HL7 Clinical Document Architecture, Release 2.0

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1 CDA Overview

1.1 What is the CDA

The HL7 Clinical Document Architecture (CDA) is a document markup standard that specifies the structure and semantics of "clinical documents" for the purpose of exchange. A clinical document contains observations and services and has the following characteristics:

- Persistence – A clinical document continues to exist in an unaltered state, for a time period defined by local and regulatory requirements [1].
- Stewardship – A clinical document is maintained by an organization entrusted with its care.
- Potential for authentication - A clinical document is an assemblage of information that is intended to be legally authenticated.
- Context - A clinical document establishes the default context for its contents.
- Wholeness - Authentication of a clinical document applies to the whole and does not apply to portions of the document without the full context of the document.
- Human readability – A clinical document is human readable.

A CDA document is a defined and complete information object that can include text, images, sounds, and other multimedia content.

1.1.1 Key aspects of the CDA

Key aspects of the CDA include:

- CDA documents are encoded in Extensible Markup Language (XML).
- CDA documents derive their meaning from the HL7 Reference Information Model (RIM) and use the HL7 Version 3 Data Types.
- The CDA specification is richly expressive and flexible. Document-level, section-level and entry-level templates can be used to constrain the generic CDA specification (see The "A" in "CDA" (§ 1.2.2)).

1.1.2 Scope of the CDA

The scope of the CDA is the standardization of clinical documents for exchange.

The data format of clinical documents outside of the exchange context is not addressed in this specification.

The clinical content of CDA documents is defined in the RIM. CDA documents can be transmitted in HL7 messages designed to transfer clinical documents. The specification for such messages is outside the scope of the CDA, although this standard does specify how to package CDA documents within HL7 messages (see CDA Document Exchange in HL7 Messages (§ 2.2)).

The CDA does not specify the creation or management of documents, only their exchange markup. While it may be possible to directly use the CDA Schema in a document authoring environment, such use is outside the CDA specification.

Document management is critically interdependent with the CDA specifications, but the specification of document management messages is outside the scope of the CDA. (For more on this, see Relationship of the CDA to HL7 Messaging Standards (§ 1.2.6)).

1.1.3 Goals and Design Principles

The goals of the CDA are:

- Give priority to delivery of patient care.
- Allow cost effective implementation across as wide a spectrum of systems as possible.
- Support exchange of human-readable documents between users, including those with different levels of technical sophistication.
- Promote longevity of all information encoded according to this architecture.
- Enable a wide range of post-exchange processing applications.
- Be compatible with a wide range of document creation applications.
- Promote exchange that is independent of the underlying transfer or storage mechanism.
- Prepare the design reasonably quickly.
- Enable policy-makers to control their own information requirements without extension to this specification.

A number of design principles follow from consideration of the above goals:

- This architecture must be compatible with XML and the HL7 RIM
- Technical barriers to use of the architecture should be minimized.
- The architecture specifies the schemas required for exchange.
- The architecture should impose minimal constraints or requirements on document structure and content required for exchange.
- The architecture must be scalable to accommodate fine-grained markup such as highly structured text and coded data.
- Document specifications based on this architecture should accommodate such constraints and requirements as supplied by appropriate professional, commercial, and regulatory agencies.
- Document specifications for document creation and processing, if intended for exchange, should map to this exchange architecture.
- CDA documents must be human readable using widely-available and commonly-deployed XML-aware browsers and print drivers and a generic CDA style sheet written in a standard style sheet language.
- Use open standards.

1.2 General CDA Concepts

1.2.1 Major Components of a CDA Document

This section serves as a high-level introduction to the major components of a CDA document, all of which are described again and in greater detail later on. The intent here is to familiarize the reader with the high-level concepts to facilitate an understanding of the sections that follow.

Major components of a prototypic CDA document are shown in the following example.

A CDA document is wrapped by the <ClinicalDocument> element, and contains a header (see CDA Header (§ 2.3.2)) and a body (see CDA Body (§ 2.3.3)). The header lies between the <ClinicalDocument> and the <StructuredBody> elements, and identifies and classifies the document and provides information on authentication, the encounter, the patient, and the involved providers.

The body contains the clinical report, and can be either an unstructured blob, or can be comprised of structured markup. The example shows a structured body, which is wrapped by the <StructuredBody> element, and which is divided up into recursively nestable document sections.

A CDA document section is wrapped by the <Section> element. Each section can contain a single narrative block (see CDA Section Narrative Block (§ 2.3.3.5)), and any number of CDA entries (see CDA Entry Acts (§ 2.3.3.6)) and external references.

The CDA narrative block is wrapped by the <text> element within the <Section> element, and provides a slot for the human readable content needing to be rendered. See also Human Readability and Rendering CDA Documents (§ 1.2.3) and CDA Conformance (§ 1.3) for principles governing the representation of the narrative block, and conformance requirements on the part of originators when populating the block, and recipients when rendering it.

Within a document section, the narrative block represents content to be rendered, whereas CDA entries represent structured content provided for a computer. CDA entries encode content present in the narrative block of the same section. The example shows two <Observation> CDA entries, although several other CDA entries are defined.

CDA external references always occur within the context of a CDA entry, and are wrapped by the <reference> element. External references refer to things that exist outside the CDA document - such as some other image, some other procedure, or some other observation (which is wrapped by the <ExternalObservation> element). The CDA entry that wraps the external reference can be used to encode the specific portions of the external reference that are addressed in the narrative block.

Example 1: Major components of a CDA document

```
<ClinicalDocument>
  ... CDA Header ...
  <StructuredBody>
    <section>
       <text>...</text>
      <Observation>...</Observation>
      <Observation>
        <reference>
          <ExternalObservation>...</ExternalObservation>
        </reference>
      </Observation>
    </section>
    <section>
        <section>...</section>
    </section>
  </StructuredBody>
</ClinicalDocument>
```

1.2.2 The "A" in "CDA"

The notion of CDA "levels" in CDA, Release One anticipated a hierarchical set of XML DTDs or XML Schemas to achieve the goals enumerated above (see Goals and Design Principles (§ 1.1.3)). This hierarchy formed an "architecture", hence the "A" in "CDA".

While the notion of levels in CDA, Release Two remains constant, the approach to representing the hierarchies has changed. The current specification consists of a single CDA XML Schema, and the architecture arises from the ability to apply one or more of a hierarchical set of HL7 Templates, which serve to constrain the richness and flexibility of CDA.

NOTE: HL7 Templates are in a draft state at the time of this writing, therefore no definitive statements can be made regarding the mechanism by which CDA and HL7 Templates will interoperate. There are however, several ways by which CDA can be constrained today - by an approved HL7 mechanism (such as the creation of a derived static model) and/or by the creation of a local implementation guide (which may define constraints using a combination of narrative, constraining vocabulary tables, formal constraint rules, etc), and/or by the creation of a more constrained XML schema (for instance as described in Creating CDA Documents (§ 3.2.1)).

The RIM's InfrastructureRoot class contains an attribute, templateId, which is available for use in CDA. Thus, while HL7 Templates are in flux at this time, CDA provides a mechanism to reference a template or implementation guide that has been assigned a unique identifier. Until there is a formal HL7 Template specification, there is no universally guaranteed process to test conformance against referenced templates.

There is no requirement that CDA must be constrained in order to be used. However all implementations of CDA that make use of the structured data elements in this specification to drive automated processes shall be either: (1) constrained by an appropriately refined model or other HL7 approved constraint language; or (2) comply with a detailed implementation guide that details the manner in which structured elements are to be represented and their intended interpretation to a level sufficient to ensure a degree of clinical safety that is appropriate to the use case that it is designed to address.

The CDA specification permits the use of document codes and section codes. Thus, it is possible to differentiate a "Consultation Note" from a "Discharge Summary" because the two will have distinct document codes in the document instance. An HL7 Template provides a formal mechanism to say that a particular consultation note or discharge summary must contain certain sections, or that an assessment or plan section must contain certain observations.

There are many kinds of HL7 Templates that might be created. Among them, two are particularly relevant for clinical documents: (1) those that constrain the document sections based on the type of document (section-level templates); (2) those that constrain the entries within document sections (entry-level templates). In fact, a comparison can be made between the prior notion of CDA levels and the current notion of CDA with these two kinds of HL7 Templates:

Table 1: Evolution of CDA "levels" from CDA, Release One to CDA, Release Two

CDA, Release One	CDA, Release Two
CDA Level One	The unconstrained CDA specification.
CDA Level Two	The CDA specification with section-level templates applied.
CDA Level Three	The CDA specification with entry-level templates applied.

An illustration of one possible hierarchy of CDA plus HL7 Templates is shown here:

Example 2: Illustration of a possible CDA Document Hierarchy

```
CDA Schema
  CDA Schema :: Progress Note section-level template applied.
    CDA Schema :: Progress Note section-level and Vital Signs entry-level template applied.
      CDA Schema :: Endocrinology Progress Note section-level and Vital Signs entry-level template applied.
      CDA Schema :: Progress Note section-level and Intensive Care Unit Vital Signs entry-level template applied.
    CDA Schema :: Cardiology Progress Note section-level template applied
       CDA Schema :: Cardiology Progress Note section-level and Cardiac Physical Examination entry-level template
applied.
    CDA Schema :: Endocrinology Progress Note section-level template applied.
       CDA Schema :: Endocrinology Progress Note section-level and Vital Signs entry-level template applied.
```

1.2.3 Human Readability and Rendering CDA Documents

The CDA requirement for human readability guarantees that a receiver of a CDA document can algorithmically display the clinical content of the note on a standard Web browser. CDA, Release Two, with its blend of narrative and CDA entries, presents new challenges to this requirement.

Among the requirements affecting the design of CDA Release 2 are the following:

- There must be a deterministic way for a recipient of an arbitrary CDA document to render the attested content.
- Human readability shall not require a sender to transmit a special style sheet along with a CDA document. It must be possible to render all CDA documents with a single style sheet and general-market display tools.
- Human readability applies to the authenticated content. There may be additional information conveyed in the document that is there primarily for machine processing that is not authenticated and need not be rendered.
- When structured content is derived from narrative, there must be a mechanism to describe the process (e.g. by author, by human coder, by natural language processing algorithm, by specific software) by which machine-processable portions were derived from a block of narrative.
- When narrative is derived from structured content, there must be a mechanism to identify the process by which narrative was generated from structured data.

These principles and requirements have led to the current approach, where the material to be rendered is placed into the Section.text field (see CDA Section Narrative Block (§ 2.3.3.5)). The content model of this field is specially hand crafted to meet the above requirements, and corresponds closely to the content model of sections in CDA, Release One. Structured observations can reference narrative content in the Section.text field. Multimedia observations are encoded outside the Section.text field, and the <renderMultiMedia> tag within the Section.text field provides an outgoing pointer that indicates where the referenced multimedia should be rendered.

1.2.4 XML Markup of CDA Documents

XML markup of CDA documents is prescribed in this specification. CDA instances are valid against the CDA Schema and may be subject to additional validation (see CDA Conformance (§ 1.3)). There is no prohibition against multiple schema languages (e.g., W3C, DTD, RELAXNG), as long as conforming instances are compatible.

Design Principles of the CDA Schema include:

- **General Requirements:** The design of the CDA Schema follows the more general requirements for CDA (see Goals and Design Principles (§ 1.1.3)).
- **CDA Schema and V3 Implementation Technology Specification (ITS) :** The CDA Schema will follow the general V3 XML ITS.
- **RIM Mapping:** The CDA Schema describes the style of XML markup of CDA instances for the purpose of exchange. It cannot be understood outside the context of this defining specification including the normative R-MIM and Hierarchical Description.
  the same time, the CDA Schema should be evaluated on its own and is not intended to replicate or take the place of the R-MIM and HD. The CDA Schema, then, is not, in and of itself, an adequate map between conforming instance and the HL7 RIM. Semantic interoperability of CDA instances requires use and knowledge of the CDA Schema, R-MIM and HD as well as the corresponding RIM.
- **Document Analysis:** The CDA Schema and conformant instances should adhere to the requirements of document analysis in derivation of the content model.

  NOTE: Document analysis is a process that might be thought of as the document equivalent of a use case. Document analysis looks at a single instance or class of documents and analyzes their structure and content, often representing this is a tree structure "elm" notation. Document analysis also looks at the business rules for the lifecycle of that document or document class. Traditionally, document analysis determines the content model and overall structure and style of XML.

  Document analysis is an iterative step in content model derivation -- the "bottom up" approach to complement the "top down" derivation from the RIM. This will ensure that schemas and instances are not only RIM-derived, but represent recognizable artifacts in a simple manner.

- **Forward and Backward Compatibility:** The CDA Schema should adhere to the requirements for forward and backward compatibility. (See Backwards and Forwards Compatibility (§ 1.5))
- **Naming:** While XML markup, by definition, is for machine processing, it should be optimized for human review, debug, and design. The CDA Schema is not "self-documenting", but meaning should be clear from tag name and documentation (e.g., mapping to RIM). The human-language sense of a tag name should not be counterintuitive
- **Vocabulary:** Vocabulary can be enumerated within the CDA Schema or in an external, referenced source. It is preferable to enumerate it when the vocabulary terms are both limited (not too large in number) and stable (not subject to change between ballot cycles). Where vocabulary is either too large or is subject to change, it is preferable to maintain it external to the CDA Schema and incorporate it by reference. In these cases, XML validation will not suffice for conformance.

