



SNOMED CT-AU Clinical Terminology Implementation Process and Checklist

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Purpose

The purpose of this document is to provide a broad overview for implementers of SNOMED CT-AU¹, including the Australian Medicines Terminology (AMT), of the steps required to integrate clinical terminology within their clinical products and systems, and the resources available to support those steps.

Scope

This guidance is applicable to the following types of implementations:

- Greenfields CIS implementations
- Existing CIS implementations
- State-wide catalogues
- Local catalogues
- Third party knowledge bases
- Data management and mapping ownership

Acronyms

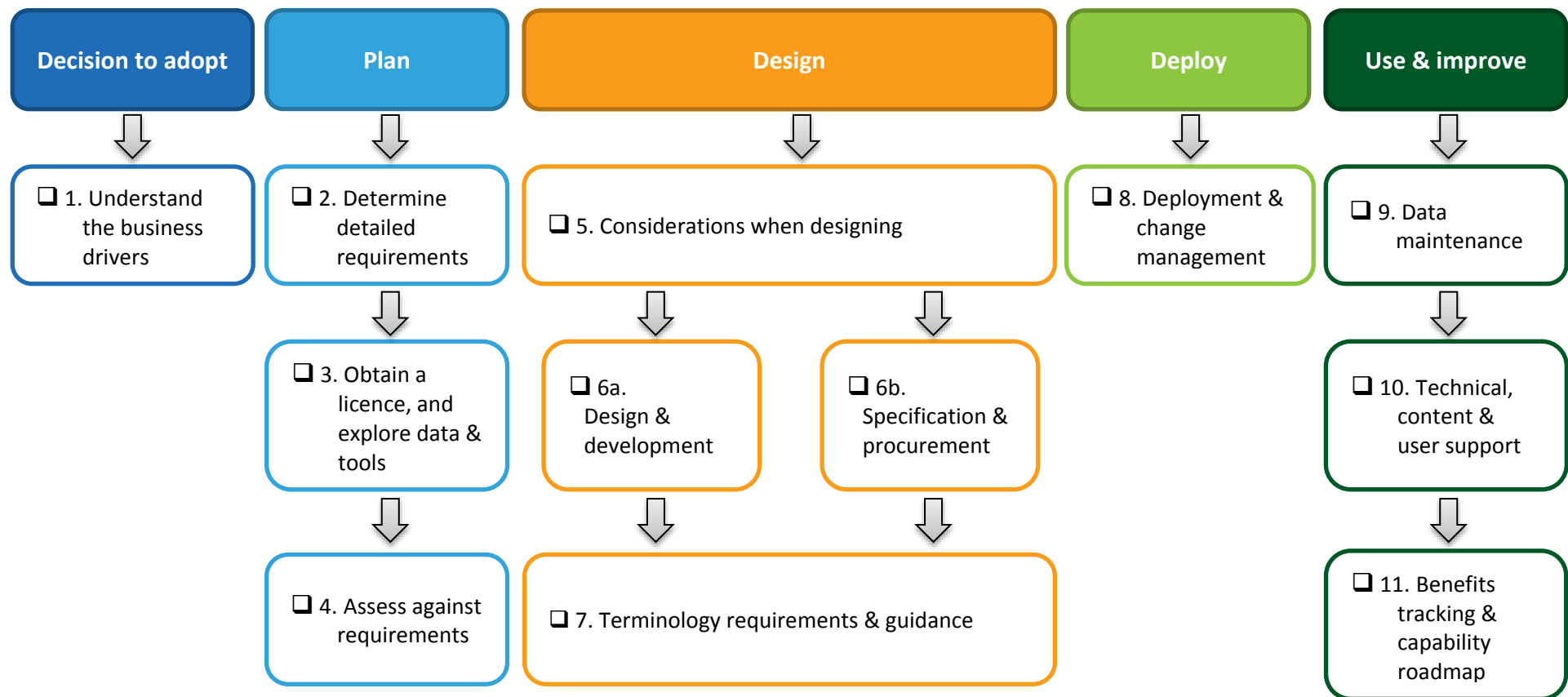
Acronym	Meaning
Agency	Australian Digital Health Agency
AMT	Australian Medicines Terminology
ARTG	Australian Register of Therapeutic Goods
CDA	clinical document architecture
CIS	clinical information system
FHIR	Fast Healthcare Interoperability Resources
NCTS	National Clinical Terminology Service
NSS	National Syndication Server
NTS	National Terminology Server
PBS	Pharmaceutical Benefits Scheme
RF2	Release Format 2
SNOMED CT-AU	Australian extension of SNOMED CT

¹ “SNOMED” and “SNOMED CT” are registered trademarks of the [IHSTDO](http://www.ihstdo.org).

