Document information

_HISO 10043 CDA Common Templates_ is an interim standard for the New Zealand health and disability sector

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Contributors

The following organisations contributed to the development of this standard through representation on HISO or one of its working groups:

- Health Sector Architects Group
- Patients First
- interRAI New Zealand
- Nursing Council of New Zealand
- Health Informatics New Zealand
- Chief Medical Officers Forum
- Māori interests
- National Health IT Board Consumer Panel
- Accident Compensation Corporation

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See the HISO website for information about our standards development processes.
Related specifications

http://www.hl7.org/

HL7/LOINC user guide for CDA document type vocabulary domain

Unified Code for Units of Measure (UCUM) http://unitsofmeasure.org/

ASTM/HL7 Continuity of Care Document (CCD) http://www.hl7.org/

Consolidated CDA Implementation Guide (CCDA) http://www.hl7.org/

HISO 10040 Health Information Exchange Architecture Building Blocks
http://www.ithealthboard.health.nz/content/health-sector-architects-group/

HISO 10041 Continuum of Care http://ithealthboard.health.nz/hiso/ (in development)

HISO 10045 Healthcare Provider Index http://ithealthboard.health.nz/hiso/ (in development)

HISO 10046 National Health Index http://ithealthboard.health.nz/hiso/ (in development)

Health and Disability Sector Ethnicity Data Protocols

Health and Disability Services Eligibility Direction 2011 http://www.health.govt.nz/new-
zealand-health-system/eligibility-publicly-funded-health-services/eligibility-direction/

Reference Architecture for Interoperability
http://www.ithealthboard.health.nz/content/health-sector-architects-group/
# Contents

1 Introduction 1

2 Working with CDA 2
   2.1 Precepts 2
   2.2 Compact style 2
   2.3 Document type codes 4
   2.4 Template identifiers 4
   2.5 Data elements 4
   2.6 Value sets 5
   2.7 Data types 5
   2.8 Missing information 6

3 CDA templates 7
   3.1 Patient identity 7
   3.2 Addresses 8
   3.3 Telephone numbers 9
   3.4 Ethnicity 9
   3.5 Birthplace 10
   3.6 Spoken languages 10
   3.7 Eligibility 11
   3.8 Health workers 12
   3.9 Provider organisations 13
   3.10 Health care facilities 13
   3.11 Care team 14
   3.12 Guardians 14
   3.13 Support people 15
   3.14 Authors 15
   3.15 Information sources 16
   3.16 Approvers 17
   3.17 Recipients 18
1 Introduction

We are introducing a set of HL7 Clinical Document Architecture (CDA) document types as a currency for information exchange in the New Zealand health and disability sector. Structured clinical assessments, referral requests, e-prescriptions and shared health summaries will circulate as standardised CDA documents, produced and consumed by certified point-of-care and repository-based applications. This is one of our key building blocks for interoperability.

Every approved document type will be the subject of a published standard stating its use cases and including CDA templates that describe how such documents are composed. CDA templates will be reused from one document type to another – for example, a list of medications will have much the same format in a referral request as in a discharge summary.

Here, we provide rules for creating powerful yet easily implemented CDA templates. We illustrate a particular compact style in which CDA templates will be expressed in HISO specifications.

The main purpose of this standard is to define those CDA templates that are the most common across all document types. Essentially, these are templates for identity and contact information about patients, health workers and health services.

From the implementer’s viewpoint, someone who is already an XML developer needn’t have a detailed knowledge of CDA in order to use this specification – some familiarity with the principles of CDA should be enough.

This specification is primarily about CDA templates and document types. Readers should refer to the relevant specifications for information on the related topics of web services as the recommended transport for CDA documents, and the use of detailed clinical models as part of the development process.
2 Working with CDA

Our use of CDA complies with the HL7 CDA Release 2 standard, including the CDA domain information model and the CDA XML schema. Unlike some jurisdictions we do not employ any extensions to the international standard. In terms of design, our templates are most influenced by the Continuity of Care Document (CCD) and Consolidated CDA (CCDA) implementation guides used overseas. As a small country, we can create even more sharply focused specifications with benefits for users and implementers alike, while staying within the international guidelines.

