NT Department of Health - Core Clinical System Renewal (CCSR) Program

NT Reference Standards Advice v1.01

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Approved for NT Health information
Acknowledgements

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# Document information

## Key information

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<thead>
<tr>
<th><strong>Owner</strong></th>
<th>Head of Strategy, Architecture and Informatics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contact for enquiries</strong></td>
<td>NEHTA Help Centre</td>
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<tr>
<td><strong>t:</strong></td>
<td>1300 901 001</td>
</tr>
<tr>
<td><strong>e:</strong></td>
<td><a href="mailto:help@nehta.gov.au">help@nehta.gov.au</a></td>
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1 Introduction

1.1 Background

The Northern Territory Department of Health (NT Health) is currently in the process of engaging with the market to replace their core clinical systems to support improved delivery of healthcare. NT Health’s vision is that:

By 2018, NT Health will have implemented contemporary and responsible solutions to transform service delivery focusing on client-centric connected care supported by a mobile workforce.

NT Health have set up the Core Clinical System Renewal program (the Program) to implement improved primary care, community care and acute care systems that provide a comprehensive, contemporary package of clinical business systems to support the provision of all patient and client services.

Improving the technology landscape for NT Health is of key importance in providing improved patient safety, reducing the total cost of ownership, and allowing NT Health to align its systems with contemporary clinical and business practices.

In order to realise this vision, one of the principles that NT Health is actively pursuing is to ensure interoperability between their own systems and those of external providers, as well as with national eHealth infrastructure, such as the PCEHR system. NT Health aims to achieve adherence to commonly used Australian and international standards and specifications, and to progress towards meeting emerging standards, such as HL7® FHIR®. During the future procurement phase of the Program, NT Health will treat standards compliance as one of the key evaluation factors in arriving at relevant procurement decisions.

1.2 Purpose and structure of this document

This reference standards advice is provided as a supplement to NT Health’s Market Sound Brief document. This advisory document provides a breakdown of the clinical functions and processes that are being replaced by the Program, and identifies relevant reference standards, specifications and architecture approaches that may be considered from an interoperability perspective.

Software vendors, in turn, are invited to confirm adherence or support for these standards or provide information on other standards, specifications and approaches that are supported by their proposed solutions, either currently or in the future. They are also invited to describe their approach to achieving interoperability in general. This document contains appendices that provide an overview of the benefits of adhering to clinical terminology standards such as SNOMED CT® and the Australian Medicines Terminology (AMT).

NEHTA conducted a detailed review and analysis of eHealth specifications and standards in 2011, following which a specifications and standards plan for a national eHealth Record was created. Please refer to the eHealth Foundations section under the Implementation Resources area of NEHTA website for more information.

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2 Architecture approaches, reference standards and specifications

NT Health is looking for standards compliance in three categories, namely:

- integration and interoperability;
- common functions; and
- clinical and administrative functions.

2.1 Integration and interoperability

NT Health has successfully implemented Intersystems’ Ensemble product as their Integration Engine. They are now focussing on moving away from a point-to-point (mesh) style of systems integration to a more modern approach. While this is a worthy outcome in itself, it is NT Health’s desire to move to a truly service-oriented approach and be informed about other architectural approaches supported by their vendors. Some of the other commonly used approaches are described below.

2.1.1 Event-driven approach

To satisfy demands for agility, there may be a case for critical clinical components to provide real-time orchestration of clinical events, as well as continuous monitoring and reaction to those events. For improved healthcare delivery, effective monitoring and timely reaction to clinical events and situations is crucial.

2.1.2 RESTful approach

Representational State Transfer (REST) provides guidelines and best practices for creating scalable web services. REST is a coordinated set of constraints applied to the design of components in a distributed system, as a simpler alternative to SOAP and WSDL-based web services. An example of the use of a RESTful interface is the emerging FHIR® standard.

2.1.3 Infrastructural capabilities

Some of the infrastructure capabilities, along with relevant reference standards and specifications, are provided in Table 1 below.