1.2.5 Security, Confidentiality, and Data Integrity

Application systems sending and receiving CDA documents are responsible for meeting all legal requirements for document authentication, confidentiality, and retention. For communications over public media, cryptographic techniques for source/recipient authentication and secure transport of encapsulated documents may be required, and should be addressed with commercially available tools outside the scope of this standard.

The CDA does provide confidentiality status information to aid application systems in managing access to sensitive data. Confidentiality status may apply to the entire document or to specified segments of the document.

1.2.6 Relationship of the CDA to HL7 Messaging Standards

A CDA document is a defined and complete information object that can exist outside of a messaging context and/or can be a MIME-encoded payload within an HL7 message (see CDA Document Exchange in HL7 Messages (§ 2.2)). Thus, the CDA complements HL7 messaging specifications.

Clinical documents can be revised, and they can be appended to existing documents. Ideally, an updated document would declare itself as obsolete, and would contain an explicit pointer to a more recent version. This would lessen the chances of a healthcare provider basing treatment decisions on erroneous or incomplete data.

In practice, however, it is impossible to guarantee an explicit forward pointer from an outdated version to the newer version. Without a process that tracks the chain of custody of clinical documents and all of their copies, there can be no way to guarantee that a clinical document being viewed has not been subsequently revised.

To minimize the risk of viewing superseded information, there is a critical interdependence between clinical documents and document management systems. If CDA documents are viewed outside the context of a document management system, it cannot be known with certainty whether or not the viewed document has been revised. HL7 messages that carry CDA documents (such as the MDM messages in HL7 V2.x and the **HL7 V3 Medical Records messages**) convey critical contextual information that ensures accurate viewing of clinical data.

1.3 CDA Conformance

NOTE: See HL7 V3 Refinement and Localization for a complete discussion of V3 conformance.

A conformant CDA document is one that at a minimum validates against the CDA Schema, and that restricts its use of coded vocabulary to values allowable within the specified vocabulary domains. However a computer cannot validate many aspects of conformance. The focus of this section is to highlight these aspects of CDA that cannot be machine validated - particularly those aspects related to the CDA human readability requirements.

A document originator is an application role that creates a CDA document. CDA documents can be created via transformation from some other format, as a direct output of an authoring application, etc. The document originator often is responsible for communicating with a persistent storage location, often using HL7 V2 MDM or **HL7 V3 Medical Records messages**. The document originator is responsible for ensuring that generated CDA documents are fully conformant to this specification.

A document recipient is an application role that receives status updates and documents from a document originator or document management system. The document recipient is responsible for ensuring that received CDA documents are rendered in accordance to this specification.

Because CDA is an exchange standard and may not represent the original form of a document, there are no persistent storage requirements for CDA documents defined in this standard. However, as noted below (see Relationship of the CDA to HL7 Messaging Standards (§ 1.2.6)), document management is critically interdependent with the CDA specification. The custodian identified in the CDA header (see CDA Header Participants (§ 2.3.2.2)) is the participant charged with maintaining the original document, which may be in some form other than CDA.

1.3.1 Recipient Responsibilities

- **Assume default values where they are defined in this specification, and where the instance does not contain a value** : Where CDA defines default values, the recipient must assume these values in the event that no value is contained in a CDA instance. This holds regardless of whether or not the CDA Schema supplies the recipient with the default values.
- **Parse and interpret the complete CDA header** : A recipient of a CDA document must be able to parse and interpret the complete CDA header. Because applications may choose to display demographic and other CDA header data drawn from a central master directory, the rendering of the CDA document header is at the discretion of the recipient.
- **Parse and interpret the CDA body sufficiently to be able to render it** : A recipient of a CDA document must be able to parse and interpret the body of a CDA document sufficiently to be able to render it, using the following rendering rules:
  - If the CDA Body is non-XML, it will need to be rendered with a software tool that recognizes its particular MIME media type.
  - If the CDA Body is structured, the label of a section, as conveyed in the Section.title component, must be rendered. The absence of the Section.title component signifies an unlabeled section.
  - If the CDA Body is structured, the contents of the Section.text field must rendered per the rules defined in CDA Section Narrative Block (§ 2.3.3.5).
- A recipient of a CDA document is not required to parse and interpret the complete set of CDA entries contained within the CDA body. Within a local implementation, trading partners may ascribe additional recipient responsibilities to parse and interpret various entries.
- A recipient of a CDA document is not required to validate a CDA document against referenced templates. Within a local implementation, trading partners may ascribe additional recipient responsibilities for template validation.

1.3.2 Originator Responsibilities

- **Properly construct CDA Narrative Blocks** : An originator of a CDA document must ensure that the attested portion of the document body is structured such that a recipient, adhering to the recipient responsibilities above, will correctly render the document. This includes:
  - If the CDA Body is structured, the label of a section must be conveyed in the Section.title component. The absence of the Section.title component signifies an unlabeled section.
  - If the CDA Body is structured, the narrative of each section, together with the multimedia content refererenced in the narrative, comprises the complete authenticated content of the section. The attested narrative contents of a section must be placed in the Section.text field, regardless of whether information is also conveyed in CDA entries within a section. Attested multimedia referenced in the narrative must be added as ObservationMedia and/or RegionOfInterest CDA entries.
  - If the CDA Body is structured, the contents of the Section.text field must be created per the rules defined in CDA Section Narrative Block (§ 2.3.3.5)
- An originator of a CDA document is not required to fully encode all narrative into CDA entries within the CDA body. Within a local implementation, trading partners may ascribe additional originator responsibilities to create various entries.

1.4 CDA Extensibility

NOTE: See XML ITS - Informal Extensions for a complete discussion of V3 XML Extensibility rules.

Locally-defined markup may be used when local semantics have no corresponding representation in the CDA specification. CDA seeks to standardize the highest level of shared meaning while providing a clean and standard mechanism for tagging meaning that is not shared. In order to support local extensibility requirements, it is permitted to include additional XML elements and attributes that are not included in the CDA schema. These extensions should not change the meaning of any of the standard data items, and receivers must be able to safely ignore these elements. Document recipients must be able to faithfully render the CDA document while ignoring extensions.

Extensions may be included in the instance in a namespace other than the HL7v3 namespace, but must not be included within an ED datatype (since the contents of an ED datatype within the conformant message may be in a different namespace). Since all conformant content (outside of elements of type ED) is in the HL7 namespace, the sender can put any extension content into a foreign namespace (any namespace other than the HL7 namespace). Receiving systems must not report an error if such extensions are present.

When these extension mechanisms mark up content of general relevance, HL7 encourages users to get their requirements formalized in a subsequent version of the standard so as to maximize the use of shared semantics.

1.5 Backwards and Forwards Compatibility

NOTE: A detailed list of all changes between CDA, Release One and CDA, Release Two can be found in the appendix (see Enumeration of Changes Between Release One and Release Two (§ 3.3)).

The basic model of CDA, Release Two is essentially unchanged. A CDA document has a header and a body. The body contains nested structures (such as sections). These structures can be coded using standard vocabularies, and can contain CDA entries. The main evolutionary steps in CDA, Release Two are that both header and body are fully RIM-derived, and there is a much richer assortment of entries to use within CDA structures. CDA, Release Two enables clinical content to be formally expressed to the extent that is it modeled in the RIM.

This section describes the types of changes that can be introduced to a new release of CDA and CDA principles of forward and backward compatibility. In general, changes can include the addition of new components; a renaming of components (including XML element and attribute names in the CDA Schema); a deprecation of components defined in a prior release; a change in cardinality of a component (either to tighten or to loosen); or a change in a vocabulary domain of a component (to add or change values, to change between CWE and CNE). The following set of guiding principles defines how CDA can continue to evolve, while protecting the investment implementers have made through their adoption of earlier releases.

- **Documentation** : A new release of CDA will enumerate all substantive changes from the previous release.
- **Attested content**: Attested, human readable content must be completely loss-less across CDA releases. Backwards and forwards compatibility on the attested content will be supported such that it will be possible for an automated transformation script to translate the human readable content in both directions.
- **New components** : A new release of CDA can introduce new components. To preserve roundtrip translation capability, a translation from the new release to a prior release must represent the new components as extensions (e.g. local markup or local namespace).
- **Renaming** : A new release of CDA can rename components (including XML element and attribute names). Where this occurs, a mapping table will list all changes. Renaming will adhere to the naming convention articulated above (see XML Markup of CDA Documents (§ 1.2.4)).
- **Deprecated components** : A new release of CDA can deprecate components defined in a prior release. Deprecated components will be removed from the subsequent release of the standard, and therefore their use is not recommended.
- **Cardinality** : A new release of CDA can change the cardinality of a component. Where an optional component becomes required, a translation between releases requires a dummy value or a null value.
- **Changes to vocabulary domain** : A new release of CDA can change the vocabulary domain of a component. Where this occurs, a mapping table will list changes.
- **Change within CNE** : Where a value in a CNE domain in a prior release is no longer present or has been renamed, a mapping table will indicate what the current value should be.
- **Change within CWE** : When a CWE domain is expanded, users should begin using the new codes in addition to any equivalent local codes they may already be using.
- **Change from CWE to CNE** : To preserve roundtrip translation capability, a translation between releases must represent unrecognized components as extensions (e.g. local markup or local namespace). Ideally these situations will surface during a ballot cycle, allowing the CNE domain to be sufficiently inclusive.

These guiding principles have lead to the current approach, defined in this Release Two of the CDA standard. The goal is to ensure that the documents created using Release One can be transformed into minimally compliant Release Two instances and that Release Two documents received can be down-translated to Release One instances using automated means (transformations) with no loss of attested, human-readable content and known limitation on loss of universal processing semantics.

2 CDA Technical Specifications

2.1 Introduction to CDA Technical Artifacts

A complete understanding of CDA requires an understanding of the normative artifacts used to define the specification. **The CDA Hierarchical Description is the definitive source for CDA conformance rules**, and serves as the source from which the CDA Schema is derived. While a CDA instance must validate against the CDA Schema, it must also adhere to the conformance rules stated in the CDA Hierarchical Description. The CDA Hierarchical Description is derived from the CDA R-MIM, which in turn is derived from the HL7 Reference Information Model (RIM). The HL7 RIM is the definitive source for class and attribute definitions.

The following sections summarize the artifacts used by CDA, and how they can be used by those seeking to implement or understand the CDA specification.

2.1.1 HL7 Reference Information Model

The definitive description of the HL7 Reference Information Model can be found here.

The HL7 RIM is the definitive reference source for class and attribute definitions. The CDA specification does not exhaustively replicate RIM definitions, but instead refers the reader to the RIM for complete definitions. While CDA may further constrain RIM definitions, at no time will CDA definitions conflict with those in the RIM.

CDA, Release Two is derived from HL7 RIM, Version 2.03.

Where a reader needs to see the complete definition of a RIM attribute or class, they should refer to the HL7 RIM.

2.1.2 HL7 V3 Data Types

HL7 defines both an abstract data type specification, which is the definitive reference, and an XML-specific data type representation.

Data types define the structural format of the data carried within a RIM attribute and influence the set of allowable values an attribute may assume. Some data types have very little intrinsic semantic content. However HL7 also defines more extensive data types such as the one for an entity's name. Every attribute in the RIM is associated with one and only one data type.

CDA, Release Two is based on the HL7 V3 Data Types, Release One abstract and XML-specific specification.

A reader will often find that the XML-specific description of a data type is sufficient for implementation, but at times will want to refer to the abstract data type specification for a more comprehensive discussion.

2.1.3 HL7 Vocabulary Domains

The definitive description of HL7 V3 Vocabulary Domains can be found here.

Vocabulary domains represent value sets for coded CDA components. These domains can include HL7-defined concepts or can be drawn from HL7-recognized coding systems such as LOINC or SNOMED. The HL7 Vocabulary chapter is the definitive reference source for the definitions of HL7-defined concepts. While CDA may further constrain these definitions, at no time will CDA definitions conflict with those in the Vocabulary chapter.

Vocabulary domains have a coding strength that can be "Coded, No Extensions" (CNE), in which case the only allowable values for the CDA component are those in the vocabulary domain; or "Coded, With Extensions" (CWE), in which case values other than those in the vocabulary domain (such as local codes) can be used if necessary. Every vocabulary domain has a unique HL7-assigned identifier, and every concept within a vocabulary domain has a unique code.

Where a coded CDA component is associated with a CNE value set, the allowable values are fixed by the standard, and are enumerated as shown in the following example:

Table 2: Value set for relatedDocument.typeCode (CNE)

Code	Definition
APND (append)	The current document is an addendum to the ParentDocument.
RPLC (replace)	The current document is a replacement of the ParentDocument.
XFRM (transform)	The current document is a transformation of the ParentDocument.

A number of vocabulary domains and coding systems already in existence (e.g., LOINC, SNOMED) may be used to encode concepts in CDA documents (e.g., Section.code, Observation.code). These domains are referenced as external domains according to HL7 V3 processes. Where a coded CDA component is associated with a CWE value set, preferred values may be specified by the standard (such as for ClinicalDocument.code or for ClinicalDocument.confidentialityCode). Where the standard does not enumerate any values, the implementor is free to choose from any external source, such as LOINC or SNOMED or some other realm-specific vocabulary.