This section describes our simplified approach to CDA. We discuss templates, template identifiers, data elements, value sets, data types and missing information.

2.1 Precepts

We have certain precepts in working with CDA so as to foster the creation of expressive and easily implemented templates.

Our rules are:

• all template elements should be stated explicitly – ie, templates should be closed rather than open
• coded elements should each have one fixed declared code set and should not be paired with translations to alternative code sets
• inherently structured data should be represented as a regular array or table of coded entries with a corresponding text block for display
• there should be no explicit links from coded entries to text blocks
• sections should not be interlinked or nested
• the recorded author should always be a person or an organisation, never a device or software product
• use of the negation indicator (reversing the meaning of clinical statements) should be avoided
• templates should be structured so as to support recursive descent parsing of CDA documents.

2.2 Compact style

One of the difficulties people familiar with XML but new to CDA face is the somewhat obscure style in which templates are usually expressed. We forgo conformance statements in favour of hierarchical descriptors in a particular compact style.
Here by way of example are the first few lines of an actual document template.

{discharge summary document} →
ClinicalDocument
  {some elements skipped in this example}
  code
    @code = 18842-5 : LOINC code
    @displayName = “Discharge Summary”
    ...
  title = “Discharge Summary”
  effectiveTime
    @value : datetime
  {legal approver}?
  {approver}*
  {patient}
  {etc}

{legal approver} →
  ...

The various constructions illustrated are:

- most lines reflect either an XML element – eg, ClinicalDocument – or XML attribute – eg, @code – taken from the CDA XML schema (inevitably there are some American spellings)
- the ordered and indented layout (no angle brackets) shows the required composition of XML elements and attributes (with reference to the CDA XML schema)
- text nodes and attributes have declared value sets (introduced by a colon as a type symbol) and/or fixed value assignments (equals sign)
- nulls are permitted where indicated (see later on missing information)
- optional elements are indicated by a question mark
- repeated elements are indicated by an asterisk when any number (including zero) are permitted, while a plus sign indicates that there must be at least one occurrence
- named production rules (curly brackets) replace repeated sequences of elements/attributes; production rules are declared with the arrow symbol
- there can be multiple production rules under the same name, any of which can be selected wherever the name appears
- production rules can be selected by pattern matching on the expansion as well as by name – an ellipsis acts as the wildcard, denoting the remainder of the expansion
- comments enclosed by round brackets are for information (only)
- the text node in elements with mixed content is indicated by the dot symbol
- like all other elements, text blocks are required to have a definite structure (as tables); we can use a two column layout in order to show better the intended correspondence between coded entries and cells of the table
- the namespace declaration xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance is assumed to exist.
Under these rules, CDA templates are well mannered enough to appear in standards documentation, and the style lends itself to the creation of easily processed document types.

### 2.3 Document type codes

CDA documents of different types are classified using LOINC codes from the HL7/LOINC document type vocabulary domain, enabling shared documents to be labelled consistently. For example, there are LOINC codes that distinguish referral requests as a class from discharge summaries.

We anticipate the occasional need for the issue of new LOINC codes for document types specific to New Zealand.

In terms of CDA templates, every standard document type will hardcode some particular value for the clinicalDocument/code element.

### 2.4 Template identifiers

We use ISO Object Identifiers (OIDs) as CDA template identifiers, the references that appear in CDA documents to mark out where the rules of particular templates apply, used as a foothold by parsing software.

New templates are issued OIDs stemming from the HL7 New Zealand template root – 2.16.840.1.113883.2.18.7.

There is a New Zealand registration authority and templates register.

### 2.5 Data elements

In the context of CDA templates, we use the term data element to mean any XML attribute, leaf element or text node whose purpose is to be populated by the application (and is not there simply as a structural artefact). Each template comprises a well-defined set of data elements.

Every data element is required to have a descriptive name, formed as described by ISO/IEC 11179-6 naming guidelines. If the supplied XML attribute/element name is not enough by itself, a bracketed comment can be added to it.

The data element can be constrained to some particular value set, either named or enumerated. Otherwise, the data element will have an explicitly declared data type and no particular value set constraint.