<table>
<thead>
<tr>
<th>Infrastructure capability</th>
<th>Relevant reference standards and specifications</th>
<th>Alternative standards and specifications supported</th>
<th>Approach to interoperability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure Messaging</td>
<td>AS 5550-2013, AS 5551-2013, AS 5552-2013, and AS 5546-2013 (for ELS)</td>
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</table>
### 2.2 Common functions

There are several technical functions that are common to a comprehensive, contemporary package of clinical business systems. These functions are often provisioned in a common and standardised way that promotes interoperability. They include workflow, identity management, transaction services (such as commit, rollback, and update), audit and security.

*Table 2: Common functions, reference standards and specifications*

<table>
<thead>
<tr>
<th>Common function name</th>
<th>Reference standards and specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identity Access Management and access control</td>
<td>IHE PIX PDQ</td>
</tr>
<tr>
<td>Transaction Services (Commit, rollback, update etc.)</td>
<td><strong>Web Services Atomic Transaction (WS-AtomicTransaction) Version 1.2</strong></td>
</tr>
</tbody>
</table>
| Auditing | • IHE audit profile ATNA  
• ISO/DIS 27789 Audit trails for electronic health records |
| Security | • AS ISO 17090.1  
• AS ISO 17090.2  
• AS ISO 17090.3  
• AS ISO 27799  
• ATS ISO 14265  
• ATS ISO 25237  
• NESAF  
• NEAF |
| Records Management (retention) | Records Management Standards for Public Sector Organisations in the Northern Territory 2010 (pursuant to *NT Information Act* Sections 137 and 138) |
| Business Continuity | ISO 22301 Business Continuity Management Systems - Requirements |
2.3 Clinical and administrative functions

Some of the standards and associated implementation specifications for acute care, community and primary care clinical areas are identified in Table 3 (clinical content) and Table 4 (clinical and administrative workflow) respectively.