Where a reader needs to see the complete definition of an HL7-defined value, they should refer to the HL7 Vocabulary chapter.

2.1.4 HL7 CDA R-MIM

The definitive description of HL7 V3 model refinement, R-MIM development and interpretation can be found here.

The CDA R-MIM is described below (see CDA R-MIM (§ 2.3)).

Model refinement is used to constrain the RIM and arrive at the R-MIM, through a process know as "cloning". When a refined model (e.g., an R-MIM) uses a class from the base model (e.g., the HL7 RIM), that class in the refined model is referred to as a "clone". The clone is a specialization of the base class, where for instance attribute cardinalities or coded value sets have been constrained. Multiple clones of a particular base class may appear in a refined model, each representing a different specialization.

The CDA R-MIM is a graphical representation of the CDA specification. It is presented using diagramming conventions and notations that were developed by HL7 to represent the specific semantic constructs contained in the critical, "back-bone" classes of the RIM. Although it could be represented in UML notation, as the RIM is, the HL7 notation provides more details about the specific constraints and class clones being represented. The HL7 diagramming convention abbreviates some relationship conventions, enabling diagrams to be smaller and more concise and to convey more information visually.

The CDA R-MIM is a graphical aid to understanding the specification. Because the CDA Hierarchical Description, and subsequently the CDA Schema, are derived from the R-MIM, the R-MIM serves as a good basis for describing the standard. The narrative description of the specific clones used by CDA is organized to correspond with the R-MIM.

2.1.5 HL7 CDA Hierarchical Description

The definitive description of HL7 Hierarchical Description development and interpretation can be found here.

The CDA HD is described below (see CDA Hierarchical Description (§ 2.4)).

A Hierarchical Description is a tabular representation of the sequence of elements (i.e., classes, attributes and associations) represented in an R-MIM and that define the structure of the instance without reference to XML or any other implementation technology.

The CDA HD is the definitive source for CDA conformance rules, and serves as the source from which the CDA Schema is derived. While a CDA instance must validate against the CDA Schema, it must also adhere to the conformance rules stated in the CDA Hierarchical Description. For CDA, Release Two, the CDA HD is uniquely identified by the string "POCD_HD000020". As described below (see Clinical Document (§ 2.3.1)), this value must be included in a CDA instance to serve as an unambiguous reference to the CDA, Release Two specification.

The CDA HD is required reading for anyone implementing the CDA specification.

2.1.6 HL7 CDA Schema

The definitive description of HL7 XML Implementation Technology Specification and the process used to go from Hierarchical Description to Schema can be found here.

The CDA Schema is described below (see CDA Schema (§ 2.5)).

CDA, Release Two is based on the HL7 V3 XML Implementable Technology Specification for V3 Structures, Release One.

Specific enhancements to the CDA Schema, above and beyond those defined in the HL7 V3 XML ITS, are described below in CDA Schema (§ 2.5).

Looking at the CDA R-MIM, a reader can typically identify the corresponding XML elements and attributes. Where the correspondence is unclear, the reader should refer to the HL7 V3 XML ITS.

2.2 CDA Document Exchange in HL7 Messages

From the perspective of a V2.x or V3 message, a CDA document is a multimedia object than can be exchanged as a Multipurpose Internet Mail Extensions (MIME, RFC 2046) package, encoded as an encapsulated data type (ED).

Any CDA exchange strategy, such as MIME must accommodate the following requirements:

- There is no need to change any of the references within the base CDA document when creating the exchange package.
- There is no need to change any of the references within the base CDA document when extracting the contents of an exchange package.
- All components of a CDA document that are integral to its state of wholeness (such as a non-XML body or an ObservationMedia) are able to be included in a single exchange package.
- There are no restrictions on the directory structure used by receivers. Receivers can place the components of the CDA document into directories of their choosing.

> **NOTE:** An exchanged package should typically include all the authenticated content (e.g. base document and authenticated multimedia) and content needing to be rendered if exchanging across a firewall where the links won't be traversable.

The current recommendation is to follow the approach described in the Internet standard RFC 2557 "MIME Encapsulation of Aggregate Documents, such as HTML (MHTML)", which is the approach for the MIME encapsulations of aggregate documents used by ebXML and DICOM.

In V2.x, CDA documents are to be exchanged in the OBX segment, in any message that can exchange documents (such as MDM). Within the OBX segment, the MIME package is placed in OBX.5 (Field 00573 Observation value), encoded as a V2.x encapsulated data type. The value of OBX.2 (Field 00570 Value Type) should be set to "ED". The value of OBX.3 should be the same as ClinicalDocument.code.

Many fields in the message will overlap in meaning with fields in the CDA document. The following table shows the correspondence between the HL7 V2 MDM message's TXA segment and components of CDA.

Table 3: HL7 V2 TXA Segment :: CDA Mapping

TXA Field	CDA Component
TXA-2 Document type	ClinicalDocument.code
TXA-4 Activity date/time	Event.effectiveTime
TXA-5 Primary activity provider code/name	responsibleParty
TXA-6 Origination date/time	ClinicalDocument.effectiveTime
TXA-7 Transcription date/time	dataEnterer.time
TXA-9 Originator code/name	author

TXA-11 Transcriptionist code/name	dataEnterer
TXA-12 Unique document number	ClinicalDocument.id
TXA-13 Parent document number	ParentDocument.id
TXA-18 Document confidentiality status	ClinicalDocument.confidentialityCode
TXA-22 Authentication person, time stamp	authenticator, legalAuthenticator
TXA-23 Distributed copies	informationRecipient

The following example shows a non-normative, valid use of RFC 2557 in a V2 message. Several other valid representations are possible.

Example 3: Example of a CDA document in an MDM message

```
MSH|...
EVN|...
PID|...
PV1|...
TXA|...
OBX|1|ED|11492-6^History and Physical^LN||
        ^multipart^related^A^
        MIME-Version: 1.0
        Content-Type: multipart/related; boundary="HL7-CDA-boundary";
        type="text/xml"; start="10.12.45567.43"
        Content-Transfer-Encoding: BASE64

        --HL7-CDA-boundary
        Content-Type: text/xml; charset="US-ASCII"
        Content-ID: <10.12.45567.43>

        ... Base 64 of of base CDA document, which contains
                ...
                <ObservationMedia>
                        <id root="10.23.4567.345"/>
                        <value mediaType="image/jpeg>
                        <reference value="canned_left_hand_image.jpeg"/>
                        </value>
                </ObservationMedia>
                ...

        --HL7-CDA-boundary
        Content-ID: <10.23.4567.345>
        Content-Location: canned_left_hand_image.jpeg
        Content-Type: image/JPEG

        ... Base64 image ...

        --HL7-CDA-boundary--

        ...
```

In V3, CDA documents can be exchanged in any message that can exchange documents (such as the **HL7 V3 Medical Records messages**). The Act.text RIM attribute contains the MIME package, encoded as an encapsulated data type.

Because the V3 Medical Records messages and CDA derive from a common model, many fields in the message will overlap in meaning with fields in the CDA document. The following table shows the correspondence between the HL7 V3 Medical Records message and components of CDA.

Table 4: HL7 V3 Medical Records :: CDA Mapping

HL7 V3 Medical Records Component	CDA Component	Comments
ClinicalDocument	ClinicalDocument	Medical Records includes attributes not present in CDA (text, statusCode, availabilityTime, reasonCode, completioncode, storageCode, copyTime); CDA includes attributes not present in Medical Records (title).
authenticator	authenticator	
legalAuthenticator	legalAuthenticator	
dataEnterer	dataEnterer	
encounterPerformer	encounterPerformer	

responsibleParty	responsibleParty	
custodian	custodian	
participant	participant	
informationRecipient	informationRecipient	
recordTarget	recordTarget	
author	author	
subject	subject	The Medical Records subject is a directory of all subjects listed in the document.
relatedDocument / ParentDocument	relatedDocument / ParentDocument	
documentationOf / Event	documentationOf / Event	

inFulfillmentOf / Order	inFulfillmentOf / Order	

The following example shows a non-normative, valid use of RFC 2557 in a V3 message. Several other valid representations are possible.

Example 4: Example of a CDA document in a Version 3 message

```
<someMessage>
  <Act.Code code="11488-4"
 codeSystem="2.16.840.1.113883.6.1" displayName="Consultation note"/>
  <Act.text type="multipart/related">
MIME-Version: 1.0
Content-Type: multipart/related; boundary="HL7-CDA-boundary";
type="text/xml"; start="10.12.45567.43"
Content-Transfer-Encoding: BASE64

--HL7-CDA-boundary
Content-Type: text/xml; charset="US-ASCII"
Content-ID: <10.12.45567.43>

... Base 64 of of base CDA document, which contains
  ...
  <ObservationMedia>
    <id root="10.23.4567.345"/>
    <value mediaType="image/jpeg>
      <reference value="canned_left_hand_image.jpeg"/>
    </value>
  </ObservationMedia>
  ...

--HL7-CDA-boundary
Content-ID: <10.23.4567.345>
Content-Location: canned_left_hand_image.jpeg
Content-Type: image/JPEG

... Base64 image ...

--HL7-CDA-boundary--

      </Act.text>
    </someMessage>
```

2.3 CDA R-MIM

NOTE: The definitive description of HL7 V3 model refinement, R-MIM development and interpretation can be found here.

The CDA R-MIM POCD_RM000020 can be found here: Link to graphic (opens in a new window)

A CDA document is comprised of a header and a body. The header identifies and classifies the document; provides information on authentication, the encounter, the patient, and the provider; and sets the context for the document as a whole. The body contains the clinical report, and is conceptually divided up into body structures, body entries, and external references.

2.3.1 Clinical Document

The ClinicalDocument class is the entry point into the CDA R-MIM, and corresponds to the <ClinicalDocument> XML element that is the root element of a CDA document.

A CDA document is logically broken up into a CDA Header and a CDA Body. The CDA Header is comprised of ClinicalDocument attributes, participants, and act relationships other than the component relationship. The CDA Body is the target of the ClinicalDocument component act relationship.

The ClinicalDocument class (along with all other classes derived from the RIM's Act, ActRelationship, Participation, Role, and Entity classes) inherits various attributes from the InfrastructureRoot class of the RIM, including ClinicalDocument.templateId, ClinicalDocument.typeId. When ClinicalDocument.templateId is valued in an instance, it signals the imposition of a set of template-defined constraints. The value of this attribute provides a unique identifier for the template(s) in question.

ClinicalDocument.typeId is a technology-neutral explicit reference to this CDA, Release Two specification, and must be valued as follows: ClinicalDocument.typeId.Root = "2.16.840.1.113883.1.3" (which is the OID for HL7 Registered models); ClinicalDocument.typeId.Extension = "POCD_HD000020" (which is the unique identifier for the CDA, Release Two Hierarchical Description).

2.3.2 CDA Header

The purpose of the CDA header is to enable clinical document exchange across and within institutions; facilitate clinical document management; and facilitate compilation of an individual patient's clinical documents into a lifetime electronic patient record.

2.3.2.1 CDA Header Attributes

This section describes attributes of the root ClinicalDocument class.

Table 5: Value set for ClinicalDocument.classCode (CNE)

Code	Definition
DOCCLIN [**default**]	A clinical document is a documentation of clinical observations and services, as defined in .

Table 6: Value set for ClinicalDocument.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	An actual occurrence of an event.

ClinicalDocument.id — Represents the unique instance identifier of a clinical document.

ClinicalDocument.code — The code specifying the particular kind of document (e.g. History and Physical, Discharge Summary, Progress Note). These values are preferentially drawn from LOINC.

Within the LOINC database, beginning with version 2.09, May 2003, document type codes are those that have a value of "DOC" in the Scale component. This subset of LOINC is included in the appendix (see LOINC Document Codes (§ 3.2.2)).

> **NOTE:** The hierarchical relationship among LOINC document codes is in evolution. Per the LOINC version 2.12 (February 2004) manual: As soon as possible, the component terms used in the creation of the names of document type codes will be mapped to either the UMLS Metathesaurus or SNOMED CT. This mapping will help to establish the meaning of the terms and will allow aggregation and classification of document type codes based on definitions, computable relationships, and subsumption hierarchies that exist in the reference terminology.

ClinicalDocument.title — Represents the title of the document. It's commonly the case that clinical documents do not have a title, and are collectively referred to by the display name of ClinicalDocument. code (e.g. a "consultation" or "progress note"). Where these display names are rendered to the clinician, or where the document has a unique title, the ClinicalDocument.title component should be used. In the example document in the appendix (see Sample Document (§ 3.1.1)), the value of ClinicalDocument.title = "Good Health Clinic Consultation Note".

ClinicalDocument.effectiveTime — Signifies the document creation time, when the document first came into being.

ClinicalDocument.confidentialityCode — Confidentiality is a contextual component of CDA, where the value expressed in the header holds true for the entire document, unless overridden by a nested value (as further described in CDA Context (§ 2.3.4)).

