminologies other than SNOMED CT.	Versioning
Reason	Careful control over the versioning of SNOMED CT and access to other code systems is essential, as the	

	unintended consequences of mixing different versions or code systems can be significant. Management of SNOMED CT versioning and the use of other code systems, such as local or historical terminologies, should be overseen by the system supplier or administrator and typically not be accessible to users.	
Assurance factors	This requirement is validated through system design rather than through functional or non-functional assurance.	
SCT-005	The system will offer tools to assist users in editing, updating, or re-authoring artifacts affected by a new release of the Irish Edition of SNOMED CT, such as fields containing inactive concepts within a value set.	Versioning
Reason	While most changes and updates in a SNOMED CT release will simply expand the overall vocabulary available, users must be aware of changes that impact the system artifacts they have created, such as templates, business rule triggers, and reports. Certain updates can be implemented automatically with minimal user intervention, such as adding a new child code to a drop-down list defined as 'this concept and all its children'. However, others may necessitate a decision, such as when a SNOMED CT concept is rendered inactive due to ambiguity. In such cases, users may need to decide whether one or both concepts should be included in the artifact. Users will require tools to assist them in identifying and addressing these changes.	
Assurance factors	Assuring the update tools requires covering all scenarios that could affect a user's artifacts, with the details of assurance depending on the system functions provided to manage these changes. The main SNOMED CT changes to consider include: • A concept becoming inactive with no replacement concept	

	• A concept becoming inactive and being replaced with a single new concept • A concept becoming inactive due to ambiguity or error and being replaced by multiple concepts • A concept moving within a hierarchy (such as a procedure being reclassified as regime/therapy) • A user artifact based on a query (such as 'all descendants of concept X') that now returns fewer results • A user artifact based on a query (such as 'all descendants of concept X') that now returns more results For a complete set of possible changes, consult with the National Release Centre for SNOMED CT Ireland, snomed@hse.ie to discuss any changes made to concepts within refset's or SNOMED release, and plan your test cases accordingly. Only Concept and Relationship changes will require action, as Description ID changes are unlikely to cause data or system issues.	

Available Content

The Available Content requirements outline which segments of SNOMED CT are accessible to users across the system as well as in specific areas or modules. They outline the curation and control of the content provided by SNOMED CT and outline how these selections may differ across various segments of the system.

Irish SNOMED contains active clinical concepts, though not all may be relevant to your solution or your users' needs. The available content requirements specify what is included and what is not. While these core requirements cover the basics, it is expected that you or your customer may add to these as needed. The Irish SNOMED NRC will assist in development of reference sets required by specific healthcare facilities/specialties/projects or programmes in their applications to optimise end user experience of frontend clinical healthcare applications. Data owners of reference sets, (refset's), must comply with the SNOMED CT refset development agreement with the Irish SNOMED NRC.

Reference	Requirement Text	Area
SCT-006	When inputting data into the Digital Health Solution the system will omit unsuitable clinical content from selection. When using the Irish Edition of SNOMED CT, the Solution will refrain from presenting any of the following concepts or their derived terms for entry into the Patient Record: - 410663007 | Concept history attribute (attribute) | - 408739003 | Unapproved attribute (attribute) | - 900000000000441003 | SNOMED CT Model Component (metadata) |	Available Content
Reason	SNOMED CT contains concepts that are integral to its structure and metadata. Additionally, there are segments of SNOMED CT that depict concepts related to clinical data or medical science but are unsuitable as patient record data. This requirement specifies the hierarchies that should be excluded from any implementation.	
Assurance factors	Assurance can be as simple as trying to select child concepts from the hierarchies above and verifying that they cannot be added into the Digital Health Solutions through any of the data entry interfaces using SNOMED. This could involve them not being displayed in search results or being clearly indicated as un-selectable.	

SCT-007	At a minimum, the system will facilitate the use of SNOMED CT for recording diagnoses, procedures, laterality, symptoms, family history, assessment tools, observables, clinical findings, allergies, and medications within the Digital Health Solution.	Available Content
Reason	Certain systems may not include the entire SNOMED CT vocabulary by default. Thus, it's crucial to verify the availability of all necessary data within SNOMED CT. Additionally, it's essential to ensure that the terminology is accessible in all areas of the system where data entry, viewing, or processing occurs, rather than being coded in SNOMED CT in one module and recorded solely as text in another.	
Assurance factors	Code coverage will serve as the foundation for numerous other system functions. Apart from ensuring that these elements are accessible at the database level, the most straightforward method of testing this requirement is to confirm that a diverse range of SNOMED CT codes from each hierarchy is used in testing associated functions in those areas. There should be minimal necessity to test this function separately.	
SCT-008	The system will display terms relevant to the context of the area as appropriate to the Digital Health Solution (e.g. only children of 71388002 | Procedure (procedure) | will be allowed when recording procedures)	Available Content
Reason	It is crucial for users to locate the suitable term swiftly and effortlessly and avoiding the selection of an incorrect concept due to its similarity to another term is vital for maintaining data quality. This requirement guarantees that when a particular section of the system anticipates a specific data type, selections are confined to that data type within SNOMED CT. For example, a procedure with the	

	synonym 'dressing', (referring to dressing a wound) may be chosen, but the observable entity 'dressing' (pertaining to putting on clothes) cannot be selected.	
SCT-009	The system will prohibit users from selecting inactive concepts or descriptions for data entry.	Available Content
Reason	When adding new data to a Digital Health Solution, users should exclusively choose from current SNOMED CT concepts and terms. Although inactive terms may be present in historical data and should remain available for defining or running reports, new data must originate from the currently active content of the terminology. Certain situations may necessitate a delay between adopting a new release of SNOMED and eliminating inactive content from selectable lists.	
SCT-010	During data entry, only terms deemed acceptable by the Irish SNOMED Edition will be displayed. Previously acceptable terms remained visible for historical data.	Available Content
Reason	Every national release of SNOMED CT establishes its criteria for term acceptability. This is why the Irish release includes British English spellings and may employ different preferred terms for certain concepts compared to other countries. This requirement guarantees that your system highlights the terms specified for use in Ireland.	