Table 3: Reference standards and specifications for clinical content

<table>
<thead>
<tr>
<th>Function data group</th>
<th>Relevant reference content specification or standard</th>
<th>Terminology supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverse reactions</td>
<td>NEHTA Adverse Reaction Detailed Clinical Module (DCM)</td>
<td>SNOMED CT-AU, AMT</td>
</tr>
<tr>
<td>Patient problems/conditions</td>
<td>NEHTA Problem Diagnosis DCM</td>
<td>SNOMED CT-AU</td>
</tr>
</tbody>
</table>
| Pathology orders                     | • AS 4700.1.2.4-2014 Implementation of Health Level Seven (HL7®) Version 2.4 - Patient administration  
  • AS 4700.2-2012 Implementation of Health Level Seven (HL7®) Version 2.4 - Pathology and diagnostic imaging (diagnostics) | SNOMED CT-AU, LOINC, RCPA APUTS |
| Reasons for encounter/health issue   | NEHTA Problem Diagnosis DCM                         | SNOMED CT-AU          |
| Medications                          | • NEHTA Medication Instruction and Action DCM       | SNOMED CT-AU, AMT     |
|                                      | • PCEHR Dispense Record - Logical Information Specification (SCS) v1.0 |                      |
|                                      | • PCEHR Prescription and Dispense View - Structured Content Specification v1.0 |                      |
| Immunisations                        |                                                      | AMT                   |
| Radiology/Diagnostic imaging         | • Diagnostic Imaging Report Structured Content Specification v1.0  
  • HL7® Clinical Document Architecture (CDA®), Release 2.0, Normative Edition for reports  
  • Digital Imaging and Communications in Medicine (DICOM) for images  
  • NEHTA Diagnostic Imaging Report Implementation Guide  
  • AS 4700.1.2.4-2014 Implementation of Health Level Seven (HL7®) Version 2.4 - Patient administration  
  • AS 4700.2-2012 Implementation of Health Level Seven (HL7®) Version 2.4 - Pathology and diagnostic imaging (diagnostics) | SNOMED CT-AU |
<table>
<thead>
<tr>
<th>Function data group</th>
<th>Relevant reference content specification or standard</th>
<th>Terminology supported</th>
</tr>
</thead>
</table>
| Electronic discharge summary                | • eDischarge Summary - Structured Document Template v3.3  
• NEHTA Electronic Discharge Summary CDA® Implementation Guide                                                   | SNOMED CT-AU              |
|                                             |                                                                                                                     | AMT                       |
|                                             |                                                                                                                     | LOINC                     |
| Electronic Referral                         | • eReferrals - Structured Content Specification v2.1  
• NEHTA eReferral CDA® Implementation Guide                                                                       | SNOMED CT-AU              |
|                                             |                                                                                                                     | LOINC                     |
| Electronic Shared Health Summary Record      | • Shared Health Summary - Structured Content Specification v1.1  
• NEHTA Electronic Shared Health Summary CDA® Implementation Guide                                                | SNOMED CT-AU              |
|                                             |                                                                                                                     | AMT                       |
| Electronic Specialist Letter                | • Specialist Letter - Structured Content Specification v1.1  
• Electronic Shared Health Summary                                                                                   | SNOMED CT-AU              |
| Electronic Transfer of Prescriptions and dispensed records | • ATS 4888.2-2013 Electronic transfer of prescriptions - Platform independent (logical) services model to support electronic transfer of prescriptions  
• ATS 4888.6-2013 Electronic transfer of prescriptions - Platform implementation specific web service  
• ATS 4888.4-2013 Electronic transfer of prescriptions - Platform implementation specific dispense record HL7® CDA® implementation guide  
• ATS 4888.5-2013 Electronic transfer of prescriptions - Platform implementation specific prescription request HL7® CDA® implementation guide | SNOMED CT-AU              |
|                                             |                                                                                                                     | AMT                       |
| Electronic Transfer of Pathology Reports     | • Pathology Report - Structured Content Specification v1.0  
• HL7® Clinical Document Architecture (CDA®), Release 2.0, Normative Edition  
• NEHTA ePathology Report CDA® Implementation Guide  
• AS 4700.1.2.4-2014 Implementation of Health Level Seven (HL7®) Version 2.4 - Patient administration  
• AS 4700.2-2012 Implementation of Health Level Seven (HL7®) Version 2.4 - Pathology and diagnostic imaging (diagnostics) | LOINC                     |
| Electronic Event Summary                    | • Event Summary - Structured Content Specification v1.1  
• NEHTA Event Summary CDA® Implementation Guide                                                                     | SNOMED CT-AU              |
<p>|                                             |                                                                                                                     | AMT                       |</p>
<table>
<thead>
<tr>
<th>Function data group</th>
<th>Relevant reference content specification or standard</th>
<th>Terminology supported</th>
</tr>
</thead>
</table>
| Shared Electronic Health Record (PCEHR) | • IHE XDS.b  
• AS 21667-2012  
• AS ISO 18308–2005  
• NEHTA Document Exchange Service Technical Service Specification | • SNOMED CT-AU  
• AMT |
| Care plan | HL7® Clinical Document Architecture (CDA®), Release 2.0, Normative Edition | • SNOMED CT-AU  
• AMT |
| Cancer registry reporting | • HL7® Clinical Document Architecture (CDA®), Release 2.0, Normative Edition  
• AS 4700.1.2.4-2014 Implementation of Health Level Seven (HL7®) Version 2.4 - Patient administration  
• AS 4700.2-2012 Implementation of Health Level Seven (HL7®) Version 2.4 - Pathology and diagnostic imaging (diagnostics) |  |
| Clinical decision support services | HL7® Version 3 Standard: Decision Support Service, Release 2. |  |
| Data query for Health Information | Fast Healthcare Interoperability Resources (FHIR®) |  |
| Provider Portal Web UI | • HB 306 User interface requirements for the presentation of health data  
• Cross-Enterprise Document Sharing (XDS.b) |  |
| Consumer Portal Web UI | • HB 306 User interface requirements for the presentation of health data  
• Cross-Enterprise Document Sharing (XDS.b) |  |
| Secure Token Service (Token Assertion) | Security Assertion Markup Language 2.0 (SAML 2.0) |  |
| Document Query and Management Interface | • Cross-Enterprise Document Sharing (XDS.b)  
• Resource Location and Update Service (RLUS) |  |
| Conformant Repositories | Cross-Enterprise Document Sharing (XDS.b) |  |
| Report Service | ISO/TS 25237:2008 Health informatics - Pseudonymisation |  |
| View Interfaces | HB 306 User interface requirements for the presentation of health data |  |
| NHSD (National Health Services Directory) | • ISO/TS 21091:2005 Directory Services for security, communication and identification of professionals and patients  
• OMG Healthcare Provider Directory (HPD) profile. (OMG HPD) |  |
<p>| NPC (National Product Catalogue) | GS1 specifications |  |</p>
<table>
<thead>
<tr>
<th>Function data group</th>
<th>Relevant reference content specification or standard</th>
<th>Terminology supported</th>
</tr>
</thead>
</table>
| Collaborative Care Communications | • HL7® v2 standards  
• AS 4700.6-2013 Implementation of Health Level Seven (HL7®) Version 2.5 - Referral discharge and health record | |
| Diagnostic Messaging | • AS 4700.1.2.4-2014 Implementation of Health Level Seven (HL7®) Version 2.4 - Patient administration  
• AS 4700.2-2012 Implementation of Health Level Seven (HL7®) Version 2.4 - Pathology and diagnostic imaging (diagnostics) | |
| Admission, discharge and transfer | • HL7® 2.x ADT messages  
• AS 4700.1.2.4-2014 Implementation of Health Level Seven (HL7®) Version 2.4 - Patient administration  
• NEHTA Electronic Discharge Summary CDA® Implementation Guide | NEHTA Discharge Summary Implementation Guide |
| Patient identification and demographics | • HI Service Specification  
• HB 234-2012 Healthcare identifier HL7® implementation guide | |
| Healthcare Provider Details | • HI Service Specification  
• HB 234-2012 Healthcare identifier HL7® implementation guide | |
| Healthcare Provider Organisation Details | • HI Service Specification  
• HB 234-2012 Healthcare identifier HL7® implementation guide | |
Appendix A  Overview of clinical terminology