Table 7: Value set for ClinicalDocument.confidentialityCode (CWE)

Code *	Definition
N (normal) (codeSystem 2.16.840.1.113883.5.25) [**default**]	Normal confidentiality rules (according to good health care practice) apply. That is, only authorized individuals with a legitimate medical or business need may access this item.
R (restricted) (codeSystem 2.16.840.1.113883.5.25)	Restricted access, e.g. only to providers having a current care relationship to the patient.
V (very restricted) (codeSystem 2.16.840.1.113883.5.25)	Very restricted access as declared by the Privacy Officer of the record holder.

* The codeSystem value is included here because confidentialityCode is of type CE, and therefore must carry both a code and a codeSystem.

ClinicalDocument.languageCode — Specifies the human language of character data (whether they be in contents or attribute values). The values of the attribute are language identifiers as defined by the IETF (Internet Engineering Task Force) RFC 3066 for the Identification of Languages, ed. H. Alvestrand. 1995 (), which obsoletes RFC 1766. Language is a contextual component of CDA, where the value expressed in the header holds true for the entire document, unless overridden by a nested value (as further described in CDA Context (§ 2.3.4)).

ClinicalDocument.setId — Represents an identifier that is common across all document revisions.

ClinicalDocument.versionNumber — An iteger value used to version successive replacement documents.

ClinicalDocument.copyTime (Deprecated) — Represents the time a document is released (i.e. copied or sent to a display device) from a document management system that maintains revision control over the document. Once valued, it cannot be changed. The intent is to give the viewer of the document some notion as to how long the document has been out of the safe context of its document management system.

Included for backwards compatibility with CDA, Release One. ClinicalDocument.copyTime has been deprecated because it is not part of the document at the time it is authenticated, but instead represents metadata about the document, applied at some variable time after authentication. Further use is discouraged.

2.3.2.2 CDA Header Participants

This section describes classes related to the root ClinicalDocument class via a Participation.

Several CDA Header participations can be played by the same person. In such cases, the person should be identified as the player for each appropriate participation. For instance, if a person is both the author and the authenticator of a document, the CDA Header should identify that person as both the author participant and the authenticator participant.

On other occasions, CDA Header participants are played by different people. The following table shows a number of scenarios and the values for author, authenticator, legal authenticator, responsible party, and encounter performer. Note that the ability of one clinician to sign on behalf of another clinician is subject to regulatory and local practice constraints.

Table 8: CDA authorship and authentication scenarios

StaffPhysicianOne sees a patient, dictates a note, and later signs it.
• Author — StaffPhysicianOne • Authenticator — null (need not be included) • Encounter Performer — StallPhysicianOne • Legal Authenticator — StaffPhysicianOne • Responsible Party — StaffPhysicianOne
StaffPhysicianOne sees a patient and dictates a note. StaffPhysicianTwo later signs the note.
• Author — StaffPhysicianOne • Authenticator — null (need not be included) • Encounter Performer — StaffPhysicianOne • Legal Authenticator — StaffPhysicianTwo • Responsible Party — StaffPhysicianOne
ResidentOne sees a patient with StaffPhysicianOne. ResidentOne dictates a note and later signs it. The note is co-signed by StaffPhysicianOne
• Author — ResidentOne • Authenticator — ResidentOne • Encounter Performer — ResidentOne, StaffPhysicianOne • Legal Authenticator — StaffPhysicianOne • Responsible Party — StaffPhysicianOne
ResidentOne sees a patient with StaffPhysicianOne. ResidentOne dictates a note and later signs it. The note is co-signed by StaffPhysicianTwo.

- Author: — ResidentOne
- Authenticator — ResidentOne
- Encounter Performer — ResidentOne, StaffPhysicianOne
- Legal Authenticator — StaffPhysicianTwo
- Responsible Party — StaffPhysicianOne

ResidentOne sees a patient with StaffPhysicianOne. ResidentOne dictates a note, and goes off on vacation. The note is signed by ResidentTwo and by StaffPhysicianOne.

- Author — ResidentOne
- Authenticator — ResidentTwo
- Encounter Performer — ResidentOne, StaffPhysicianOne
- Legal Authenticator — StaffPhysicianOne
- Responsible Party — StaffPhysicianOne

ResidentOne sees a patient with StaffPhysicianOne. ResidentOne dictates a note, which is later signed by ResidentTwo and StaffPhysicianTwo.

- Author — ResidentOne
- Authenticator — ResidentTwo
- Encounter Performer — ResidentOne, StaffPhysicianOne
- Legal Authenticator — StaffPhysicianTwo
- Responsible Party — StaffPhysicianOne

StaffPhysicianOne receives an abnormal lab result, attempts to contact patient but can't, and writes and signs a progress note.

- Author — StaffPhysicianOne
- Authenticator — null (need not be included)
- Encounter Performer — null (need not be included)
- Legal Authenticator — StaffPhysicianOne
- Responsible Party — StaffPhysicianOne

ResidentSurgeonOne is operating on a patient with StaffSurgeonOne. StaffSurgeonOne dictates an operative report,.
• Author — StaffSurgeonOne • Authenticator — null (need not be included) • Encounter Performer — ResidentSurgeonOne, StaffSurgeonOne • Legal Authenticator — StaffSurgeonOne • Responsible Party — StaffSurgeonOne

authenticator — Represents a participant who has attested to the accuracy of the document, but who does not have privileges to legally authenticate the document. An example would be a resident physician who sees a patient and dictates a note, then later signs it.

A clinical document can have zero to many authenticators. Each authenticator has a required authentication. time.

Table 9: Value set for authenticator.typeCode (CNE)

Code	Definition
AUTHEN (authenticator) [**default**]	A verifier who attests to the accuracy of an act, but who does not have privileges to legally authenticate the act.

Table 10: Value set for authenticator.signatureCode (CNE)

Code	Definition
S (signed) [**default**]	Signature has been affixed and is on file.

An authenticator is a person in the role of an assigned entity (AssignedEntity class). The entity playing the role is a person (Person class). The entity scoping the role is an organization (Organization class).

Table 11: Value set for AssignedEntity.classCode (CNE)

Code	Definition
ASSIGNED (Assigned) [**default**]	An agent role in which the agent is an entity acting in the employ of an organization. The focus is on the functional role on behalf of the organization.

Table 12: Value set for Person.classCode (CNE)

Code	Definition
PSN (person) [**default**]	A living subject of the species homo sapiens.

Table 13: Value set for Person.determinerCode (CNE)

Code	Definition
INSTANCE (instance) [**default**]	The specific determiner indicates that the given Entity is taken as one specific thing instance. For example, a human INSTANCE (quantity = 1,) stands for exactly one human being.

Table 14: Value set for Organization.classCode (CNE)

Code	Definition
ORG (organization) [**default**]	A social or legal structure formed by human beings.

Table 15: Value set for Organization.determinerCode (CNE)

Code	Definition
INSTANCE (Assigned) [**default**]	The specific determiner indicates that the given Entity is taken as one specific thing instance. For example, a human INSTANCE (quantity = 1,) stands for exactly one human being.

author — Represents the humans and/or machines that authored the document.

In some cases, the role or function of the author is inherent in the ClinicalDocument.code, such as where ClinicalDocument.code is "Medical Student Progress Note". The role of the author can also be recorded in the author.functionCode or assignedEntity.code attribute. If either of these attributes is included, they should be equivalent to or further specialize the role inherent in the ClinicalDocument.code (such as where the ClinicalDocument.code is simply "Physician Progress Note" and the value of author.functionCode is "rounding physician"), and shall not conflict with the role inherent in the ClinicalDocument.code, as such a conflict would constitute an ambiguous situation.

Table 16: Value set for author.typeCode (CNE)

Code	Definition
AUT (author) [**default**]	A party that originates the Act and therefore has responsibility for the information given in the Act and ownership of this Act.

Table 17: Value set for author.contextControlCode (CNE)

Code	Definition
OP (overriding propagating) [**default**]	The participant overrides associations with the same or more specific typeCode. This overriding association will propagate to any descendant Acts reached by conducting ActRelationships. (See)

An author is a person in the role of an assigned author (AssignedAuthor class). The entity playing the role is a person (Person class) or a device (AuthoringDevice class). The entity scoping the role is an organization (Organization class).

Table 18: Value set for AssignedAuthor.classCode (CNE)

Code	Definition
ASSIGNED (assigned entity) [**default**]	A role in which the playing entity is acting in the employ of or on behalf of a scoping organization.

Table 19: Value set for AuthoringDevice.classCode (CNE)

Code	Definition
DEV (device) [**default**]	An entity used in an activity, without being substantially changed through that activity.

Table 20: Value set for AuthoringDevice.determinerCode (CNE)

Code	Definition
INSTANCE (Assigned) [**default**]	The specific determiner indicates that the given Entity is taken as one specific thing instance. For example, a human INSTANCE (quantity = 1,) stands for exactly one human being.

NOTE: In CDA, Release One, it was possible to specify those individuals responsible for the device. This functionality has been deprecated in CDA, Release Two. The MaintainedEntity class is present for backwards compatibility, and its use is discouraged, except where needed to support the transformation of CDA, Release One documents.

Table 21: Value set for MaintainedEntity.classCode(CNE)

Code	Definition
MNT (maintained entity) [**default**]	An entity that is maintained by another entity. This is typical role held by durable equipment. The scoper assumes responsibility for proper operation, quality, and safety.

custodian — Represents the organization from which the document originates and that is in charge of maintaining the document. The custodian is the steward that is entrusted with the care of the document. Every CDA document has exactly one custodian.

The custodian participation satisfies the CDA definition of Stewardship (see What is the CDA (§ 1.1)). Because CDA is an exchange standard and may not represent the original form of the authenticated document, the custodian represents the steward of the original source document.

Table 22: Value set for custodian.typeCode (CNE)

Code	Definition
CST (custodian) [**default**]	An organization who is in charge of maintaining the information of this service object (e.g., who maintains the report or the master service catalog item, etc.).

A custodian is an organization in the role of an assigned custodian (AssignedCustodian class). The steward organization (CustodianOrganization class) is an entity scoping the role of AssignedCustodian, and has a required CustodianOrganization.id.

Table 23: Value set for AssignedCustodian.classCode (CNE)

Code	Definition
ASSIGNED (assigned entity) [**default**]	A role in which the playing entity is acting in the employ of or on behalf of a scoping organization.

Table 24: Value set for CustodianOrganization.classCode (CNE)

Code	Definition
ORG (organization) [**default**]	A social or legal structure formed by human beings.

Table 25: Value set for CustodianOrganization.determinerCode (CNE)

Code	Definition
INSTANCE (Assigned) [**default**]	The specific determiner indicates that the given Entity is taken as one specific thing instance. For example, a human INSTANCE (quantity = 1,) stands for exactly one human being.

dataEnterer (Transcriptionist)

Represents the participant who has transformed a dictated note into text.

Table 26: Value set for dataEnterer.typeCode (CNE)

Code	Definition
ENT (transcriptionist) [**default**]	A person entering the data into the originating system. The data entry person is collected optionally for internal quality control purposes. This includes the transcriptionist for dictated text.

Table 27: Value set for dataEnterer.contextControlCode (CNE)

Code	Definition
OP (overriding propagating) [**default**]	The participant overrides associations with the same or more specific typeCode. This overriding association will propagate to any descendant Acts reached by conducting ActRelationships. (See)

A person entering the data into the originating system. The data entry person is collected optionally for internal quality control purposes. This includes the transcriptionist for dictated text.

informant — An informant (or source of information) is a person that provides relevant information, such as the parent of a comatose patient who describes the patient's behavior prior to the onset of coma.

Table 28: Value set for informant.typeCode (CNE)

Code	Definition
INF (informant) [**default**]	A source of reported information (e.g., a next of kin who answers questions about the patient's history). For history questions, unless otherwise stated, the patient is implicitly the informant.

Table 29: Value set for informant.contextControlCode (CNE)

Code	Definition
OP (overriding propagating) [**default**]	The participant overrides associations with the same or more specific typeCode. This overriding association will propagate to any descendant Acts reached by conducting ActRelationships. (See)

An informant can be a person in one of two roles. The RelatedEntity role is used to represent an informant without a role.id (e.g. a parent or guy on the street). The informant in this case bears some formal or personal relationship to the patient. The role is unscoped, with the assumption that the patient is always the implied scoper. RelatedEntity.code can be used to specify the nature of the relationship. The AssignedEntity role is used for an identified informant, and is scoped by an Organization.

Table 30: Value set for RelatedEntity.classCode (CNE)

Code	Definition
Any subtype of RoleClassMutualRelationship	A role of an entity that has some mutual relationship with the patient. The basis of such relationship may be agreements (e.g., spouses, contract parties) or they may be de facto behavior (e.g. friends) or may be an incidental involvement with each other (e.g. parties over a dispute, siblings, children).

informationRecipient — Represents a recipient who should receive a copy of the document.

> **NOTE:** The information recipient is an entity to whom a copy of a document is directed, at the time of document authorship. It is not the same as the cumulative set of persons to whom the document has subsequently been disclosed, over the life-time of the patient. Such a disclosure list would not be contained within the document, and it outside the scope of CDA.

Table 31: Value set for informationRecipient.typeCode (CNE)

Code	Definition
PRCP (primary recipient) [**default**]	Recipient to whom the document is primarily directed.
TRC (secondary recipient)	A secondary recipient to whom the document is directed.

An informationRecipient is an entity in the role of intended recipient (IntendedRecipient class). The entity playing the role is a person (Person class) or a health chart (HealthChart class). The entity scoping the role is an organization (Organization class).