Additional requirements for available content may include:

Reference	Requirement Text	Area
ADD-001	The system will enable users to choose and commit any acceptable concept description to the Digital Health Solutions excluding the Fully Specified Name.	Available Content
ADD-002	Concepts from the following additional hierarchies will be unavailable for selection: • Navigational Concepts • Physical Forces • Organisms	Available Content
ADD-003	Super-users and system administrators will have the option to choose from hierarchies beyond the restricted set by accessing a specific option visible only to them in their user preferences profile. They will also need to acknowledge a warning stating that data outside of the restricted hierarchies is typically unsuitable for entry into the Digital Health Solution and proceed with this setting at their own risk. The system should be able to generate a report of any concepts that have been added beyond the restricted set.	Available Content

Data Display

The majority of specifications regarding the presentation of Digital Health Solutions data in systems are typically outlined in broader requirements rather than those specifically related to SNOMED CT. However, certain aspects of SNOMED CT data merit specification in the core requirements, notably the character length of terms and the presentation of SNOMED CT identifiers, (Concept IDs and Description IDs, commonly known as "SNOMED Codes"). While most system functions revolve around Concepts and their associated Concept IDs, the fundamental data display functions predominantly focus on human-readable terms, either in isolation or coupled with code display in interfaces. Legacy terminologies comprised multiple term sets with varying maximum lengths, with most implementations typically adhering to 30- or 60-character maximum string lengths. In contrast, SNOMED CT features a single term set that can extend up to 255 characters in length. While new systems can

integrate this aspect into their initial design, updating an existing system may necessitate extensive regression testing, as term truncation can pose clinical safety concerns.

Reference	Requirement Text	Area
SCT-011	The system will support the full and un-truncated display of the Irish Edition of SNOMED CT terms up to 255 characters wherever human-readable terms are shown.	Data Display
Reason	SNOMED CT terms can extend up to 255 characters, and truncating these terms can significantly alter their meaning for human readers. Hence, truncation should be minimised whenever feasible. This requirement holds particular significance for systems accustomed to older terminologies where terms seldom exceeded 60 characters.	
Assurance factors	Ensuring the assurance of this function should be straightforward (by inserting a long term into the field). However, it is important to note that the requirement may also affect aspects such as constraints within user template building tools and other functions where users design their own interfaces. Regarding test data, as of the time of writing, there are no SNOMED CT preferred terms or synonyms that fully use the entire 255 characters. There is a 255-character FSN (Fully Specified Name) for Concept 10776411000001105, but FSNs typically do not appear in Digital Health Solutions. The longest clinical preferred term is 241 characters long for Concept 1207044011. For reasons that are unclear, the search string "nontraffic accident" retrieves around 189 concepts, all with descriptions ranging between 80 and 200 characters. When combined with Concept 1207044011, these can	

	form a suitable test dataset for evaluating long term lengths.	
SCT-012	Concept IDs and Description IDs will be visible in Digital Health Solutions data and can be toggled on or off by users with a single button always available in the interface when viewing patient records.	Data Display
Reason	The capability to observe the actual SNOMED CT Identifiers holds significance primarily for designated tasks like data quality assessments, audits, or report design. However, during daily operations, users may prefer to hide the codes from Digital Health Solutions, displays to enhance readability and reduce screen congestion. The simplest solution to this is to incorporate a ribbon button or a similar interface toggle that enables users to switch code display on and off as required.	
Assurance factors	Once again, ensuring this function should require no elaboration. However, it may impact the assurance of Reference SCT-011, depending on the implementation. If codes are displayed to users by appending them to the term, this will extend the maximum length that your interfaces need to accommodate. For reference, SCTIDs are all numeric and range between 6 to 18 characters in length. Therefore, assuming at least one white space between the code and term, this may necessitate assurance against a minimum display length of 274 characters (255 + 1 + 18).	

Search and Select

The significance of interfaces cannot be overstated, and while most systems entail a diverse range of interface demands extending beyond the core requirements, some fundamental elements are integrated. These elements are commonly found in most SNOMED CT term browsers SNOMED CT - Home (ihtsdotools.org) and search approaches, serving as a foundation for enhancing your system's specific needs.