A clinical terminology can greatly reduce ambiguity in descriptions of medical history, illnesses, treatments, laboratory results, and the like. Standardised information can facilitate improved patient outcomes, clinical decision support, follow-up, and treatment. It can also facilitate analyses based on coded information from clinical IT systems.

A.1  SNOMED CT-AU at a glance

SNOMED Clinical Terms (SNOMED CT®) is the internationally pre-eminent clinical terminology that has been identified as the preferred national terminology for Australia and has been endorsed by all Australian governments. SNOMED CT is owned, maintained and distributed by the International Health Terminology Standards Development Organisation (IHTSDO). SNOMED CT is not just a simple code system or classification, but a comprehensive ontology of over 300,000 concepts covering a broad range of clinical content. It includes things like diseases and procedures, along with body structures, substances, organisms and other concepts to define these. Specific relationships between these various concepts are defined, such as:

- **Streptococcal laryngitis** (disorder) has some **Causative agent** of **Genus Streptococcus** (organism)
- **Biopsy of breast** (procedure) has **Direct Procedure site** of **Breast structure** (body structure)

The concepts are also organised in a hierarchical structure based on “IS A” relationships, where the specificity of concepts increases further down the hierarchy. While other code systems may have hierarchies, SNOMED CT differs in that a single concept may have multiple lineages to the root node (that is, more than one parent). For example:

- **Eosinophil** (cell) IS A **Polymorphonuclear leucocyte** (cell)
- **Eosinophil** (cell) IS A **Eosinophilic granulocytic cell** (cell)

Both instances of Eosinophil (above) are the same concept, with the same identifier. All of these relationships between concepts are based on documented models and formal description logic.