Table 32: Value set for IntendedRecipient.classCode (CNE)

Code	Definition
ASSIGNED (assigned entity) [**default**]	A role in which the playing entity is acting in the employ of or on behalf of a scoping organization.
HLTHCHRT (health chart)	A role in which the playing entity is a physical health chart belonging to the scoping organization.

Table 33: Value set for HealthChart.classCode (CNE)

Code	Definition
HCE (organization) [**default**]	A health chart included to serve as a document receiving entity in the management of medical records.

Table 34: Value set for HealthChart.determinerCode (CNE)

Code	Definition
INSTANCE (Assigned) [**default**]	The specific determiner indicates that the given Entity is taken as one specific thing instance. For example, a human INSTANCE (quantity = 1) stands for exactly one human being.

When the intended recipient is an organization, the value for IntendedRecipient.classCode is "ASSIGNED", and the recipient is reflected by the presence of a scoping Organization, without a playing entity.

legalAuthenticator — Represents a participant who has legally authenticated the document.

The CDA is a standard that specifies the structure of exchanged clinical documents. In the case where a local document is transformed into a CDA document for exchange, authentication occurs on the local document, and that fact is reflected in the exchanged CDA document. A CDA document can reflect the unauthenticated, authenticated, or legally authenticated state. The unauthenticated state exists when no authentication information has been recorded (i.e., it is the absence of being either authenticated or legally authenticated).

Both authentication and legal authentication require that a document has been signed manually or electronically by the responsible individual. While electronic signatures are not captured in a CDA document, the header does require documentation of whether signature has been acquired, via the legalAuthenticator. signatureCode component, which can distinguish between intended, and actual authenticators. A value of "S" (default) indicates that the signature has been obtained and is on file.

Table 35: Value set for legalAuthenticator.typeCode (CNE)

Code	Definition
LA (legal authenticator) [**default**]	A verifier who legally authenticates the accuracy of an act. An example would be a staff physician who sees a patient and dictates a note, then later signs it. Their signature constitutes a legal authentication.

Table 36: Value set for legalAuthenticator.signatureCode (CNE)

Code	Definition
S (signed) [**default**]	Signature has been affixed and is on file.

Table 37: Value set for legalAuthenticator.contextControlCode (CNE)

Code	Definition
OP (overriding propagating) [**default**]	The participant overrides associations with the same or more specific typeCode. This overriding association will propagate to any descendant Acts reached by conducting ActRelationships. (See)

A legalAuthenticator is a person in the role of an assigned entity (AssignedEntity class). The entity playing the role is a person (Person class). The entity scoping the role is an organization (Organization class).

participant — Used to represent other participants not explicitly mentioned by other classs, that were somehow involved in the documented acts.

Table 38: Value set for participant.typeCode (CNE)

Code	Definition
Any ParticipationType value	

Table 39: Value set for participant.signatureCode (CNE)

Code	Definition
S (signed)	Signature has been affixed and is on file.
I (intended)	The particpant intends to provide a signature.

X (required)	A signature for the service is required of this actor.

Table 40: Value set for participant.contextControlCode (CNE)

Code	Definition
OP (overriding propagating) [**default**]	The participant overrides associations with the same or more specific typeCode. This overriding association will propagate to any descendant Acts reached by conducting ActRelationships. (See)

A participant is a person or organization in the role of a participating entity (ParticipatingEntity class). The entity playing the role is a person (Person class). The entity scoping the role is an organization (Organization class).

Table 41: Value set for ParticipatingEntity.classCode (CNE)

Code	Definition
Any RoleClassAssociative subtype	

When the participating entity is an organization, this is reflected by the presence of a scoping Organization, without a playing entity.

recordTarget — The recordTarget class represents the medical record that this document belongs to.

A clinical document typically has exactly one recordTarget participant. In the uncommon case where a clinical document (such as a group encounter note) is placed into more than one patient chart, more than one recordTarget participants can be stated.

Table 42: Value set for recordTarget.typeCode (CNE)

Code	Definition
RCT (record target) [**default**]	The record target indicates whose medical record holds the documentation of this act.

Table 43: Value set for recordTarget.contextControlCode (CNE)

Code	Definition
OP (overriding propagating) [**default**]	The participant overrides associations with the same or more specific typeCode. This overriding association will propagate to any descendant Acts reached by conducting ActRelationships. (See)

A recordTarget is represented as a relationship between a person and an organization, where the person is in a patient role (PatientRole class). The entity playing the role is a patient (Patient class). The entity scoping the role is an organization (Organization class).

Table 44: Value set for PatientRole.classCode (CNE)

Code	Definition
PAT (patient) [**default**]	A person that receives health care services from a provider.

Table 45: Value set for Patient.classCode (CNE)

Code	Definition
PSN (person) [**default**]	A living subject of the species homo sapiens.

Table 46: Value set for Patient.determinerCode (CNE)

Code	Definition
INSTANCE (instance) [**default**]	The specific determiner indicates that the given Entity is taken as one specific thing instance. For example, a human INSTANCE (quantity = 1,) stands for exactly one human being.

A Patient's birthplace is represented as a relationship between a patient and a place. The Birthplace class is played by a place (Place class), and scoped by the patient (Patient class).

Table 47: Value set for Birthplace.classCode (CNE)

Code	Definition
BIRTHPL (birthplace) [**default**]	Relates a place as the location where a living subject was born.

Table 48: Value set for Place.classCode (CNE)

Code	Definition
PLC (place) [**default**]	A physicial place or site with its containing structure.

Table 49: Value set for Place.determinerCode (CNE)

Code	Definition
INSTANCE (instance) [**default**]	The specific determiner indicates that the given Entity is taken as one specific thing instance. For example, a human INSTANCE (quantity = 1,) stands for exactly one human being.

A patient's guardian is a person or organization in the role of guardian (Guardian class). The entity playing the role of guardian is a person (Person class) or organization (Organization class). The entity scoping the role is the patient (Patient class).

Where a guardian is not explicitly stated, the value should default to local business practice (e.g. the patient makes their own health care decisions unless incapacitated in which case healthcare decisions are made by the patient's spouse).

Table 50: Value set for Guardian.classCode (CNE)

Code	Definition
GUARD (guardian) [**default**]	An entity (player) that acts or is authorized to act as the guardian of the patient.

A patient's language communication skills can be expressed in the LanguageCommunication class.

responsibleParty — Represents the participant having primary legal responsibility for the documented acts. The responsible party is not necessarily present in an action, but is accountable for the action through the power to delegate, and the duty to review actions with the performing participant. This differs from the legalAuthenticator participant in that the legalAuthenticator may or may not be the responsible party, and is serving a medical records function by signing off on the document, moving it into a completed state.

Table 51: Value set for responsibleParty.typeCode (CNE)

Code	Definition
RESP (responsible party) [**default**]	The provider (person or organization) who has primary responsibility for the act. The responsible provider is not necessarily present in an action, but is accountable for the action through the power to delegate, and the duty to review actions with the performing actor after the fact (e. g. head of a biochemical laboratory).

A responsibleParty is a person or organization in the role of an assigned entity (AssignedEntity class). The entity playing the role is a person (Person class). The entity scoping the role is an organization (Organization class).

When the responsible party is an organization, the value for AssignedEntity.classCode is "ASSIGNED", and the recipient is reflected by the presence of a scoping Organization, without a playing entity.

2.3.2.3 CDA Header Relationships

This section describes classs related to the root ClinicalDocument class via an ActRelationship.

ParentDocument — The ParentDocument represents the source of a document revision, addenda, or transformation. ParentDocument.text is modeled as an ED data type - allowing for the expression of the MIME type of the parent document. It is not to be used to embed the related document, and thus ParentDocument.text.BIN is precluded from use.

Allowable values for the intervening relatedDocument.typeCode are shown in the following table.

Table 52: Value set for relatedDocument.typeCode (CNE)

Code	Definition
APND (append)	The current document is an addendum to the ParentDocument.
RPLC (replace)	The current document is a replacement of the ParentDocument.
XFRM (transform)	The current document is a transformation of the ParentDocument.

A conformant CDA document can have a single relatedDocument with typeCode "APND"; a single relatedDocument with typeCode "RPLC"; a single relatedDocument with typeCode "XFRM"; or a combination of two relatedDocuments with typeCodes "XFRM" and "RPLC".

Table 53: Value set for ParentDocument.classCode (CNE)

Code	Definition
DOCCLIN (clinical document) [**default**]	A clinical document.

Table 54: Value set for ParentDocument.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	An actual occurrence of an event.

Document Identification, Revisions, and Addenda

A replacement document is a new version of the parent document. The parent document is considered superseded, but a system may retain it for historical or auditing purposes. The parent document being replaced is referenced via act relationship relatedDocument, where relatedDocument.typeCode is set to equal "RPLC" (for "replaces"). An example is a report found to contain an error that is subsequently replaced by the corrected report.

An addendum is a separate document that references the parent document, and may extend or alter the observations in the prior document. The parent document remains a current component of the patient record, and the addendum and its parent are both read by report recipients. The parent report (represented by the ParentDocument class) being appended is referenced via act relationship relatedDocument, where relatedDocument.typeCode is set to equal "APND" (for "appends").

Every CDA document must have a unique ClinicalDocument.id, and thus the replacement or addendum documents each have ClinicalDocument.id that is different from that of the parent document.

CDA documents may also contain a ClinicalDocument.setId and a ClinicalDocument.versionNumber, which together support a document identification and versioning scheme used in some document management systems. In this scheme, all documents in a chain of replacements have the same ClinicalDocument.setId and are distinguished by an incrementing ClinicalDocument.versionNumber. The initial version of a document gets, in addition to a new unique value for ClinicalDocument.id, a new value for ClinicalDocument.setId, and has the value of ClinicalDocument.versionNumber set to equal "1". A replacement document gets a new globally unique ClinicalDocument.id value, and uses the same value for ClinicalDocument.setId as the parent report being replaced, and increments the value of ClinicalDocument.versionNumber by 1. (Note that version number must be incremented by one when a report is replaced, but can also be incremented more often to meet local requirements.)

These relationships are illustrated in the following exhibit "Document Identification, Revisions, and Addenda Scenarios". Typical scenarios are a simple relacement (e.g. ClinicalDocument.id "1.2.345.6789.266" replacing ClinicalDocument.id "1.2.345.6789.123") and a simple append (e.g. ClinicalDocument.id "1.2.345.6789.456" appends ClinicalDocument.id "1.2.345.6789.123"). More complex scenarios that might be anticipated include: [1] replacement of an addendum (e.g. ClinicalDocument.id "1.2.345.6789.224" replaces ClinicalDocument.id "1.2.345.6789.456", which itself is an addendum to ClinicalDocument.id "1.2.345.6789.123") - expected behavior would be to render the replacement as the addendum (e.g. render ClinicalDocument.id "1.2.345.6789.224" as the addendum to ClinicalDocument.id "1.2.345.6789.123"); [2] addendum to a replaced document (e.g. ClinicalDocument.id "1.2.345.6789.456" appends ClinicalDocument.id "1.2.345.6789.123", which has been replaced by ClinicalDocument.id "1.2.345.6789.266") - expected behavior would be to render the addendum along with the replacement (e.g. render ClinicalDocument.id "1.2.345.6789.456" as an addendum to ClinicalDocument.id "1.2.345.6789.266").

Document transformations

A CDA document can be a transformation from some other format, meaning that it has undergone a machine translation from some other format (such as DICOM SR). In this case, relatedDocument.typeCode should be set to "XFRM".

A proper transformation must ensure that the human readable clinical content of the report is not impacted. Local business rules determine whether or not a transformed report replaces the source, but typically this would not be the case. If it is, an additional relationship of type "RPLC" is to be used. The "XFRM" relationship can also be used when translating a document in a local format into CDA for the purpose of exchange. In this case, the target of the "XFRM" relationship is the local document identifier.

Figure 1: Document Identification, Revisions, and Addenda Scenarios

Link to graphic (opens in a new window)

Event — This class represents the main Act, such as a colonoscopy or an appendectomy, being documented.

In some cases, the Event is inherent in the ClinicalDocument.code, such as where ClinicalDocument.code is"History and Physical Report" and the procedure being documented is a "History and Physical" act. An Event can further specialize the Act inherent in the ClinicalDocument.code, such as where the ClinicalDocument.code is simply "Procedure Report" and the procedure was a "colonoscopy". If Event is included, it must be equivalent to or further specialize the value inherent in the clinicalDocument.code, and shall not conflict with the value inherent in the ClinicalDocument.code, as such a conflict would constitute an ambiguous situation.

Event.effectiveTime can be used to indicate the time the actual event (as opposed to the encounter surrounding the event) took place.

Table 55: Value set for documentationOf.typeCode (CNE)

Code	Definition
DOC (documents) [**default**]	The current document is a documentation of the related Event.

Table 56: Value set for Event.classCode (CNE)

Code	Definition
ACT (act) [**default**]	A healthcare service.
Any ACT subtype	

Table 57: Value set for Event.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	An actual occurrence of an event.