We permit both optional and nullable data elements.
2.6 Value sets

Value sets are used to constrain data elements to meaningful values. Each value set is drawn from some code system, or is simply an enumerated or otherwise defined collection of values of the same data type. For example, units of measure for physical quantities come from the UCUM code system.

Value sets are uniquely named. OIDs are assigned to those value sets used in concept descriptors. OIDs for value sets in the HL7 New Zealand namespace stem from the root 2.16.840.1.113883.2.18 – for instance, 2.16.840.1.113883.2.18.2 represents the NHI number code system.

We have production rules for concept descriptors with commonly used value sets.

```
{snomed code} →
@code : SNOMED code (concept id)
@displayName
@codeSystem = 2.16.840.1.113883.6.96

{loinc code} →
@code : LOINC code
@displayName
@codeSystem = 2.16.840.1.113883.6.1
```

Enumerated code sets are classed as either static or dynamic. We can freely add codes to a dynamic code set and reasonably expect software to pick up these codes. However, static code sets cannot be changed without considering the impact on the application. We will issue new OIDs as a version control measure.

All code sets are registered in a codes sets database (external to template specifications). This database records for each value set: unique name, OID, whether static or dynamic, the actual list of values or a pointer to such a list (for enumerated value sets), and the data type.

2.7 Data types

In our templates, we use a mix of ISO/IEC data types, W3C XML Schema primitive data types and HL7 V3 simple data types. Where CDA uses complex data types – eg, physical quantity comprising magnitude and unit of measure – we treat each component as a separate data element.

The standard for dates and times is ISO 8601 Basic Format – values matching the pattern YYYYMMDDHHMMSS.UUUUUU[+|-ZZz]. The ‘timestamp’ data type uses the full precision, alongside ‘datetime’ (YYYYMMDDHHMMSS) and ‘date’ (YYYYMMDD) data types. Whole months or years are indicated with further truncation.

We use the native W3C XML Schema integer and decimal data types.

Boolean values are represented as strings ‘true’ and ‘false’.

The ‘text’ data type is used for character strings and blocks of text.

Uniform Resource Identifiers (URIs) of various schemes are used.
2.8 Missing information

CDA permits the use of null to indicate the fact that an expected element cannot be assigned a value because of missing information.

In our specifications, we support four kinds of null:

• NA when the element is not applicable in the context
• UNK when the element is applicable but its value is unknown
• OTH when there is known information but it cannot be coded for the element
• NI when there is no information but we cannot be specific as to the reason.
3 CDA templates

In this section, we present the set of CDA templates that we have chosen for general use across all CDA document types. Most of these templates concern elements in the CDA document header, while a smaller number are for frequently occurring body elements.

The templates fall into three groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>Templates for information about the patient</th>
<th>Templates for information about clinical services</th>
<th>Templates for information about the clinical document itself</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Patient identity</td>
<td>Health workers</td>
<td>Authors</td>
</tr>
<tr>
<td></td>
<td>Ethnicity</td>
<td>Provider organisations</td>
<td>Information sources</td>
</tr>
<tr>
<td></td>
<td>Addresses</td>
<td>Health care facilities</td>
<td>Approvers</td>
</tr>
<tr>
<td></td>
<td>Telephone numbers</td>
<td>Care team</td>
<td>Recipients</td>
</tr>
<tr>
<td></td>
<td>Birthplace</td>
<td>Guardians</td>
<td>Custodian</td>
</tr>
<tr>
<td></td>
<td>Spoken languages</td>
<td>Support people</td>
<td>Confidentiality</td>
</tr>
<tr>
<td></td>
<td>Eligibility</td>
<td></td>
<td>Versioning</td>
</tr>
</tbody>
</table>

3.1 Patient identity

Patient identity and demographic details appear in the CDA document header.