SNOMED CT also has the capacity to support multiple human-readable representations of the same concept. For example the concept 90708001 |Kidney disease (disorder)| has the following synonyms:

- Nephrosis
- Renal disease
- Disease of kidney
- Nephropathy
- Renal disorder
- Disorder of kidney

While the Preferred Term in this case is "Kidney disease", having additional synonyms improves the useability of the terminology when searching for content.
The Preferred Term displayed to end users can also be determined by changing contexts, such as a patient portal or a GP desktop system.

SNOMED CT Australian Release (SNOMED CT-AU) is the Australian extension to SNOMED CT, providing a local customisation relevant to requirements of the Australian healthcare community. It includes the core international resources along with Australian-developed terminology and documentation for implementation in Australian clinical IT systems. The terminology is currently updated every six months. SNOMED CT-AU is published as a collection of tab delimited text files, which are required to be imported into target software before clinical end users can interact with it.

A.2 The AMT at a glance

The Australian Medicines Terminology (AMT) is effectively an extension of SNOMED CT-AU, being based on the same principles as SNOMED CT, including sharing the same distribution format. The AMT only covers concepts related to describing medicinal products. It provides unique codes and unambiguous standardised descriptions to accurately identify the medicines commonly used in Australia.

The AMT was developed to be implemented in clinical information systems for the following activities:

- Prescribe
- Record
- Review
- Issue - including dispense
- Administer
- Transfer of information

AMT releases are provided every month and include updates from the Pharmaceutical Benefits Scheme (PBS) and Therapeutic Goods Administration (TGA).

Concepts in the AMT are organised into two general classes, medicinal and trade concepts, with corresponding levels of detail within each class. Medicinal concepts relate to generic products, whereas trade concepts relate to branded products.

For example, Amoxil is a branded “Trade Product” whose generic counterpart (that is, a “Medicinal Product”) is amoxycillin. Similarly,

Amoxil 500 mg capsule: hard, 20 capsules, blister pack

is a branded “Containered Trade Product Pack” whose generic counterpart (a “Medicinal Product Pack”) is

amoxycillin 500 mg capsule, 20.

As with SNOMED CT, the concepts in AMT are associated with each other by defined relationships that may be processed by clinical systems. For example:

**Buscopan Forte 20 mg tablet: film-coated** has intended active ingredient hyoscine butylbromide
When implemented in software, both terminologies represent clinically relevant information consistently, reliably and comprehensively as an integral part of the EHR. They support interoperability either natively or as a reference terminology through mapping to local code systems. SNOMED CT-AU and the AMT serve as a foundation upon which healthcare organisations can develop effective analysis applications to conduct outcomes research, evaluate the quality and cost of care, design effective treatment guidelines, and much more.


## Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMT</td>
<td>Australian Medicines Terminology</td>
</tr>
<tr>
<td>CCSR</td>
<td>Core Clinical System Renewal (program)</td>
</tr>
<tr>
<td>CDA®</td>
<td>Clinical Document Architecture</td>
</tr>
<tr>
<td>DICOM</td>
<td>Digital Imaging and Communications in Medicine</td>
</tr>
<tr>
<td>EHR</td>
<td>eHealth record</td>
</tr>
<tr>
<td>ESB</td>
<td>Enterprise Service Bus</td>
</tr>
<tr>
<td>EY</td>
<td>Ernst and Young</td>
</tr>
<tr>
<td>FHIR®</td>
<td>Fast Healthcare Interoperability Resources</td>
</tr>
<tr>
<td>HPD</td>
<td>Health Provider Directory</td>
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<tr>
<td>IHTSDO</td>
<td>International Health Terminology Standards Development Organisation</td>
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<tr>
<td>NHSD</td>
<td>National Health Service Directory</td>
</tr>
<tr>
<td>PBS</td>
<td>Pharmaceutical Benefits Scheme</td>
</tr>
<tr>
<td>PCEHR</td>
<td>personally controlled electronic health record</td>
</tr>
<tr>
<td>REST</td>
<td>Representational State Transfer</td>
</tr>
<tr>
<td>SCS</td>
<td>structured content specification</td>
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