Overview

Clinical terminology is a standard way to name, identify and record information relevant to healthcare, and is implemented within software applications. This guide identifies a practical approach for implementing SNOMED CT-AU and the AMT, with links to supporting resources. Although presented linearly, the stages of a systems development lifecycle can be iterative as the application undergoes testing and refinement.

At any step of the process, specific information and education sessions can be arranged with a representative from the Australian Digital Health Agency via email help@digitalhealth.gov.au or call the Help Centre line 1300 901 001.



1. Understand the business drivers

The decision to adopt SNOMED CT-AU or the AMT will be influenced by an understanding of the relevant business drivers.

External factors may include:

- Achieving interoperability, with support for sending and receiving clinical information between different systems.
- Adherence to state-wide or national digital health programs.
- Electronic medications management.
- Data analytics and secondary use.

Internal factors may include:

- Product development to support functionality required within a clinical information system (CIS).
- Upgrades to system architecture to adopt new technology and streamline processes.

There is a range of introductory level material that helps to answer the following questions:

- What is a clinical terminology and where does SNOMED CT fit in?
- What are the benefits of SNOMED CT?
- What is SNOMED CT-AU?
- What is the AMT?

These documents are freely available from:

- [SNOMED International](#)
- [National Clinical Terminology Service \(NCTS\)](#)

Resources

- *SNOMED CT Starter Guide* [1]
- *SNOMED International Frequently Asked Questions* [2]
- *Introduction to SNOMED CT-AU presentation* [3]
- *Introduction to the AMT presentation* [4]
- *AMT Benefits Analysis 2014/15* [5]

2. Determine detailed requirements

Once you gain an understanding of the business drivers, you can start to determine detailed business, functional and non-functional requirements for implementing terminology.

Consider the use cases of your clinical solution (such as CIS or other type of clinical application) and the way terminology can be used to support:

- Clinical data capture.
- Medications management.
- Clinical information exchange between systems.
- Analytics and reporting.

Depending on your business drivers, the following should also be considered:

- Terminology use and interoperability with SNOMED CT-AU and non-SNOMED CT-AU content within a clinical solution or ecosystem.
- Connectivity with My Health Record and other systems that support and exchange clinical documents (such as Discharge Summaries and Shared Health Summaries), and whether they are:
 - Compliant with national specifications.
 - Coded with SNOMED CT-AU and the AMT.
- Ability to generate statistical data that feed into analytics and reporting.
- Change management and benefits realisation.

Resources

- *Vendor Introduction to SNOMED CT* [6]
- *AMT Concept Model and Business Use Cases* [7]

3. Obtain a licence, and explore data & tools

To help you gain a better understanding of SNOMED CT-AU and the AMT and their role within CIS data structures and functionality, introductory level documents are available from the NCTS document library. It may also be useful to explore the terminology content and learn about the associated tools and services.

<p>Explore SNOMED CT-AU and AMT content via the web-based Shrimp terminology browser.</p>	<p>Access to terminology content from the NCTS website requires a registered account (organisation or individual).</p> <p>This includes acceptance of the <i>SNOMED CT Affiliate License Agreement</i> [8] and the <i>Australian National Terminology Licence Agreement</i> [9].</p> <p>Any organisation that has developed products integrated with SNOMED CT-AU or the AMT must comply with the obligations stated within these licence agreements.</p>	<p>The distribution format for SNOMED CT-AU (which incorporates the AMT) is based on the SNOMED International Release Format 2 (RF2) specification.</p> <p>The release data is provided as a suite of tab-delimited text files and is comprised of:</p> <ul style="list-style-type: none"> • Core files (Concept, Description and Relationship files). • Subsets or extended files (Reference sets).
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Resources

- *Browse the AMT using Shrimp presentation* [10]
- *Registering for a License* [11]
- *Vendor Introduction to SNOMED CT* [6]
- *AMT Concept Model and Business Use Cases* [7]
- *SNOMED CT Editorial Guide* [12]
- *SNOMED CT-AU RF2 Release File Bundle* [13]
- *National Clinical Terminology Service Guide for Implementers* [14]

4. Assess against requirements

Review the documentation produced by the NCTS, Australian Digital Health Agency (the “Agency”) and SNOMED International to determine how SNOMED CT-AU and the AMT can meet defined business, functional and non-functional requirements.