Order — This class represents those orders that are fulfilled by this document. For instance, a provider orders an X-Ray. The X-Ray is performed. A radiologist reads the X-Ray and generates a report. The X-Ray order identifier is transmitted in the Order class, the performed X-Ray procedure is transmitted in the Event class, and the ClinicalDocument.code would be valued with "Diagnostic Imaging Report".

Table 58: Value set for InFulfillmentOf.typeCode (CNE)

Code	Definition
FLFS (fulfills) [**default**]	The current document fulfills the order stated in ActOrder.

Table 59: Value set for Order.classCode (CNE)

Code	Definition
ACT (act) [**default**]	A healthcare service.
Any ACT subtype	

Table 60: Value set for Order.moodCode (CNE)

Code	Definition
RQO (request) [**default**]	A request or order to perform the stated act.

Consent — This class indicates the consents associated with this document. The type of consent (e.g. a consent for the documented acts, a consent for the information contained in the document to be released to a third party) is conveyed in Consent.code. Consents referenced in the CDA Header have been finalized (Consent.statusCode = "completed") and should be on file.

Table 61: Value set for authorization.typeCode (CNE)

Code	Definition
AUTH (authorized by) [**default**]	The consent authorizes or certifies acts specified in the current document.

Table 62: Value set for Conset.classCode (CNE)

Code	Definition
CONS (consent) [**default**]	The Consent class represents informed consents and medico-legal transactions.

Table 63: Value set for Consent.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	An actual occurrence of an event.

Table 64: Value set for Consent.statusCode (CNE)

Code	Definition
completed [**default**]	The consent being referenced by the CDA document has been finalized and is on file.

CurrentEncounter — This optional class represents the setting of the clinical encounter during which the documented act occurred. Documents are not necessarily generated during an encounter, such as when a clinician, in response to an abnormal lab result, attempts to contact the patient but can't, and writes a Progress Note.

In some cases, the setting of the encounter is inherent in the ClinicalDocument.code, such as where ClinicalDocument.code is"Diabetes Clinic Progress Note". The setting of an encounter can also be transmitted in the HealthCareFacility.code attribute. If HealthCareFacility.code is sent, it should be equivalent to or further specialize the value inherent in the ClinicalDocument.code (such as where the ClinicalDocument.code is simply "Clinic Progress Note" and the value of HealthCareFacility.code is "cardiology clinic"), and shall noto conflict with the value inherent in the ClinicalDocument.code, as such a conflict would constitute an ambiguous situation.

CurrentEncounter.dischargeDispositionCode can be used to depict the disposition of the patient at the time of hospital discharge (e.g., discharged to home, expired, against medical advice, etc.).

Table 65: Value set for componentOf.typeCode (CNE)

Code	Definition
COMP (component) [**default**]	The current document is a documentation of events that occurred during the EncounterEvent.

Table 66: Value set for CurrentEncounter.classCode (CNE)

Code	Definition
ENC (encounter) [**default**]	An interaction between a patient and healthcare participant(s) for the purpose of providing patient service(s) or assessing the health status of a patient.

Table 67: Value set for CurrentEncounter.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	An actual occurrence of an event.

The location participant (location class) relates a healthcare facility (HealthCareFacility class) to the encounter to indicate where the encounter took place. The entity playing the role of HealthCareFacility is a place (Place class). The entity scoping the HealthCareFacility role is an organization (Organization class).

The setting of an encounter (e.g. cardiology clinic, primary care clinic, rehabilitation hospital, skilled nursing facility) can be expressed in HealthCareFacility.code. Note that setting and physical location are not the same. There is a many-to-many relationship between setting and the physical location where care is delivered. Thus, a particular room can provide the location for cardiology clinic one day, and for primary care clinic another day; and cardiology clinic today might be held in one physical location, but in another physical location tomorrow.

When the location is an organization, this is indicated by the presence of a scoping Organization, without a playing Place.

Table 68: Value set for location.typeCode (CNE)

Code	Definition
LOC (location) [**default**]	The location where the service is done. May be a static building (or room therein) or a moving location (e.g., ambulance, helicopter, aircraft, train, truck, ship, etc.)

Table 69: Value set for HealthCareFacility.classCode (CNE)

Code	Definition
• SDLOC (service delivery location) [**default**]	A role played by a place at which services may be provided.
Any SDLOC (RoleClassServiceDeliveryLocation) subtype	

The encounterPerformer participant represents clinicians who played a role in the encounter.

Table 70: Value set for encounterPerformer.typeCode (CNE)

Code	Definition
PRF (performer) [**default**]	A person who actually and principally carries out the documented act.
CON (consultant)	An advisor participating in the service by performing evaluations and making recommendations.
SPRF (secondary performer)	A person assisting in an act (e.g. as an assistant) through their substantial presence and involvement.

An encounterPerformer is an entity in the role of assigned entity (AssignedEntity class). The entity playing the role is a person (Person class). The entity scoping the role is an organization (Organization class).

2.3.3 CDA Body

2.3.3.1 CDA Body Choice

The CDA body can be either an unstructured blob, or can be comprised of structured markup.

Table 71: Value set for component.typeCode (CNE)

Code	Definition
COMP (component) [**default**]	The associated document body is a component of the document.

NonXMLBody

The NonXMLBody class represents a document body that is in some format other than XML. NonXMLBody.text is used to reference data that is stored externally to the CDA document, rather than directly encoded inline. Because inline transmission of the non-XML body is not allowed, the use of NonXMLBody.text.BIN is precluded from use.

Rendering a referenced non-XML body requires a software tool that recognizes the particular MIME media type of the blob.

Table 72: Value set for NonXMLBody.classCode (CNE)

Code	Definition
DOCBODY (document body) [**default**]	A context that distinguishes the body of a document from the document header.

Table 73: Value set for NonXMLBody.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	An actual occurrence of the event.

Table 74: Value set for NonXMLBody.confidentialityCode (CWE)

Code *	Definition
N (normal) (codeSystem 2.16.840.1.113883.5.25)	Normal confidentiality rules (according to good health care practice) apply. That is, only authorized individuals with a legitimate medical or business need may access this item.
R (restricted) (codeSystem 2.16.840.1.113883.5.25)	Restricted access, e.g. only to providers having a current care relationship to the patient.
V (very restricted) (codeSystem 2.16.840.1.113883.5.25)	Very restricted access as declared by the Privacy Officer of the record holder.

* The codeSystem value is included here because confidentialityCode is of type CE, and therefore must carry both a code and a codeSystem.

StructuredBody — The StructuredBody class represents a CDA document body that is comprised of one or more document sections.

Table 75: Value set for StructuredBody.classCode (CNE)

Code	Definition
DOCBODY (document body) [**default**]	A context that distinguishes the body of a document from the document header.

Table 76: Value set for StructuredBody.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	An actual occurrence of an event.

Table 77: Value set for StructuredBody.confidentialityCode (CWE)

Code *	Definition
N (normal) (codeSystem 2.16.840.1.113883.5.25)	Normal confidentiality rules (according to good health care practice) apply. That is, only authorized individuals with a legitimate medical or business need may access this item.
R (restricted) (codeSystem 2.16.840.1.113883.5.25)	Restricted access, e.g. only to providers having a current care relationship to the patient.
V (very restricted) (codeSystem 2.16.840.1.113883.5.25)	Very restricted access as declared by the Privacy Officer of the record holder.

* The codeSystem value is included here because confidentialityCode is of type CE, and therefore must carry both a code and a codeSystem.

2.3.3.2 CDA Section Attributes

Document sections can nest, can override context propagated from the header (see CDA Context (§ 2.3.4), and can contain CDA entries.

Table 78: Value set for Section.classCode (CNE)

Code	Definition
DOCSECT (document section) [**default**]	A context that subdivides the body of a document. Document sections are typically used for human navigation, to give a reader a clue as to the expected content. Document sections are used to organize and provide consistency to the contents of a document body.

Table 79: Value set for Section.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	An actual occurrence of an event.

Section.id — The unique instance identifier of a particular document section.

Section.code — The code specifying the particular kind of section (e.g. Chief Complaint, Review of Systems, Assessment). Values are preferentially drawn from LOINC.

NOTE: Version 2.11 (February 2004) of the LOINC database does not yet provide a ready method for identification of section codes. Per the June 20, 2003 Clinical LOINC meeting minutes:

- LOINC will use the same code for sections whether they contain coded information or a text blob.
- LOINC will use the same code for sections and panels. For example, the same LOINC code would be used to designate a Vital Signs section and a Vital Signs panel.
- All items in the LOINC database will be classified as to whether they are a document code, a section/panel/battery code, or an individual (single) observation.

Section.title — Represents the label of a section. If valued, it is to be rendered as part of the narrative content of the clinical document body.

Section.text — Used to store narrative to be rendered. Also referred to as the CDA Narrative Block. See CDA Section Narrative Block (§ 2.3.3.5) for details.

Section.confidentialityCode — A value for Section.confidentialityCode overrides the value propagated from StructuredBody. See CDA Context (§ 2.3.4) for more details.

Table 80: Value set for Section.confidentialityCode (CWE)

Code*	Definition
N (normal) (codeSystem 2.16.840.1.113883.5.25)	Normal confidentiality rules (according to good health care practice) apply. That is, only authorized individuals with a legitimate medical or business need may access this item.

R (restricted) (codeSystem 2.16.840.1.113883.5.25)	Restricted access, e.g. only to providers having a current care relationship to the patient.
V (very restricted) (codeSystem 2.16.840.1.113883.5.25)	Very restricted access as declared by the Privacy Officer of the record holder.

Section.languageCode — Specifies the human language of character data (whether they be in contents or attribute values). The values of the attribute are language identifiers as defined by the IETF (Internet Engineering Task Force) RFC 3066: Tags for the Identification of Languages, ed. H. Alvestrand. 1995 () , which obsoletes RFC 1766.

A value for Section.languageCode overrides the value propagated from StructuredBody.languageCode. See CDA Context (§ 2.3.4) for more details.

2.3.3.3 CDA Section Participants

author — The author participant (described above, see CDA Header Participants (§ 2.3.2.2)), can be ascribed to a CDA section, where it overrides the value(s) propagated from the CDA header.

informant — The informant participant (described above, see CDA Header Participants (§ 2.3.2.2)), can be ascribed to a CDA section where it overrides the value(s) propagated from the CDA header.

subject — The subject participant represents the primary target of the entries recorded in the document. Most of the time the subject is the same as the recordTarget (see CDA Header Participants (§ 2.3.2.2)), but need not be, for instance when the subject is a fetus observed in an obstetrical ultrasound.

The subject participant can be ascribed to a CDA section or a CDA entry. It propagates to nested components, unless overridden. The subject of a document is presumed to be the patient.

A subject is a person playing one of several possible roles (SubjectRole class). The entity playing the role is a person (SubjectPerson class).

Table 81: Value set for subject.typeCode (CNE)

Code	Definition
SBJ (subject) [**default**]	The principle target that the service acts on.

Table 82: Value set for subject.contextControlCode (CNE)

Code	Definition
OP (overriding propagating) [**default**]	The participant overrides associations with the same or more specific typeCode. This overriding association will propagate to any descendant Acts reached by conducting ActRelationships. (See <specref ref="CDA_Context"/>)

Table 83: Value set for RelatedSubject.classCode (CNE)

Code	Definition
PRS (personal relationship) [**default**]	The subject has a personal relationship to the patient. The type of personal relationship is stated in SubjectRole.code, with a value drawn from the extensible (CWE) PersonalRelationshipRoleType vocabulary domain. The scoper is always the patient, and is implied.
PAT (patient)	The subject of an entry is the patient, who is identified in the recordTarget participant in the CDA header.

Table 84: Value set for SubjectPerson.classCode (CNE)

Code	Definition
PSN (person) [**default**]	A living subject of the species homo sapiens.

Table 85: Value set for SubjectPerson.determinerCode (CNE)

Code	Definition
INSTANCE (instance) [**default**]	The specific determiner indicates that the given Entity is taken as one specific thing instance. For example, a human INSTANCE (quantity = 1,) stands for exactly one human being.

2.3.3.4 CDA Section Relationships

component — The "component" Act Relationship is used to nest a Section within a Section. Context propagates to nested sections (see CDA Context (§ 2.3.4)).

Table 86: Value set for component.typeCode (CNE)

Code	Definition
COMP (component) [**default**]	The nested section is a component of the outer section.

entry — The relationship between the Section's narrative (Section.text) and its entries is encoded in the intervening "entry" Act Relationship.

The narrative of each Section, together with the multimedia content referenced in the narrative, comprises the complete authenticated content of the Section. This multimedia content consists of ObservationMedia and RegionOfInterest entries referenced by <renderMultimedia> tags in the Section.text (see CDA Entry Acts (§ 2.3.3.6)). This is the only case where the entries contain authenticated content that must be rendered with the narrative.

In terms of the relationship between Entries and narrative, CDA defines one specific and one general case:

Specific Entry/Narrative relationship:

Derived from (DRIV): Narrative fully derived from CDA Entries. When a report consisting entirely of structured data is transformed into CDA, the encoding application must ensure that the authenticated content (narrative plus multimedia) is a faithful and complete rendering of the clinical content of the structured source data. This ensures that the narrative plus multimedia represents, as in all CDA documents, the complete authenticated content of the Section. In this case, narrative plus multimedia does not contain any clinical content that is not present in the Entries. An example of this case is a DICOM Structured Reporting document of obstetrical measurements made by ultrasound, rendered into a tabular report by a program converting it to CDA narrative block.