Reference	Requirement Text	Area
SCT-013	The system will require a minimum search string of three characters, and the search will only be triggered once the user has entered a three-character term, excluding whitespaces or blank characters.	Search and Select
Reason	The Irish of Edition SNOMED CT comprises more than 2.7 million terms. Attempting to retrieve terms by searching for just one or two characters could not only render search results cumbersome but also potentially strain the SNOMED implementation and affect system performance.	
Assurance factors	The three-character minimum requirement contributes to performance improvements when retrieving search results and may be considered in volume and performance testing. If you wish to specifically test three-character terms, examples like "Eye," "tic," "LSD," and "hip" are commonly found in Digital Health Solutions While SNOMED contains only a few terms with less than three characters (such as the concept for an Ox, certain unit of measure abbreviations, and a few tumour staging codes), if any of these codes are necessary for your users and are typically	

	searched in their short form, you may need to reconsider this requirement or ensure special handling solutions. It would be prudent to include these specific terms in your test data set.	
SCT-014	The system will perform searches independent of the order of search tokens (e.g., "Skin Cancer" and "Cancer Skin" will return the same results).	Search and Select
Reason	The order of search terms must never impact the search results. Occasionally, terms may have a word order that differs from the commonly used one.	
SCT-015	The system will default to partial matching in search results and will not require the entry of wildcard characters.	Search and Select
Reason	Requiring users to include a wildcard in a search string complicates the search process and introduces potentially confusing syntaxes that users must remember. Search functionality should consistently assume that each part of the search term concludes with a wildcard.	
SCT-016	The system will default to returning search results in ascending order of term length.	Search and Select
Reason	Among the diverse options for ordering search results, a straightforward method that proves remarkably effective is arranging terms by length, from shortest to longest. While there may be a desire to enhance or refine this approach, it serves as a logical and efficient initial requirement.	
Assurance factors (SCT-014, SCT-015 and SCT-016)	Ireland and SNOMED Internationals online term browsers function SNOMED CT - Home (ihtsdotools.org) similarly and can serve as valuable tools for direct comparison when ensuring compliance with these three requirements.	
SCT-017	The system will enable searches using Concept ID and Description ID.	Search and Select

Reason	SNOMED CT is primarily intended to be searched using human-readable terms. However, there are instances when users may require searching using specific Concept IDs or, on occasion, Description IDs. This need may arise, for example, when the codes are specified in clinical guidelines or contractual obligations.	
SCT-018	The system will permit users to paste strings into the search box of the term browser.	Search and Select
Reason	Aligned with the preceding requirement, due to the length of certain SNOMED CT Identifiers, it is advantageous for users to have the capability to copy and paste codes, and even search strings, to streamline processes and reduce the risk of typographical errors.	
Assurance Factors (SCT-017 & SCT-018)	SNOMED CT is primarily designed for navigation by terms rather than codes, particularly in user interactions. Therefore, searching by codes would not be the typical approach. However, a scenario that could be simulated in testing is following a guidance document where a specific code is specified for use in creating a data entry template or report. In cases where users input codes, you may consider adding validation using a Verhoeff check digit function. This validation can be easily confirmed while testing this requirement. An actual test scenario observed in the real world involves SCTIDs over 15 digits in length losing their last check digit after passing through Microsoft Excel and undergoing exponential conversion, resulting in the last digit being rounded up or down to 0 or 1 instead of its original value. You can access an online SNOMED CT Identifier checking tool for verification. (Excel needs to format numerical ID	

	column as ‘text’ to stop last digit >18 length ID to be rounded off to ‘0’).	
SCT-019	The system will facilitate real-time progressive matching of term results.	Search and Select
Reason	Comparable to predictive text features on mobile devices, this functionality recommends SNOMED CT terms as data is inputted. While particularly beneficial outside of a term browser, it also provides some utility within it, significantly streamlining and expediting the inclusion of SNOMED CT in activities such as narrative notetaking, effectively using the SNOMED CT vocabulary as a dictionary. Coupled with autocomplete and additional interface functionalities, entering SNOMED CT data can surpass the speed of typing narrative notes without codes.	
Assurance factors	This requirement could be relevant to various elements such as a browser search box, a template field, or narrative text. Effective search strings for testing purposes should be typical. For instance, words like "Bronchoscopy" will display suggestions such as "bronze," followed by "bronchus" and finally "Bronchoscopy" once the letters "Bronchosc" have been entered.	
SCT-020	Following the return of search results, the system will permit users to browse through IS A relationships.	Search and Select
Assurance factors	This primary requirement may trigger various graphical browsing options. However, it is important to note that SNOMED CT is polyhierarchical. For example, Concept 54176009, representing "Congenital cyst of canal of Nick," has 13 different parent concepts. Any solution must be verified against such concepts, despite	

	their abnormality, as most concepts typically have between 1 and 3 parent codes. It is worth mentioning that only one active concept, which is the concept for SNOMED CT Concepts (138875005), has no parents.	

Additional requirements for search and select may include:

Reference	Requirement Text	Area
ADD-004	The term browser will consistently show the concept FSN in the top right-hand corner of the screen, ensuring users are aware of the hierarchy they are selecting from.	Search and Select
ADD-005	Former local codes (referred to as hash codes, inputted via the # key in the prior system) when entered in the SNOMED CT browser, SNOMED CT - Home (ihtsdotools.org) will retrieve the corresponding agreed SNOMED CT Concept as documented in the SNOMED mapping document. E.g. #246 will return Concept 75367002 | Blood pressure (observable entity) |	Search and Select
ADD-006	During narrative notetaking, activating the grave key (`) will enable predictive text entry mode, and 'Tab' can be used to autocomplete a SNOMED CT description that matches the entered text string, in accordance with requirement ref SCT-019. The	Search and Select

	current auto-completion selection will default to the topmost entry displayed in the choice box at the top right of the interface. Users can adjust the auto-selected term from the choice box using the up and down arrow keys. If only one choice remains, it will be automatically selected.	
ADD-007	Concept terms meeting the outlined criteria will be indicated with the relevant icon, as detailed in the Interface Design Specification/Information model, when displayed in the Code Browser. Additionally, when toggled on in the user's display preferences, this icon will also be visible in Digital Health Solutions data. The criteria include: • Codes flagged by the Data Quality team as undesirable • Codes deemed unacceptable for inclusion in national data returns for the recorded clinical area • Codes explicitly listed in a reimbursement specification.	Search and Select

Reporting

The ability to enquire about data within Digital Health Solutions offers extensive advantages for both direct care, secondary applications, and organisational management. It introduces a level of comprehension regarding the care dispensed, the activities executed, and the results of those endeavours, which can furnish a greater understanding of the care being supported or provided. It forms the cornerstone of clinical activities like clinical audit, patient recall, research, resource management and service evaluation. The four fundamental requirements outlined in the 40 core requirements, serve as the foundation upon which more sophisticated reporting functionalities can be developed.