Some key questions to ask are:

- What clinical concepts from SNOMED CT-AU or the AMT are relevant for use?
- Should existing local or proprietary code sets be mapped to terminology?
- Are terminology descriptions required for the user interface display or creation of messages?
- Are relationships between concepts required to support the use of the terminology, for example to identify active ingredients or dosage forms?
- Which SNOMED CT-AU or AMT reference sets are appropriate for use?
- What clinical information exchange with terminology-encoded data is in scope?
- How is terminology-encoded information structured within clinical documents, so as to be compliant with national specifications?
- What are the relevant data analytics or reporting obligations and formats?

The main terminology implementation methods are:

- Mapping local clinical or medicinal terms to SNOMED CT-AU or the AMT
 - The user interface (the “front end”) continues to display and support local code sets and descriptions, with a link to the terminology within the system (the “back end”) to support information exchange and interoperability.
- Direct (native) adoption of SNOMED CT-AU or the AMT
 - The terminology is available in both the “front end” and the “back end”.
- Hybrid approach
 - Both mapped and native methods are used.

Resources

- *Vendor Introduction to SNOMED CT* [6]
- *SNOMED CT Editorial Guide* [12]
- *SNOMED CT-AU Development Approach For Reference Sets* [15]
- *AMT Concept Model and Business Use Cases* [7]
- *Australian Digital Health Agency Clinical Documents* [16]
- *NCTS Frequently Asked Questions* [17]

5. Considerations when designing

Implementers may choose to adopt SNOMED CT-AU or the AMT by upgrading existing systems; designing and developing their own bespoke terminology-enabled product; or adapting, procuring or subscribing to a third party terminology-enabled product.

The following are essential tasks to be undertaken for any implementation of a terminology-enabled product:

- Gap analysis between terminology requirements for content and functionality and what is provided by SNOMED CT-AU and the AMT.
- Development of local reference sets, content extensions and processes to address any identified gaps.
- Ability to deal with inactive concepts.
- Engagement of clinical users throughout all stages of the implementation, especially during the planning, design phases and change management.
- Considerations of how legacy data is handled, for example:
 - Will legacy data be coded with terminology?
 - Will legacy data be kept as a separate and distinct dataset, while allowing continued access for clinical use or reporting?
- Planning for additional clinical resources when required, for example to validate some or all terminology content in a third party product such as a map.
- Change management activities and documentation.
- Ensuring that appropriate clinical governance and reporting mechanisms are engaged.

Some additional considerations for mapping implementations include the following:

- The initial cost and effort of mapping will be influenced by the number of entries to be mapped and the complexity of the dataset.
- An ongoing process must be put in place to maintain the map:
 - Maps must be examined each time the source or target code sets are updated.
 - Associated ongoing costs and resources associated with this effort should be accounted for.
 - Consider any tooling required to maintain mappings.
- A risk management plan put in place to address:
 - The prospect of inexact matches and therefore imprecise mapping, such as mapping a specific local term with a more general SNOMED CT-AU term.
 - Validation of complex rules-based map entries and how other systems will interpret them.
 - Implications of mapping on clinical safety.

Resources

- *SNOMED CT Technical Implementation Guide* [18]
- *SNOMED CT-AU Australian Technical Implementation Guide* [19]
- *SNOMED CT-AU Reference Set Implementation Toolkit* [20]
- *SNOMED CT-AU Mapping Guidelines* [21]
- *AMT Mapping Guidelines* [22]

6a. Design & development

An implementer can choose to adopt SNOMED CT-AU or the AMT by upgrading existing systems, or designing and developing their own bespoke terminology-enabled product.

Some design considerations include:

- Alignment of SNOMED CT-AU and AMT concepts with existing local database structures.
- Validation that appropriate local concepts are associated with SNOMED CT-AU and AMT concepts.
- Validation and use of key relationships and attributes of concepts.
- Display of Preferred Terms (with or without Synonyms), and implications of user interface limitations such as description character length limit.
- Appropriate display of terminology subsets, for example within selection lists for data elements.
- Appropriate search strategies.
- Appropriate data storage and messaging formats to facilitate interoperability.
- Use of a central local terminology server to provide real time terminology data to multiple connected clinical systems.

Additional considerations include:

- Use of NCTS tools to access SNOMED CT-AU and the AMT via HL7™ FHIR® standard²-based operations and resources.
 - Automated content downloads including delta files are possible by subscribing to the National Syndication Server (NSS).
 - Use of a local Ontoserver instance and Snapper provides automated access to the latest terminology data for direct use or mapping.
- Appropriate linkage to existing or third party decision support data.
- Appropriate linkage to other data, such as the PBS and the ARTG.
- Appropriate linkage to other classifications and terminologies for reporting purposes.
- Establish processes to track and demonstrate benefits of terminology enablement, which often accrue in the mid to long term. Further information on benefits is available from the [Agency](#) website.