{patient} →
templateId
  @root = 2.16.840.1.113883.2.18.7.5.2
id
  @extension : NHI Number (format AAANNNN)
  @root = 2.16.840.1.113883.2.18.2
{address}*
{telephone number}*
patient
templateId
  @root = 2.16.840.1.113883.2.18.7.5.1
{person name}+
administrativeGenderCode
  @code : NHI Gender Code = F | M | I | U
  @codeSystem = 2.16.840.1.113883.2.18.57
birthTime
  @value (exact birth date or approximate month or year) : date
maritalStatusCode
  @code : HL7 Marital Status | null
  @displayName
  @codeSystem = 2.16.840.1.113883.2.18.5.2

religionAffiliationCode
  @code : HL7 Religious Affiliation | null
  @displayName
  @codeSystem = 2.16.840.1.113883.5.1076

ethnicGroupCode?
  @code (iwi) : iwi code

{guardian}*
{birthplace}?
{spoken language}*  

There always has to be a current official name, while former names and any preferred names or aliases can also be recorded.

{person name} →
@use : HL7 Name Use = L (legal/official name) | M (maiden name) | N (nickname) | A (alias)
prefix? (title)
given* (including middle names)
  @qualifier? = IN (initials)
family
suffix?

Marital status is based on the HL7 international code set, with the addition of civil union as a possible classification.

3.2 Addresses

New Zealand and overseas addresses appearing in our CDA documents follow the New Zealand Post standard. Residential, business and mailing addresses are differentiated.

{address} →
addr
  @use : HL7 Postal Address Use = WP (workplace) | H (home) | PST (postal)
streetAddressLine*
  precinct? (suburb or rural locality)
city (or town or district)
state?
postalCode?
country (name) : ISO 3166-1 Country Name
3.3 Telephone numbers

Telephone numbers and other electronic addresses are written as URI strings in CDA documents. The URI scheme indicates the mode of communication, e.g., prefix ‘tel:’ for telephone. Presently, we support telephone, fax, email, instant messaging and videoconferencing addresses.

{telephone number} →
telecom
  @use : HL7 Telecommunication Address Use (enumerate)
  @value : URI (permitted schemes are tel, fax, mailto, im and sip respectively, as above)

Only current addresses are included.

3.4 Ethnicity

Ethnicity is recorded in a specific CDA body section. There can be up to six entries, in any order, as allowed by the ethnicity data protocol.

{ethnicity section} →
section
  templatedId
    @root = 2.16.840.1.113883.2.18.7.86
code
  @code = 69490-1 : LOINC
  ...
title = Ethnicity
text
table
  thead
    tr
      th = Ethnicity
tbody
  {ethnicity display row}* {ethnicity entry}*

Entries are coded using the ethnicity data protocol’s level 4 code set. This is a hierarchical code set with some hundreds of ethnicities at level 4, rolling up to increasingly wider classifications at levels 3, 2 and 1.
3.5 Birthplace

Birthplace is recorded as a partial address that must include country name, and may specify the town, city, district or rural locality.

3.6 Spoken languages

Where there may be language difficulties, details of all spoken or signed languages, along with possible alternative modes of communication are recorded. For each entry, there is also a record of proficiency and an indication of whether this is the preferred mode of communication.
proficiencyLevelCode
@code : HL7 Language Ability Proficiency Code
@codeSystem = 2.16.840.1.113883.1.11.12199
@displayName (eg, Fair)
preferenceInd = true | false

3.7 Eligibility

There is often a need to know the patient’s eligibility for publicly funded health services. This information is presented in a specific body section.

Government policy is stated in the Health and Disability Services Eligibility Direction 2011, which defines categories of eligibility numbered B2 (New Zealand citizen) to B27 (prisoner who requires services not available through prison health services). We record eligibility in terms of these categories.

{eligibility section} →
section
templatedId
@root = 2.16.840.1.113883.2.18.7.34
code
@code : LOINC = 53247-3
@displayName = “Eligibility acknowledgement”

... title = Eligibility
text
table
@caption = Eligibility
thead
tr
th = Eligibility
tbody
{eligibility display row}*
{eligibility entry}*

This section contains as many entries as necessary to indicate the categories of eligibility that are met. The category code and its full description from the policy document are recorded.
3.8 Health workers

References to health practitioners and other health workers appear in several contexts in CDA documents. HPI person number is always used as the identifier, alongside the person’s name and address, telephone numbers and details of the provider organisation represented (if any).

Health workers are also identified in other templates.
3.9 Provider organisations

References in CDA documents to health care provider organisations use HPI organisation number as the identifier, and include name and address details. The HPI system allows us to reference individual clinical services or entire organisations.