Reference	Requirement Text	Area
SCT-021	The system will use SNOMED CT for all hierarchical searching, reporting, and analysis of clinical data stored in the Digital Health Solution.	Reporting
Reason	Reports typically rely on hierarchies instead of manually selecting individual codes to be included. For example, instead of listing each specific asthma code, a report might request "Asthma and all its descendants." This requirement ensures that the descendants of Asthma are defined by the hierarchies within SNOMED CT, rather than those from a proprietary or legacy terminology.	
Assurance factors	The assurance complexity will vary based on your underlying reporting and querying implementation. This requirement primarily targets systems transitioning from a legacy terminology or those abstracting the terminology used in data entry from the underlying data structure in the system. Regardless of the system's mechanics, SNOMED CT hierarchies must be used to generate flat code lists defining report returns, rather than relying on the taxonomy of any	

	other code system involved in internal report processing.	
SCT-022	The system will guarantee that inactivated concepts are accessible for reporting, graphing, grouping, and analytics by implementing the Irish Edition of SNOMED CT Query Table.	Reporting
Reason	Inactive terms (and concepts) will remain visible within historical patient record data, despite being unavailable for selection when new data is entered. It would be impractical to require systems or users to recode historical data each time a code becomes inactive. The Irish Edition of SNOMED CT includes special artifacts, such as the history substitution and query tables, enabling systems to retrieve inactive data in reports or other system functions as if it were still a current part of the SNOMED CT vocabulary. This requirement ensures that this functionality is implemented.	
Assurance factors	When concepts are inactivated, they lose their 'is a' relationships and are consequently removed from hierarchies. The query table serves the purpose of reinstating inactive codes to their appropriate positions within the SNOMED structure for reporting purposes. Suppliers are advised to consult the documentation accompanying the Irish SNOMED CT History Substitution and Query Tables and tailor their assurance and test data accordingly. Assistance from HSE Technology and Transformation SNOMED NRC is available if required.	
SCT-023	All reporting, graphing, grouping, and analytical functions will automatically operate at the Concept ID level by default.	Reporting

Reason	Reports and queries are typically crafted at the Concept level. For instance, when identifying all patients who have experienced a myocardial infarction, the specific term used at the time of data entry, whether "infarction of heart," "heart attack," or "myocardial infarct," is inconsequential, as these are synonymous with the same clinical concept (and belong to the same SNOMED CT concept - 22298006). There may be rare instances where pinpointing a specific term in Digital Health Solutions data is necessary, thus enabling Description level reporting as an option. However, queries are predominantly executed at the Concept level, and this should be the default setting.	
Assurance factors	While there might be exceptional circumstances where reporting at the Description ID level is necessary, the majority of data querying should default to using the Concept ID. Testing this should be relatively simple, ensuring that the default settings in the reporting tool are correct and that a dataset containing various terms for the same concept is returned when a report is generated.	

ADD-008	When the preview button is pressed, the report authoring tool will display the count of current patient records that would fulfil the authored query, without retrieving the complete set of report information.	Reporting
ADD-009	When generating reports on inactive data, the user will be offered three choices: • Currently active codes only	Reporting

	• High confidence inactive code matches • All inactive code matches These options are outlined in the accompanying documentation for the Irish Edition of SNOMED CT Query Table.	

Post-Coordination

Individual SNOMED concepts encapsulate a self-contained clinical idea and are termed 'pre-coordinated.' However, it is possible to refine a pre-coordinated concept with additional information to represent the desired clinical idea if no pre-coordinated concept is available more accurately.

For example, the concept 386053000 represents 'Evaluation procedure.' To describe a procedure that evaluates someone for physiotherapy, you could post-coordinate the expression 386053000:363702006=91251008, indicating 'Evaluation procedure that has a focus of physiotherapy.'

While a comprehensive explanation regarding the rules and purposes of post-coordination lies beyond the scope of this document, two requirements are included in the core set to serve as the foundation for further definition of post-coordination functions if required.

Post Coordination is a complex function that may exceed the scope of initial implementations and has intentionally been omitted from this document. If you are interested in exploring the implementation of post coordination and ensuring its assurance, please reach out to HSE SNOMED National Release Centre via email snomed@hse.ie.