Resources

- | | |
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| <ul style="list-style-type: none"> • <i>Australian Digital Health Agency Clinical Documents</i> [16] • <i>SNOMED CT Technical Implementation Guide</i> [18] • <i>SNOMED CT-AU Australian Technical Implementation Guide</i> [19] • <i>SNOMED CT-AU Development Approach For Reference Sets</i> [15] • <i>SNOMED CT-AU Reference Set Implementation Toolkit</i> [20] • <i>SNOMED CT-AU Mapping Guidelines</i> [21] | <ul style="list-style-type: none"> • <i>AMT Mapping Guidelines</i> [22] • <i>AMT Editorial Rules</i> [23] • <i>NCTS Frequently Asked Questions</i> [17] • <i>NCTS Test Cases For Software and Messaging</i> [24] • <i>National Clinical Terminology Service Guide for Implementers</i> [14] • <i>NCTS Technical Specifications</i> [25] [26] [27] |
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² FHIR is a registered trademark of Health Level Seven International.

6b. Specification & procurement

Alternatively, an implementer may choose to adopt SNOMED CT-AU or the AMT by adapting, procuring or subscribing to a third party terminology-enabled product. Some design considerations from Step 6a (Design & development) may be applicable.

This approach may simplify the overall process to adopt terminology.

However, the implications must be well understood such as:

- The extent of terminology-enabled features.
- The content offered by the third party product.

The following assessments of the third party product are essential:

- Does it deliver against your defined business, functional and non-functional requirements for terminology implementation?
- Is it compatible with your current system requirements?
- Does it comply with SNOMED CT licence obligations?

Additional assessments are recommended, such as:

- Does it comply with the published NCTS guidance documentation and requirements?
- If relevant, did it go through the Agency's Conformance, Compliance and Declaration processes?

The advantages and disadvantages of how a third party has implemented SNOMED CT-AU and AMT should be considered, such as:

- What terminology data is adopted?
- How do they provide access to the data, via a mapping or through a terminology server application?
- Do they have proprietary data structures or information models?
- Do they provide active linkages to decision support protocols?
- What are the vendor capabilities for regular maintenance processes and their future terminology roadmap?

Resources

- *Australian Digital Health Agency Clinical Documents* [16]
- *ISO: Principles of Mapping Between Terminological Systems* [28]
- *NCTS Test Cases For Software and Messaging* [24]
- *NCTS Guidance for Use in Healthcare Software* [29]
- *NCTS Guidance for People and Processes* [30]
- *NCTS Use of Medical Nomenclatures in Information Exchange* [31]
- *National Clinical Terminology Service Guide for Implementers* [14]
- *NCTS Technical Specifications* [25] [26] [27]

7. Terminology requirements & guidance

The Design phase of an implementation includes various cycles of development and testing to ensure the product meets all stated requirements prior to deployment for live use. The NCTS has developed guidance documentation for organisations implementing SNOMED CT-AU and the AMT, to assist with meeting and testing for terminology requirements.

Terminology requirements are available that deal with healthcare software system behaviour.

Implementations that have adopted this guidance give users confidence that an implementation:

- Will behave as expected.
- Will perform functions in a known manner.
- Has interfaces or formats that adhere to agreed specifications.
- Is likely to operate with other similar implementations that have also followed this guidance.

Some terminology requirements pertain to data maintenance for SNOMED CT-AU and the AMT. Others relate to the use of medical nomenclature and terminology for clinical information exchange, including CDA³ and non-CDA messages.

Test cases are available to assist with terminology compliance and functionality testing.

Additional requirements address the business processes, documentation and personnel needed to enable access, recording, storing and displaying terminology in healthcare software systems in a manner that minimises risks to patient safety, and maximises the benefits associated with using SNOMED CT-AU and the AMT.

Resources

- *NCTS Guidance for Use in Healthcare Software* [29]
- *NCTS Guidance for People and Processes* [30]
- *NCTS Use of Medical Nomenclatures in Information Exchange* [31]
- *NCTS Test Cases For Software and Messaging* [24]

³ HL7 and CDA are trademarks of Health Level Seven International and are registered with the United States Patent and Trademark Office.

8. Deployment & change management

When a terminology-enabled product is deployed for active use, various training and change management activities are undertaken, as defined in the earlier Plan and Design phases.

The deployment approach is determined by business requirements and needs. Some examples are:

- A phased transition with co-existence of current and new systems.
- An initial deployment to a lead site as a proof of concept.
- A comprehensive rollout paired with extensive change management.