The typeCode of the ActRelationship linking these Entries to the Section should be "DRIV" (is derived from). This indicates to a receiving application: 1) the source of the narrative block is the Entries; 2) the contents of the two are equivalent.

There is no linking of any parts of the Section narrative to particular Entries; the set of all Entries with ActRelationship of typeCode="DRIV" is linked to the Section. The method of derivation may be identified via participants sourced from those Entries.

General Entry/narrative relationship:

Component (COMP): The narrative is the original content. The CDA entries are derived from the narrative, such as coding added by a natural language processing system or a human coder or structured entry tools that output both Entries and a text report. The method of extraction may be indicated by the participants identifying the algorithm or person generating the Entries. This relationship carries no assertion on the equivalence of the Entries and narrative. The typeCode of the ActRelationship linking these Entries to the Section must be "COMP" (component).

A section may also have no narrative content in the case where the entries represent information that is not part of the clinical content of the document. A report may embed information referencing evidence data, reagents, calibration or other information that may be used for later processing but is not part of the clinical content. Such entries are also linked to the Section with ActRelationships possessing typeCode="COMP"

The Entries sourced from a Section may have a mix of ActRelationship typeCodes. For example, a single section may be rendered from a set of Entries (all with ActRelationship typeCode="DRIV") in such a way that the rendering process produced graphical ObservationMedia Entries (all with ActRelationship typeCode="DRIV"), and from the narrative a set of coded Entries (all with ActRelationship typeCode="COMP") was extracted using a natural language processing algorithm.

The value set for the Section-to-Entry ActRelationship typeCode is defined in the following table.

Table 87: Value set for entry.typeCode (CNE)

Code	Definition
COMP (component) [**default**]	The associated CDA Entry is a component of the section.
DRIV (is derived from)	The narrative was rendered from the CDA Entries, and contains no clinical content not derived from the entries.

XML ID / IDREFS Pointers — CDA entries can point in to the <content> element of the CDA Narrative Block, and the <renderMultiMedia> element of the CDA Narrative Block can point out to CDA entries.

The <content> element (see CDA Section Narrative Block (§ 2.3.3.5)) contains an optional local identifier (represented as an XML ID attribute), serving as the target of a reference. The originalText component of a RIM attribute present in any CDA entry can make explicit reference to the identifier, thereby indicating the original text associated with the attribute in the CDA entry.

Example 5: Referencing into the CDA Narrative Block

```
<section>
        <code code="10153-2" codeSystem="2.16.840.1.113883.6.1"
         codeSystemName="LOINC"/>
        <title>Past Medical History</title>
        <text>
There is a history of <content ID="a1">Asthma</content>
        </text>
        <entry>
                <Observation>
                        <code code="84100007"
                                codeSystem="2.16.840.1.113883.6.96"
                                codeSystemName="SNOMED CT"
                                displayName="history taking (procedure)"/>
                        <value xsi:type="CD" code="195967001"
                                codeSystem="2.16.840.1.113883.6.96"
                                codeSystemName="SNOMED CT"
                                displayName="Asthma">
                                        <originalText>
                                          <reference value="#a1"/>
                                        </originalText>
                        </value>
                </Observation>
        </entry>
</section>
```

There is no requirement that CDA entries must reference into the CDA Narrative Block. The referencing mechanism can be used where it is important to represent the original text component of a coded CDA entry.

The <renderMultiMedia> element (see CDA Section Narrative Block (§ 2.3.3.5)) contains a required referencedObject attribute (represented as an XML IDREFS attribute), the values of which must equal XML ID values of one ObservationMedia or one or more RegionOfInterest CDA entries within the same document.

An XML attribute "MMID" (multimedia identifier), of type XML ID, is added to ObservationMedia and RegionOfInterest within the CDA Schema.

Example 6: Referencing out of the CDA Narrative Block

```
<section>
        <code code="8709-8" codeSystem="2.16.840.1.113883.6.1"
                        codeSystemName="LOINC"/>
        <title>Skin exam</title>
        <text>
                 Erythematous rash, palmar surface, left index finger.
                <renderMultiMedia referencedObject="MM1"/>
        </text>
        <entry>
        <ObservationMedia MMID="MM1">
                        <id root="10.23.4567.345"/>
                                <value xsi:type="ED"
                                   mediaType="image/jpeg">
                                   <reference value="left_hand_image.jpeg"/>
                                </value>
                </ObservationMedia>
        </entry>
</section>
```

2.3.3.5 CDA Section Narrative Block

The Section.text field is used to store narrative to be rendered, as described above in CDA Conformance (§ 1.3), and is therefore referred to as the CDA Narrative Block.

The content model for the Section.text field is shown in the following exhibit "Content Model of Section. text", and is described here.

<content> — The CDA <content> element is used to wrap a string of text so that it can be explicitly referenced, or so that it can suggest rendering characteristics. The <content> element can nest recursively, which enables wrapping a string of plain text down to as small a chunk as desired.

The <content> element contains an optional local identifier (represented as an XML ID attribute), serving as the target of a reference. The originalText component of a RIM attribute present in any CDA entry can make explicit reference to the identifier, thereby indicating the original text associated with the attribute in the CDA entry (see CDA Section Relationships (§ 2.3.3.4)). There is no requirement that CDA entries must reference into the CDA Narrative Block. The referencing mechanism can be used where it is important to represent the original text component of a coded CDA entry.

The <content> element contains an optional "emphasis" attribute that can be valued with "bold", "underline", "italics", or "yes", which can be used to indicate the text decoration or emphasis present in the source document. Emphasis values operate much like HTML where a value is either on or off, and can be combined with other values, as in the following example:

Example 7: Example use of the "emphasis" attribute

```
<section>
<text>
<content emphasis="bold">
        This is rendered bold,
        <content emphasis="italics">
                this is rendered bold and italicized,
        </content>
        this is rendered bold.
</content>
</text>
</section>
```

Receivers are not required to render documents using the style hints provided and can present stylized text in accordance with their local style conventions.

The <content> element contains an optional "revised" attribute that can be valued with "insert" or "delete", which can be used to indicate narrative changes from the last version of a CDA document. The attribute is limited to a single generation, in that it only reflects the changes from the preceding version of a document. If applied, it needs to be used in conjunction with standard CDA revision tracking. Changes to a CDA document that has been released for patient care still require a formal versioning and revision, and the revised document can optionally carry the "revised" attribute to show the delta in the narrative. Receivers are required to interpret the "revised" attribute when rendering by visually distinguishing or suppressing deleted narrative.

<link> — The CDA <link> is a generic referencing mechanism, and contains a single required <linkHtml>element. Its intent is to provide behavior similar to the HTML anchor tag.

Multimedia that is integral to a document, and part of the attestable content of the document requires the use of the ObservationMedia CDA entry, which is referenced by the <renderMultiMedia> element in the narrative block (see CDA Section Narrative Block (§ 2.3.3.5)). Multimedia that is simply referenced by the document and not an integral part of the document can use <link>.

> **NOTE:** CDA links do not convey meaning. Shareable semantics are only achieved by the inclusion of CDA entries and their associated formalized relationships.

<sub> and <sup> — The CDA <sub> and <sup> elements are used to indicate subscripts and superscripts, respectively.

Receivers are required to interpret these elements when rendering by visually distinguishing subscripted and superscripted characters.

 — The CDA
 element is used to indicate a hard line break. It differs from the CDA <paragraph> element in that the
 element has no content, and typically is rendered without an intervening blank line.

<renderMultiMedia> — The CDA <renderMultiMedia> element references external multimedia that is integral to a document, and part of the attestable content of the document, and serves to show where the referenced multimedia is to be rendered.

The <renderMultiMedia> element has an optional <caption>, and contains a required referencedObject attribute (represented as an XML IDREFS attribute), the values of which must equal XML ID values of ObservationMedia or RegionOfInterest CDA entries within the same document (see CDA Section Relationships (§ 2.3.3.4)).

Multimedia that is simply referenced by the document and not an integral part of the document can use <link>.

The expected behavior is that the referenced multimedia be rendered at the point of reference. Where a caption is present, it must also be rendered. <renderMultiMedia> can either reference a single ObservationMedia, or one or more RegionOfInterest. If <renderMultiMedia> references a single ObservationMedia, that ObservationMedia should be rendered at the point of reference. If <renderMultiMedia> references one or more RegionOfInterest, all RegionOfInterests should be rendered at the point of reference, atop the multimedia they are regions of. If <renderMultiMedia> references more than one RegionOfInterest, each RegionOfInterest must be a region on the same multimedia.

<paragraph> — A CDA <paragraph> is similar to the HTML paragraph, which allows blocks of narrative to be broken up into logically consistent structures. A CDA <paragraph> element contains an optional caption, which if present must come first before any other character data.

<list> — A CDA <list> is similar to the HTML list. A CDA <list> has an optional caption, and contains one or more <item> elements. A CDA <item> element contains an optional caption, which if present must come first before any other character data. The required listType attribute specifies whether the <list> is ordered or unordered (with unordered being the default). Unordered lists are typically rendered with bullets, whereas ordered lists are typically rendered with numbers, although this is not a requirement of a receiver.

<table> — The CDA <table> is similar to the HTML table. The table markup is for presentation purposes only and, unlike a database table, does not possess meaningful field names.

CDA modifies the strict XHTML table model (see the following exhibit "Changes to the strict XHTML table model in CDA") by removing formatting tags and by setting the content model of cells to be similar to the contents of other elements in the CDA Narrative Block. The <th> element is modeled analogously to the <caption> element, and like the <caption> element, the <localCaptionCode> is optional and non-repeatable, and must occur first.

Exhibit 1: Changes to the strict XHTML table model in CDA

```
Change this:
  <!ELEMENT caption  %Inline;>
To this:
  <!ELEMENT caption (#PCDATA | link | sub | sup | localCaptionCode)*>

Change these XML attributes:
  %attrs;
To these:
  ID ID #IMPLIED
  xml:lang NMTOKEN #IMPLIED

Change this:
  <!ELEMENT td %Flow;>
to this:
  <!ELEMENT td (#PCDATA | content | link | sub | sup | br |
        renderMultiMedia | paragraph | list)*>

change this:
  <!ELEMENT th %Flow;>
to this:
  <!ELEMENT th (#PCDATA | link | sub | sup | localCaptionCode)*>
```

<caption> — The CDA <caption> is a label for a paragraph, list, list item, table, or table cell. It can also be used within the <renderMultiMedia> element to indicate a label for referenced ObservationMedia and RegionOfInterest entries.

A <caption> contains plain text and may contain links, and can be coded using the optional <localCaptionCode> element. The <localCaptionCode> element, if used, must occur directly after the <caption> element, and may not repeat. The <localCaptionCode> element's displayName attribute reflects the name of the code within the code system from which it is drawn. It is not to be rendered. Rendered text is part of the plain text within the <caption>.

Local caption codes are provided as a convenience for local implementations, and do not convey shareable semantics. There is no requirement for a receiver of an arbitrary CDA document to interpret or act on the codes.