Reference	Requirement Text	Area
SCT-024	If a SNOMED CT post-coordinated expression is recorded and supported, all attribute value relationships must be stored alongside the focus concept.	Post coordination
Reason	As mentioned earlier in this section, post-coordinated statements consist of multiple components. If any part of the entire statement were to be lost, it could	

	significantly alter the intended meaning of the clinical concept being described. For example, 'appendectomy planned' could lose its 'planned' aspect and be mistakenly assumed to have occurred. This requirement guarantees that post-coordinated statements are stored in their entirety, thereby minimising the likelihood of such occurrences. Additionally, adhering to the rules of the SNOMED CT concept model further mitigates this risk.	
SCT-025	Before being committed to the Digital Health Solution all post-coordination will undergo validation against the SNOMED CT Concept Model.	Post coordination
Reason	Merely constructing English sentences with SNOMED CT codes in post-coordination is not permissible. There are stringent regulations dictating which concepts can be employed to refine other concepts. This requirement introduces a validation process to ensure that only post-coordinated content conforming to the rules of the SNOMED CT Concept Model can constitute clinical data in the Digital Health Solution.	

Interoperability

Interoperability refers to systems' ability to exchange, comprehend, and use data from other systems. A significant incentive for adopting SNOMED CT is its facilitation of the 'understanding' aspect of interoperability, as all Digital Health Solutions will employ the same terminology.

While various interoperability pathways may entail specific requirements, they must also adhere to national digital health standards. To ensure the establishment of baseline functionality, a set of three core SNOMED CT requirements are incorporated.

Semantic Interoperability assurance can be primarily categorised into two types: homogeneous, involving information exchange between two instances of the same system, and heterogeneous, involving information exchange between different systems. Testing for heterogeneous interoperability will naturally necessitate collaboration with a partner vendor or the use of external test messages.

Reference	Requirement Text	Area
SCT-026	The system will facilitate the transmission and reception of clinical data using SNOMED CT for various data exchanges, including record transfer, electronic discharge, data migration, data warehousing, and national data returns.	Interoperability
Reason	This aligns with the overarching requirement that all clinical in Digital Health Solutions data exchanges will use SNOMED CT and establishes the anticipation that the system will primarily rely on SNOMED CT codes for any interoperation involving clinical data with a terminology. The system should have the capacity to take in mappings to other terminologies/classifications where available such as ICD-10-AM, LOINC, Orphanet codes, and make the mappings available in the relevant contexts to SNOMED CT. This may include on screen	

	display and inclusion in generated documents, reports, and data extracts.	
Assurance factors	National interoperation pathways will come with specifications detailing the formation and population of their messaging. Assurance will be grounded in these specifications rather than the broader requirements of SNOMED CT. Therefore, this requirement primarily outlines expectations rather than something that can be directly tested.	
SCT-027	The system will prohibit concepts from local or proprietary SNOMED CT extensions from being used in any interoperability beyond the local system or suite of systems.	Interoperability
Reason	Organisations and system suppliers have the option to request a namespace from SNOMED CT, permitting them to develop their own SNOMED CT extensions. However, unless these extensions are nationally published and validated for interoperation, the codes within them would only be comprehensible to the originating system or organisation. Therefore, only codes from the Irish Edition of SNOMED CT, comprising the international core along with the Irish clinical and Irish Drug extensions, should be present in heterogeneous data exchanges. (I.e. The Irish edition of SNOMED CT to be used in Ireland rather than another countries edition, e.g. UK or US).	
Assurance factors	In cases where organisations possess their own SNOMED CT namespace,	

	codes from within that namespace will not be comprehensible to other systems unless they have access to the extension. Assurance efforts should verify that any external messaging effectively prohibits codes from the local namespace from populating message payloads in heterogeneous messaging.	
SCT-028	The system will facilitate the reception, filing, and onward propagation of all incoming valid Irish Edition of SNOMED CT codes, including those beyond the locally selectable range, without any loss of quality.	Interoperability
Reason	Digital Health Solutions systems within the HSE are expected to comprehend the entirety of the Irish Edition of SNOMED CT, even if the entire terminology may not be directly selectable by users of a particular system. Without this capability, as data circulates within the HSE, only the most basic concepts shared by all systems would be reliably understood. In instances where a concept outside the locally accessible SNOMED CT set is received, the system should be capable of incorporating the code into the Digital Health Solution and ensuring its interaction with reports and other code-dependent functions. Additionally, the system should have the capability to transmit the code to another system if the data is requested in the future.	
Assurance factors	Once more, this requirement will contribute to broader messaging implementation assurance. An efficient	

	approach to generate data for these tests may involve manually modifying existing test message data with specific Concepts known to be outside the locally selectable set. However, it is important to avoid hierarchies mentioned in Reference SCT-006 for this purpose.	

Additional requirements for Interoperability may include:

Reference	Requirement Text	Area
ADD-010	All SNOMED CT data will be transmitted using ConceptID as the primary code element, with DescriptionID included solely as a qualifier to a ConceptID-coded data item.	Interoperability

Historical Data Management

Unless the system is being implemented in a completely new environment, pre-existing data will already in Digital Health Solutions be present in records, either within the Digital Health Solutions system being upgraded or during the transfer of data from the old Digital Health Solutions to the new system. In cases where this data includes coded information from legacy national terminologies, mapping to SNOMED CT can be accomplished through centrally published tables. If the data is encoded in local coding schemes, system suppliers and organisations may collaborate to develop their own mappings from these codes to SNOMED CT Concepts or use third-party tools for secure and precise mappings.