It may be useful to engage clinical champions to demonstrate and advocate live product use during the deployment phase.

Examples of change management activities for a native terminology implementation are:

- Demonstration of the different terms a CIS user may type to search for a SNOMED CT-AU clinical concept in the user interface.
- Training to access various levels of clinical concepts and hierarchies in SNOMED CT-AU for data retrieval, aggregation and analytics to report on individual patients or cohorts.
- Tracking usage, workflow efficiency, system performance and error rates.

Terminology implementation via a mapped approach should have little day-to-day impact on CIS users, because they will interact with the same local or proprietary terms used within their current system.

Mappings to terminology will mainly support clinical information exchange.

If a mapping is done by a healthcare organisation:

- SNOMED CT-AU or AMT concepts, terms and key editorial rules must be understood.
- Additional rules and exceptions may need to be developed, adhered to and validated during maintenance.

Setting up a roadmap towards a native adoption of SNOMED CT-AU or AMT may be worth considering.

Resources

- *SNOMED CT Editorial Guide* [12]
- *SNOMED CT-AU Mapping Guidelines* [21]
- *AMT Editorial Rules* [23]
- *AMT Mapping Guidelines* [22]

9. Data maintenance

Once a terminology-enabled product is in active use, regular updates of its terminology content are essential to keep pace with the latest clinical content. SNOMED CT-AU and AMT updates are currently released by the NCTS on a monthly basis.

Licence holders are notified at the time of a new SNOMED CT-AU release.

Release documentation includes information on relevant issues and key changes.

To ensure information is current, terminology data within the product should be updated as soon as possible after a terminology release.

Current licence agreement obligations stipulate that terminology data is updated within 30 days of the publication of a new terminology release for live or in-production systems.

Regardless of the implementation method, ongoing quality reviews and issue management are an essential part of terminology maintenance.

Resources

- *SNOMED CT-AU RF2 Release File Bundle* [13]
- *SNOMED CT Technical Implementation Guide* [18]
- *SNOMED CT-AU Australian Technical Implementation Guide* [19]
- *National Clinical Terminology Service Guide for Implementers* [14]
- *NCTS Technical Specifications* [25] [26] [27]

10. Technical, content & user support

Content, technical and implementation support for SNOMED CT-AU and AMT implementers is available through the Agency Help Centre, via email (help@digitalhealth.gov.au) or telephone (1300 901 001).

<p>Issues with data gaps, concept models and general content can be logged through the Agency Help Centre.</p>	<p>Additional content can be requested for addition into the terminology via an online request submission form.</p> <p>Issues are prioritised for resolution by the NCTS.</p>	<p>Frequently asked questions covering terminology, including the AMT data contained within the PBS, are available from the following websites:</p> <ul style="list-style-type: none"> • SNOMED International • NCTS 	<p>All users of SNOMED CT-AU and the AMT are invited to join the following user groups, with free membership:</p> <ul style="list-style-type: none"> • Australian Clinical Terminology User Group (AuCT-UG) • AMT Support Group <p>Please contact the Help Centre to register your interest to participate.</p>
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Resources

- *SNOMED International Frequently Asked Questions* [2]
- *SNOMED CT Technical Implementation Guide* [18]
- *SNOMED CT-AU Australian Technical Implementation Guide* [19]
- *SNOMED CT Editorial Guide* [12]
- *AMT Editorial Rules* [23]
- *NCTS Frequently Asked Questions* [17]

11. Benefits tracking & capability roadmap

It is useful to determine the level of benefits accrued from the initial adoption of terminology. The NCTS continues to enhance terminology content, tools and services – these should be assessed from time to time to determine whether changes or upgrades to the terminology-enabled product are required. Implementers may also work towards a staged terminology maturity and capability roadmap.

Stakeholders are encouraged to provide feedback to the NCTS to help us continue developing and improving SNOMED CT-AU and the AMT. This may include terminology content, documentation, and the tools and services we provide to assist implementations.

Keep up to date via:

- Email notifications to licence holders.
- SNOMED CT-AU release documentation.
- [Recent Updates](#) and [News and Events](#) pages on the NCTS website.
- The [Agency](#) website.
- AuCT-UG and AMT Support Group meetings.

Enhancements to terminology may be the result of:

- Various stakeholders identifying the need for additional functionality or content.
- New content that is made available from SNOMED International or in collaboration with other National Release Centres for terminology.
- Improvements or additions to NCTS tools and services to better support stakeholders.
- Outcomes from co-design projects and national digital health strategy.
- Improvements scheduled in the pipeline.

An example enhancement currently in progress is the full content integration of AMT data with SNOMED CT-AU, including *Substances*.

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