{provider organisation} →
  templateId
    @root = 2.16.840.1.113883.2.18.7.5.19.2
  id
    @extension : HPI Organisation Number
    ...
  name : text
  {address}*
  {telephone number}*

Organisations are also identified in other templates.

{hpi organisation number} →
  @extension : HPI Organisation Number (format “G” + XXNNN + “.” + X)
  @root = 2.16.840.1.113883.2.18.3.3

3.10 Health care facilities

Health care facilities and their locations are represented as follows.

{health care facility} →
  healthCareFacility
    id
      @extension : HPI Facility Number (format “F” + XXNNN + “.” + X)
      @root = 2.16.840.1.113883.2.18.3.2
    code
      @code (facility type) : NHSN Healthcare Service Location (format NNNN-N)
      @displayName : text
      @codeSystem = 2.16.840.1.113883.13.19
    location
      name : text
      {address}*
      serviceProviderOrganization?
        {provider organisation}

Facilities include practices and facilities in the community and hospital wards and clinics. The chosen value set allows the type of facility to be recorded at this level – eg, cardiac catheterisation laboratory.
3.11 Care team

The health professionals making up the patient’s multi-disciplinary care team are listed in some CDA document types, as header elements. The care team naturally includes the GP, along with any specialists, community nurses, social workers and so on who are currently involved in the patient’s care. We indicate the worker’s role and the provider organisation.

{care team member} →
participant
  @typeCode = IND (individual or indirect) : HL7 Participation Type
templateId
  @root = 2.16.840.1.113883.2.18.7.5.14
functionCode
  @code (role) : HL7 Participation Function
  @displayName = “Primary Care Physician”
  @codeSystem = 2.16.840.1.113883.5.88
associatedEntity
  @classCode = PROV
id
  @extension : HPI Person Number
...
{address}+
{telephone number}+
associatedPerson
  {person name}
scopingOrganization
  {provider organisation}

3.12 Guardians

Parents and guardians are named where necessary, with contact details, in the CDA document header.

{guardian} (individual) →
guardian
templateId
  @root = 2.16.840.1.113883.2.18.7.5.3
code (relationship to patient)
  @code : HL7 Personal Relationship Role Type
  @codeSystem = 2.16.840.1.113883.5.111
  @displayName : text
...
{address}*{telephone number}*
guardianPerson
  {person name}
As well as individuals, organisations including courts and government agencies can act as guardians. Such organisations will need to be HPI registered.

{guardian} {organisation} →

guardian
templated
   @root = 2.16.840.1.113883.2.18.7.5.3
code (relationship to patient)
   @code : HL7 Personal Relationship Role Type = GUARD
   @codeSystem = 2.16.840.1.113883.5.111
   @displayName : text

...  
guardianOrganization
   {provider organisation}

3.13 Support people

Support people are those non-health professionals in the patient’s life who can be classed as next of kin, emergency contacts or simply carers. We record name and contact details in the CDA header, along with the relationship to the patient.

{support person} →

participant
   @typeCode = IND
templated
   @root = 2.16.840.1.113883.2.18.7.5.14
associatedEntity
   @classCode = NOK (next of kin) | ECON (emergency contact) | CAREGIVER
code
   @code (relationship to patient) : HL7 Personal Relationship Role Type Code
   @displayName : text (eg, Mother)
   @codeSystem = 2.16.840.1.113883.5.111

{address}*
{telephone number}*
associatedPerson
   {person name}

3.14 Authors

Details of a document’s authorship appear in the CDA header.

The author is usually an individual health professional, or there could be a number of such authors.

{author} {health worker} →

author
   templated
   @root = 2.16.840.1.113883.2.18.7.5.7
For document types that are not suited to individual authorship it is possible to name a provider organisation as the author.

{author} (organisation) →
author
templateId
   @root = 2.16.840.1.113883.2.18.7.5.7
time
   @value (when document created) : datetime
assignedAuthor
   {provider organisation}

Sometimes the patient is most appropriately the author, eg, in recording the results of self-administered tests.