Reference	Requirement Text	Area
SCT-029	The system will facilitate the mapping of historical data from legacy terminologies to SNOMED CT, which will encompass data	Historical Data Management

	previously entered using local code systems.	
Reason	Through either mapping functionalities developed by the supplier or provided tools, information within the system containing a shared coded element, originating from either a legacy terminology or a local code system, should undergo evaluation and mapping to a SNOMED CT Concept. This enables historical data predating SNOMED CT to engage with new SNOMED CT features like reporting and graphing.	
Assurance factors	Suppliers and users may need to collaborate to establish an agreed-upon set of mappings for local codes. Assurance of mapping will need to be integrated into reporting assurance, as well as interoperability testing, to ensure that historical data interacts with SNOMED CT-based system functions as anticipated.	
SCT-030	The system will facilitate fully automated mapping of data from legacy terminologies using national mapping tables provided by the Irish Edition SNOMED CT Release Centre.	Historical Data Management
Reasoning	In cases where data has been stored in CTV3, for instance, the system supplier should ensure that the data can be mapped at the database level with minimal user intervention, typically conducted as a single bulk data migration process.	
Assurance factors	HSE SNOMED NRC offers mapping tables within the RF2 file. You can request RF2 file via application for SNOMED licence SNOMED International MLDS (ihtsdotools.org) If needed, HSE SNOMED	

	NRC can aid in this assurance by providing a set of anticipated results for the implemented tables with use of tools such as snap2snomed tool.	

Additional requirements for historical data management may include:

Reference	Requirement Text	Area
ADD-011	All SNOMED CT data will use ConceptID as the primary code element, with DescriptionID solely incorporated as a qualifier to a ConceptID-coded data item.	Historical Data Management
ADD-012	All SNOMED CT data will contain a Human Readable string corresponding to the term displayed to users in the sending system. This string will be used for handling degradation if the primary code is not recognised by the sending system.	Historical Data Management
ADD-013	All systems will verify their SNOMED CT version against the central terminology server. If a discrepancy is identified, they will request new SNOMED database rows according to the guidelines outlined in the Terminology Server API documentation.	Historical Data Management

Optional Core Versioning requirements that are typically used:

Reference	Requirement Text	Area
SCT-031	The system will automatically update value sets referenced in user-defined artifacts according to SNOMED CT hierarchical statements.	Versioning

SCT-032	The system will replace all inactive codes with new ones based on the history substitution table, which identifies valid replacements for inactive concepts and provides metadata about each substitution. When a single inactive concept is replaced by multiple codes, all replacement concepts will be added to the value set.	Versioning
SCT-033	The system will generate a report for super-users and system administrators, detailing the changes caused by the new SNOMED CT release. This report will include: • All user artifacts affected by the update. • The nature of the changes (e.g. increased value set options, reduced value set options, changes due to concept inactivation). The report will also provide links to the definition module entry for each item, facilitating easy access for manual review and editing. The SNOMED NRC will assist in these reporting measures of details of inactivation's and replacement concepts.	Versioning
SCT-034	The system will alert super-users and system administrators to any value sets that are empty or have had their member numbers increased by more than 20%, requiring manual review of these items before they can be used.	Versioning

Optional Core Data Display requirements that are typically used:

Reference	Requirement Text	Area
SCT-035	In an app, if a SNOMED CT term exceeds 45 characters, a yellow ellipsis icon will be displayed next to the text box. Pressing this icon will trigger auto-scrolling for the term. Alternatively, users can enable auto scrolling by default in their settings, eliminating the need to press the icon.	Data Display

SCT-036	When code display is activated, the relevant codes will be shown in parentheses to the right of the term text, following the format (ConceptID/ Description ID).	Data Display
SCT-037	When hovering over any SNOMED CT term in the Digital Health Solutions the status bar at the bottom of the screen will display: • The Fully Specified Name of the concept • The Preferred term (if the term in the Digital Health Solution is not the preferred term) • The Concept ID • The Description ID	Data Display

Optional Core Reporting requirements that are typically used:

Reference	Requirement Text	Area
SCT-038	Users will be able to input SNOMED CT Expression Constraint Language syntax directly into the reporting module, either by typing or pasting.	Reporting

Optional Care Interoperability requirements that are typically used:

SCT-039	All SNOMED CT data will incorporate a Human Readable string corresponding to the term displayed to users in the sending system, used for handling degradation in the event that the primary code is not recognised by the receiving system and for the receiving system to design manual or secondary checks if needed.	Interoperability

SCT-040	All systems will verify their SNOMED CT version against the Central Terminology Service, (CTS). (Currently in HSE procurement process 2024). In case of any disparity, they will request new SNOMED database rows following the guidelines outlined in the Terminology Server API Documentation.	Interoperability

Building on the core requirements

The ultimate step in defining your system or organisational needs involves refining the core requirements outlined earlier and expanding upon them to encompass the full functional scope required.

One approach is to align this expansion with the system areas outlined in the core requirements. This process can be guided by posing specific questions or engaging in discussions to elaborate on the core requirements.

In this section, we will delve into these questions and discussions, offering examples of additional requirements based on a hypothetical system we are designing. These fictional requirements are provided not as prescriptive elements for your implementation but rather as illustrative examples.

Frequently Asked Questions

Versioning FAQ’s

Ref SCT-003 – SNOMED CT Update Frequency

Requirement SCT-003 stipulates that "The version of Irish Edition of SNOMED CT will never be more than 18 months behind the latest International SNOMED CT release available."
It is essential to assess the timelines outlined in this requirement in alignment with your organisation's requirements. However, it is advisable to ensure that your system remains no more than 18 months behind the most recent Irish Edition of SNOMED CT from the Irish NRC. To guide this evaluation process, consider the following questions:

From whom do we receive data and to whom do we send data, and what are their timescales for updating SNOMED CT?

Maintaining synchronisation with the systems you interact with will streamline data exchanges and decrease the chances of data becoming un-coded text in the receiving Digital Health Solutions due to unrecognised codes.
Note: The HSE is in procurement for a Central Terminology Service, (CTS) in 2024 and the updates for the latest edition of SNOMED CT will be accessible through an API centrally in one place for Ireland, therefore reducing the burden for individual sites to update via RF2 file.

How soon do we need to obtain the latest codes and terms?

The urgency for having the latest concepts and terms can vary depending on the care setting. Systems interacting with Primary Care, Emergency, or Ambulance services encounter diverse care situations that may require codes from any part of SNOMED CT. Thus, quickly accessing new releases ensures they are prepared for any scenario with the most up-to-date information. Conversely, as a Digital Health Solution system in a specialised care setting, such as Renal Care, might primarily use codes from a well-defined and stable area of SNOMED CT, making the need for rapid updates less frequent.

How does an update to a SNOMED CT release affect our system and processes?

Any change to a system has some impact. When updating SNOMED CT, it may also necessitate updates to other key areas of the system, such as third-party decision support products. Additionally, the volume of user-designed artefacts might require an extensive review period, making a 6-month update cycle preferable to a two-month cycle. The impact of these updates will heavily depend on your system's local configuration and its tools and processes for change management.
Closely related to ref SCT-003, you will likely need to expand on requirement ref SCT-005, which states, "The system will offer tools to assist users in editing, updating, or re-authoring artefacts affected by a new release of SNOMED CT, such as fields where a value set now includes inactive concepts". If you are a system supplier, your developers will need detailed information on what is expected of the tools to be designed. If you are an HSE organisation, you will need to ensure the supplied tools align with your business needs and change management processes.

Available Content Frequently Asked Questions

Determining the content available throughout an entire implementation could be as straightforward as requesting the entirety of SNOMED CT, excluding certain specific hierarchies, and encompassing all acceptable descriptions. However, you may prefer to be more precise about what users can access when choosing Digital Health Solutions content. Considerations to ponder include:

Should users be granted access to all acceptable synonyms, or solely preferred terms?

Some systems enable users to choose any acceptable synonym, while others permit users to search all acceptable synonyms but only input the preferred term. Allowing users to select any synonym may enable them to continue using familiar terms for concepts or opt for a more patient-friendly term for a condition (such as "Chicken Pox" instead of "Varicella"). Systems that restrict users to entering only preferred terms in the Digital Health Solutions help standardise displayed data and can simplify data storage, as only Concept IDs are necessary, without the need to additionally store Description IDs. There is no inherently right or wrong approach to using synonyms versus preferred terms; both options are valid. The

SNOMED NRC will assist clinical teams in development of reference sets of specific clinical specialities to customise their healthcare applications for better end user experience.

Can we exclude additional hierarchies from selection?

While the core requirements address metadata and "unapproved" content hierarchies, there may be others that are not appropriate for your Digital Health Solution. If you are uncertain about the usefulness of a particular hierarchy, it would be advisable to keep it available for entry.

Do you wish to permit users to bypass code choice restrictions in exceptional situations?

While the majority of data selection restrictions are in place to prevent users from selecting the wrong concept based on assumed meanings (such as choosing "High Temperature" as the physical force instead of "High Body Temperature" as the clinical finding), there may be exceptional circumstances where recording information beyond the typical restrictions is appropriate in certain care settings or implementation scenarios.

Data Display FAQ’s

As highlighted in the core requirements sections, the majority of requirements concerning the presentation of Digital Health Solutions data in systems will already be outlined in the broader user interface requirements or system style guides. However, there may be specific instances where additional refinement of the display of SNOMED CT Data needs to be considered.

Is there a section of your system that has limited screen space?

Certain systems extend across multiple data devices, and it cannot be presumed that users are consistently situated in front of a PC monitor. For instance, if a system incorporates a mobile device interface, constraints on screen real estate may pose challenges in implementing some of the core requirements regarding the display of term lengths. Consequently, additional requirements might be necessary.

Are there alternative methods for displaying codes when necessary?

The visibility of SNOMED CT identifiers can vary significantly, and you may have a preferred option you wish to indicate. Certain functions, such as data duality reviews, may require a toggle display function, while others could suffice with a mouse-over pop-up containing additional information. You might need diverse options tailored to different users.

Search and Select FAQ's

An efficient and user-friendly data entry interface is essential for developing a successful and seamless SNOMED CT solution. Various users, system components, and use cases can influence design decisions related to searching and selecting. While the core requirements establish a solid foundation of cross-interface requirements, additional questions can further enhance requirements in this domain, such as:

How many distinct data entry scenarios are present in our system or care setting?
The interface requirements vary widely depending on the users and their specific use cases. For instance, individuals creating report queries may require visibility into hierarchies, real-time updates of codes returned as they add elements to their query, and a convenient way to select and deselect code sets using checkboxes.
On the other hand, individuals entering SNOMED CT data while documenting narrative notes from a patient history need a solution that allows them to select appropriate concepts seamlessly without disrupting their workflow. This could range from a meticulously crafted and structured data entry form for patient histories to a predictive text feature that monitors their typing and automatically selects codes based on their keystrokes in a free-form notes recording interface.

Do we need to replicate or emulate any existing data entry methods?

When transitioning to a completely new Digital Health Solution system, code system, or terminology, there could be years of ingrained muscle memory or learned shortcuts that may be replicated in the new system to minimise the impact of change.

Are certain concepts more favourable than others for reasons not related to SNOMED CT?