{author} (patient) →
author
templateId
   @root = 2.16.840.1.113883.2.18.7.5.7
time
   @value (when document created) : datetime
assignedAuthor
   {patient or support person}

### 3.15 Information sources

We can record in a document the details of anyone who has been a source of the information it contains.

We can identify health professionals who are not already authors as information sources.

{information source} (health worker) →
informant
templateId
   @root = 2.16.840.1.113883.2.18.7.5.9
assignedEntity
   {health worker}
Organisations also can be named as information sources.

\{information source\} \{organisation\} \rightarrow 
informant
  templateId
    @root = 2.16.840.1.113883.2.18.7.5.9
assignedEntity
  \{provider organisation\}

We can also name support people as information sources, in which case we state the relationship to the patient.

\{information source\} \{non health worker\} \rightarrow 
informant
  templateId
    @root = 2.16.840.1.113883.2.18.7.5.9
relatedEntity
  code
    @code : HL7 Personal Relationship Role Type Code
    @displayName : text (eg, Mother)
    @codeSystem = 2.16.840.1.113883.5.111
{address}*
{telephone number}*
relatedPerson
  \{person name\}

### 3.16 Approvers

Many document types are subject to formal review processes and such documents name not only their authors, but also other health professionals as their reviewers and approvers.

There can be one person in particular who takes legal responsibility for the document and is recorded as the approver.

\{legal approver\} \rightarrow 
legalAuthenticator
  templateId
    @root = 2.16.840.1.113883.2.18.7.5.12
time
  @value (when approved) : datetime
signatureCode
  @code = S (signed)
assignedEntity
  \{health worker\}

It is also possible to record accessory approvers.
{approver} →
authenticator
  @typeCode = AUTHEN
templateld
    @root = 2.16.840.1.113883.2.18.7.5.13
time
  @value {when approved} : datetime
signatureCode
  @code = S (signed)
assignedEntity
  {health worker}

3.17 Recipients

Every document has some number of declared recipients, including the patient, health workers, support people and provider organisations. There are three possible formats.

Individual health workers are addressed as follows. This format includes a pointer to the organisation represented.

{information recipient} (health worker) →
informationRecipient
templateld
  @root = 2.16.840.1.113883.2.18.7.5.11.2
intendedRecipient
  id
    @extension : HPI Person Number
...
{address}*
{telephone number}*
informationRecipient
  {person name}
receivedOrganization
  {provider organisation}

Provider organisations can also be addressed without naming an individual representative.

{information recipient} (organisation) →
informationRecipient
templateld
  @root = 2.16.840.1.113883.2.18.7.5.11.1
intendedRecipient
  receivedOrganization
    {provider organisation}
Other recipients can include family members and support people. The patient as a recipient is indicated in this fashion also.

\{(information recipient) (individual non health worker) \rightarrow informationRecipient

templateId
  @root = 2.16.840.1.113883.2.18.7.5.11.3
intendedRecipient
  \{address\}*
  \{telephone number\}*
informationRecipient
  \{person name\}

Full contact details should always be included in these templates, even when they duplicate other elements in the document.

### 3.18 Custodian

Every CDA document has a declared custodian, the provider organisation responsible for keeping the true and accurate master record of that document or, at least, the underlying dataset from which it can be recreated. HPI number is used to identify the organisation.

\{custodian\} \rightarrow
custodian
templateId
  @root = 2.16.840.1.113883.2.18.7.5.10
assignedCustodian
  representedCustodianOrganization
    \{provider organisation\}

### 3.19 Confidentiality

Our CDA documents are all classified as having the same level of confidentiality, which means subject to the rules of the Health Information Privacy Code.

\{confidentiality\} \rightarrow
confidentialityCode = N (normal)

This element appears in the CDA document header only.
3.20 Document identity

We require every CDA document to have a unique Universally Unique Identifier (UUID) identifier, recorded in the document header.

{document identifier} →
  id
    @root : UUID

3.21 Versioning

A document can be versioned as the result of new information or correction. A version number in the header is a mandatory element of all document types subject to versioning. Successive revisions of a document increment the version number, while the UUID remains the same. Versions are numbered consecutively from one.

{version number} →
  versionNumber : integer