Some data selections may be influenced not only by clinical or terminological factors. There could be concepts that are more advantageous than others due to their alignment with data quality initiatives, data reporting requirements, or even payment models, (Example, ICD-10-AM mapping to SNOMED CT). Displaying this additional information in the code browser can assist users in selecting codes based on considerations such as these.

Whom should we involve in the planning, design, and testing of interfaces?

Effective interface design typically benefits from the inclusion of individuals who will directly use it. An IT professional may not interact with the system in the same manner as a practice nurse, and the needs of someone delivering care in the community may differ from those of someone in a hospital setting. By identifying and involving a diverse range of users across various use cases, you can establish requirements from the outset that facilitate transition and align better with the product and business needs. The SNOMED NRC can work with clinicians to aid development of specific reference sets for terminology binding parts of their information model.

Reporting FAQ's

Reporting is a multifaceted domain, characterised by diverse user needs and varying system capabilities. Initially implementing SNOMED CT can pose challenges in fully understanding your needs or the potential capabilities of the system until sufficient Digital Health Solutions data is available for reporting, and a deeper comprehension of the ontology in which SNOMED CT operates is obtained. Whether you are a system supplier or a commissioning organisation, it may be necessary to revisit reporting requirements multiple times as your system evolves over time.

In certain systems, reporting functionality is provided by third-party software, or data is extracted into a data warehouse for analysis. Regardless of where reporting functions are performed, your requirements may need to extend beyond the core set. When specifying SNOMED CT reporting requirements, two fundamental questions arise:

What inquiries do we wish to pose to the data?

The response to this inquiry can aid in recognising the requirements you may have for pre-constructed reports included with a system or in planning the scope of the report creation task to be managed by users. This, in turn, could influence the specifications of the reporting module itself.

In what manner do we wish to pose those inquiries?

These represent the functional requirements pertaining to the operational aspects of the reporting module itself, including the supported languages and processes, the necessary visuals and feedback required during the authoring process, and any additional browser functions tailored specifically for report writing.

Post-Coordination FAQ's

Post-coordination is a complex subject, and the use of SNOMED CT post-coordination should be carefully regulated, primarily reserved for requirements. Therefore, this aspect will not be elaborated on beyond the core requirements outlined in this document. For further details or a conversation regarding the implementation of post-coordination, please contact the SNOMED NRC at email address: snomed@hse.ie.

Interoperability FAQ's

If you are employing a nationally established interoperability solution, comprehensive system requirements will be furnished as part of the project documentation, encompassing any SNOMED CT-related details.
When devising your own interoperability solutions, whether linking various components of a product suite or determining how a new Digital Health Solution system will integrate with other autonomous systems within an organisation, your requirements will emerge from two fundamental tasks:

Determine the necessary data transfer routes.

The extent of systems requiring interoperability may shape the overall approach concerning interoperation and SNOMED CT.

For example, in scenarios where data exchange occurs solely between two systems (such as an imaging system transmitting X-Ray and scan results to a Digital Health Solution additional SNOMED CT requirements may primarily involve defining the SNOMED CT value sets used by the imaging system and specifying how the codes are anticipated to prompt various filing options or review workflows in the Digital Health Solution upon receipt.
In cases necessitating a scalable solution due to multiple systems exchanging data, additional requirements might entail specifying the type and format of information to be transmitted via a common API, (Central Terminology Service), or addressing aspects like versioning and ensuring uniform adoption of the same SNOMED CT release across all systems, for example a Central Terminology Service supplied by the HSE which is currently in future development.

Establish the anticipated SNOMED CT Payload requirements.

After determining your solution, it might be necessary to outline the expectations regarding the appearance of SNOMED CT data in messaging and how SNOMED CT versioning is managed across systems to map to other terminologies and classifications such as –ICD-10-AM and reporting to HIPE/HPO.

Historical Data Management FAQ's

The core requirements encompass most aspects of what could be anticipated from Historical Data management, primarily involving the conversion of historical data through mapping where feasible, allowing it to interface with SNOMED CT-based functions like reporting.
When considering extension beyond these requirements, you might contemplate the following questions:

How will locally devised mapping tables be upheld?

With SNOMED CT updates, new concepts may be introduced that better align with a legacy code mapping, or the concept to which a local code maps may become inactive. It is worth considering whether mapping should be viewed as a singular undertaking or as something to be maintained over time.

Do we require highlighting information that cannot be mapped to SNOMED CT?

There might exist historical data that cannot be mapped to SNOMED CT, due to the term's vagueness or ambiguity, making it unsuitable for assigning a specific SNOMED CT concept. It is essential to assess the significance and frequency of these data items and determine whether there is a need for requirements regarding recoding or other processing.

Is it permissible to edit or update non-SNOMED CT data?

Many systems offer a means to edit historical data, but preserving these functions could pose technical complexity or even introduce clinical risk in a SNOMED CT-based system. It is conceivable that following a pre-migration data quality assessment, no further edits will be permitted, and the only recourse would be removing the data and substituting it with new SNOMED CT coded data.

Conclusion

This document, along with the accompanying training resources available on our website, SNOMED CT Irish Edition Release - eHealth Ireland as dynamic documents that will undergo regular review and updating. We highly value feedback from HSE/Health Service SNOMED CT implementers regarding areas for improvement, modifications, and expansions, ranging from individual document content to entirely new topics related to SNOMED CT implementation. If you wish to share your insights and experiences with us, please contact snomed@hse.ie.