Exhibit 2: Content Model of Section.text

The content model of the Section.text attribute is specially hand crafted to meet the requirements outlined above (see Human Readability and Rendering CDA Documents (§ 1.2.3))

```
<!ENTITY % textAtts  "
  ID ID #IMPLIED
  lang NMTOKEN #IMPLIED">

<!ELEMENT text  (#PCDATA | content | link | sub | sup | br |
        renderMultiMedia | paragraph | list | table)*>

<!ELEMENT content (#PCDATA | content | link | sub | sup | br |
        renderMultiMedia)*>
<!ATTLIST content
  %textAtts;
  emphasis (bold | underline | italics | yes) #IMPLIED
  revised (insert | delete) #IMPLIED>

<!ELEMENT link (linkHtml) >
<!ATTLIST link  %textAtts;>
```

```
<!ELEMENT linkHtml (#PCDATA) >
<!ATTLIST linkHtml
  name    CDATA   #IMPLIED
  href    CDATA   #IMPLIED
  rel     CDATA   #IMPLIED
  rev     CDATA   #IMPLIED
  title   CDATA   #IMPLIED
  %textAtts;>

<!ELEMENT sub (#PCDATA)>

<!ELEMENT sup (#PCDATA)>

<!ELEMENT br EMPTY>

<!ELEMENT renderMultiMedia (caption?)>
<!ATTLIST renderMultiMedia
  referencedObject IDREFS #REQUIRED
  %textAtts;>

<!ELEMENT paragraph (#PCDATA | caption | content | link | sub | sup | br |
       renderMultiMedia)*>
<!ATTLIST paragraph  %textAtts;>

<!ELEMENT list (caption?, item+)>
<!ATTLIST list
  %textAtts;
  listType (ordered | unordered) "unordered" >

<!ELEMENT item (#PCDATA | caption | content | link | sub | sup | br |
       renderMultiMedia | paragraph | list | table)*>
<!ATTLIST item  %textAtts;>

<!ENTITY % cellhalign
  "align      (left|center|right|justify|char) #IMPLIED
   char       CDATA          #IMPLIED
   charoff    CDATA          #IMPLIED"  >
```

```
<!ENTITY % cellvalign
  "valign     (top|middle|bottom|baseline) #IMPLIED"  >

<!ENTITY % Tframe "(void|above|below|hsides|lhs|rhs|vsides|box|border)">

<!ENTITY % Trules "(none | groups | rows | cols | all)">

<!ENTITY % Scope "(row|col|rowgroup|colgroup)">

<!ELEMENT table
     (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
<!ELEMENT caption (#PCDATA | link | sub | sup | localCaptionCode)*>
<!ELEMENT thead    (tr)+>
<!ELEMENT tfoot    (tr)+>
<!ELEMENT tbody    (tr)+>
<!ELEMENT colgroup (col)*>
<!ELEMENT col      EMPTY>
<!ELEMENT tr       (th|td)+>
<!ELEMENT th       (#PCDATA | link | sub | sup | localCaptionCode)*>
<!ELEMENT td       (#PCDATA | content | link | sub | sup | br |
        renderMultiMedia | paragraph | list)*>

<!ATTLIST table
  %textAtts;
  summary     CDATA          #IMPLIED
  width       CDATA          #IMPLIED
  border      CDATA          #IMPLIED
  frame       %Tframe;       #IMPLIED
  rules       %Trules;       #IMPLIED
  cellspacing CDATA          #IMPLIED
  cellpadding CDATA          #IMPLIED  >

<!ATTLIST caption  %textAtts;>

<!ELEMENT localCaptionCode EMPTY>
<!ATTLIST localCaptionCode
  code CDATA #IMPLIED
  codeSystem CDATA #IMPLIED
  displayName CDATA #IMPLIED
```

```
  %textAtts;>

<!ATTLIST colgroup
  %textAtts;
  span        CDATA             "1"
  width       CDATA             #IMPLIED
  %cellhalign;
  %cellvalign;  >

<!ATTLIST col
  %textAtts;
  span        CDATA             "1"
  width       CDATA             #IMPLIED
  %cellhalign;
  %cellvalign;  >

<!ATTLIST thead
  %textAtts;
  %cellhalign;
  %cellvalign;  >

<!ATTLIST tfoot
  %textAtts;
  %cellhalign;
  %cellvalign;  >

<!ATTLIST tbody
  %textAtts;
  %cellhalign;
  %cellvalign;  >

<!ATTLIST tr
  %textAtts;
  %cellhalign;
  %cellvalign;>

<!ATTLIST th
  %textAtts;
  abbr        CDATA             #IMPLIED
```

```
  axis        CDATA             #IMPLIED
  headers     IDREFS            #IMPLIED
  scope       %Scope;           #IMPLIED
  rowspan     CDATA             "1"
  colspan     CDATA             "1"
  %cellhalign;
  %cellvalign; >

<!ATTLIST td
  %textAtts;
  abbr        CDATA             #IMPLIED
  axis        CDATA             #IMPLIED
  headers     IDREFS            #IMPLIED
  scope       %Scope;           #IMPLIED
  rowspan     CDATA             "1"
  colspan     CDATA             "1"
  %cellhalign;
  %cellvalign;  >
```

2.3.3.6 CDA Entry Acts

CDA entries represent the structured computer-processable components within a document section. Each section can contain zero to many entries.

Clinical documents contain a wide breadth of content, requiring much of the RIM to enable a full and complete encoding. The current set of CDA entries have been developed in response to identified requirements and scenarios that are in CDA's scope. Rather than creating specific entries for each scenario, similar requirements are merged to create broader entries, which can then be constrained within a particular realm or implementation. This approach is consistent with the approach taken by CEN, DICOM SR, and OpenEHR.

Act — A derivative of the RIM Act class, to be used when the other more specific classes aren't appropriate.

Act.negationInd, when set to "true", is a positive assertion that the descriptive attributes of the Act as a whole are negated. The inert properties such as Act.id, Act.moodCode, and the participations are not negated. These inert properties always have the same meaning: i.e., the author remains the author of the negative Act. An act statement with negationInd is still a statement about the specific fact described by the Act. For instance, a negated "finding of wheezing on July 1" means that the author positively denies that there was wheezing on July 1, and that he takes the same responsibility for such statement and the same requirement to have evidence for such statement than if he had not used negation.

Table 88: Value set for Act.classCode (CNE)>

Code	Definition
ACT (act) [**default**]	A healthcare service.
Any ACT subtype	

Table 89: Value set for Act.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	The entry defines an actual occurrence of an event.
INT (intent)	The entry is intended or planned.
APT (appointment)	The entry is planned for a specific time and place.
ARQ (appointment request)	The entry is a request for the booking of an appointment.

PRMS (promise)	A commitment to perform the stated entry.
PRP (proposal)	A proposal that the stated entry be performed.
RQO (request)	A request or order to perform the stated entry.

CodedEntry (Deprecated) — A derivative of the RIM Act class, included for backwards compatibility with CDA, Release One. CodedEntry has been deprecated because: (1) it is ambiguous whether CDA, Release One's <coded_entry.value> corresponds to the RIM's Act.code or Observation.value; (2) its functionality is fully subsumed by the new CDA entry, Observation. Use of CodedEntry is discouraged.

Table 90: Value set for CodedEntry.classCode (CNE)

Code	Definition
ACT (act) [**default**]	A healthcare service.
Any ACT subtype	

Table 91: Value set for CodedEntry.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	The entry defines an actual occurrence of an event.

Encounter — A derivative of the RIM PatientEncounter class, used to represent related encounters, such as follow-up visits or referenced past encounters.

NOTE: The CurrentEncounter class in the CDA Header (see CDA Header Relationships (§ 2.3.2.3)) represents the setting of the clinical encounter during which the documented act occurred. The Encounter class in the CDA Body is used to represent other related encounters.

Table 92: Value set for Encounter.classCode (CNE)

Code	Definition
ENC (encounter) [**default**]	An interaction between a patient and healthcare participant(s) for the purpose of providing patient service(s) or assessing the health status of a patient.

Table 93: Value set for Encounter.moodCode (CNE)

Code	Definition
INT (intent) [**default**]	The entry is intended or planned.
EVN (event)	The entry defines an actual occurrence of an event
APT (appointment)	The entry is planned for a specific time and place.
ARQ (appointment request)	The entry is a request for the booking of an appointment.

PRMS (promise)	A commitment to perform the stated entry.
PRP (proposal)	A proposal that the stated entry be performed.
RQO (request)	A request or order to perform the stated entry.

Observation — A derivative of the RIM Observation class, used for representing coded and other observations.

Observation.negationInd, when set to "true", is a positive assertion that the descriptive attributes of the Observation as a whole are negated. The inert properties such as Observation.id, Observation.moodCode, and the participations are not negated. These inert properties always have the same meaning: i.e., the author remains the author of the negative Observation. An observation statement with negationInd is still a statement about the specific fact described by the Observation. For instance, a negated "finding of wheezing on July 1" means that the author positively denies that there was wheezing on July 1, and that he takes the same responsibility for such statement and the same requirement to have evidence for such statement than if he had not used negation.

Table 94: Value set for Observation.classCode (CNE)

Code	Definition
OBS (observation) [**default**]	Observations are actions performed in order to determine an answer or result value.
Any OBS subtype	

Table 95: Value set for Observation.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	The entry defines an actual occurrence of an event.
DEF (definition)	The entry serves to define an observation.
GOL (goal)	The entry represents a goal or objective.
INT (intent)	The entry is intended or planned.
PRMS (promise)	A commitment to perform the stated entry.
PRP (proposal)	A proposal that the stated entry be performed.
RQO (request)	A request or order to perform the stated entry.

An Observation can have zero to many referenceRange relationships, which relate an Observation to the ObservationRange class, where the expected range of values for a particular observation can be specified.

Table 96: Value set for referenceRange.typeCode (CNE)

Code	Definition
REFV (has reference values) [**default**]	Reference ranges are essentially descriptors of a class of result values assumed to be "normal", "abnormal", or "critical". This link type can act as a trigger in case of alarms being triggered by critical results.

Table 97: Value set for ObservationRange.classCode (CNE)

Code	Definition
OBS (observation) [**default**]	Observations are actions performed in order to determine an answer or result value.
Any OBS subtype	

Table 98: Value set for ObservationRange.moodCode (CNE)

Code	Definition
EVN.CRT (event criterion) [**default**]	A criterion or condition over observations that must apply for an associated service to be considered.

ObservationMedia — A derivative of the RIM Observation class that represents multimedia that is logically part of the current document. This class is only for sending multimedia by reference, and only for multimedia that is logically part of the attested content of the document. Because inline transmission of multimedia is not allowed, the use of ObservationMedia.value.BIN is precluded from use. Rendering a referenced ObservationMedia requires a software tool that recognizes the particular MIME media type.

An XML attribute "MMID" (multimedia identifier), of type XML ID, is added to ObservationMedia within the CDA Schema. This attribute serves as the target of a <renderMultiMedia> reference (see CDA Section Relationships (§ 2.3.3.4)).

The distinction between ObservationMedia and ExternalObservation is that ObservationMedia entries are part of the attested content of the document whereas ExternalObservations are not. For instance, when a clinician draws a picture as part of a progress note, that picture is represented as a CDA ObservationMedia. If that clinician is also describing a finding seen on a chest-x-ray, the referenced chest-x-ray is represented as a CDA ExternalObservation.

Table 99: Value set for ObservationMedia.classCode (CNE)

Code	Definition
OBS (observation) [**default**]	A multimedia observation

Table 100: Value set for ObservationMedia.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	The entry defines an actual occurrence of an event.

Organizer — A derivative of the RIM Act class, which can be used to create arbitrary groupings of other CDA entries that share a common context. An Organizer can contain other Organizers and/or other CDA entries, by traversing the component relationship.

> **NOTE:** CDA entries such as Observation can also contain other CDA entries by traversing the entryRelationship class. There is no requirement that the Organizer entry be used in order to group CDA entries.

Table 101: Value set for Organizer.classCode (CNE)

Code	Definition
BATTERY (battery)	A battery specifies a set of observations. These observations typically have a logical or practical grouping for generally accepted clinical or functional purposes, such as observations that are grouped together because of automation.
CLUSTER (cluster)	A group of entries that have a logical association with one another. The Cluster class permits aggregation into a compound statement.

Table 102: Value set for Organizer.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	The entry defines an actual occurrence of an event

Procedure — A derivative of the RIM Procedure class, used for representing procedures.

Procedure.negationInd, when set to "true", is a positive assertion that the descriptive attributes of the Procedure as a whole are negated. The inert properties such as Procedure.id, Procedure.moodCode, and the participations are not negated. These inert properties always have the same meaning: i.e., the author remains the author of the negative Procedure. A procedure statement with negationInd is still a statement about the specific fact described by the Procedure. For instance, a negated "appendectomy performed" means that the author positively denies that there was ever an appendectomy performed, and that he takes the same responsibility for such statement and the same requirement to have evidence for such statement than if he had not used negation.

Table 103: Value set for Procedure.classCode (CNE)

Code	Definition
PROC (procedure) [**default**]	An act whose immediate and primary outcome (post-condition) is the alteration of the physical condition of the subject.

Table 104: Value set for Procedure.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	The entry defines an actual occurrence of an event.
INT (intent)	The entry is intended or planned.
APT (appointment)	The entry is planned for a specific time and place.
ARQ (appointment request)	The entry is a request for the booking of an appointment.
PRMS (promise)	A commitment to perform the stated entry.
PRP (proposal)	A proposal that the stated entry be performed.
RQO (request)	A request or order to perform the stated entry.

RegionOfInterest — A derivative of the RIM Observation class that represents a region of interest on an image, using an overlay shape. RegionOfInterest is used to make reference to specific regions in images, e. g., to specify the site of a physical finding by "circling" a region in a schematic picture of a human body. The units of the coordinate values in RegionOfInterest.value are in pixels, expressed as a list of integers. The origin is in the upper left hand corner, with positive X values going to the right and positive Y values going down. The relationship between a RegionOfInterest and its referenced ObservationMedia or ExternalObservation is specified by traversing the entryRelationship or reference class, respectively, where typeCode equals "SUBJ". A RegionOfInterest must reference exactly one ObservationMedia or one ExternalObservation. If the RegionOfInterest is the target of a <renderMultimedia> reference, then it shall only reference an ObservationMedia and not an ExternalObservation.

An XML attribute "MMID" (multimedia identifier), of type XML ID, is added to RegionOfInterest within the CDA Schema. This attribute serves as the target of a <renderMultiMedia> reference (see CDA Section Relationships (§ 2.3.3.4)).

Table 105: Value set for RegionOfInterest.classCode (CNE)

Code	Definition
ROIOVL (overlay region of interest) [**default**]	A Region of Interest specified for an image using an overlay shape.

Table 106: Value set for RegionOfInterest.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	The entry defines an actual occurrence of an event.

Table 107: Value set for RegionOfInterest.code (CNE)

Code	Definition
CIRCLE (circle)	A circle defined by two (column,row) pairs. The first point is the center of the circle and the second point is a point on the perimeter of the circle.
ELLIPSE (ellipse)	An ellipse defined by four (column,row) pairs, the first two points specifying the endpoints of the major axis and the second two points specifying the endpoints of the minor axis.
POINT (point)	A single point denoted by a single (column,row) pair, or multiple points each denoted by a (column,row) pair.
POLY (polyline)	A series of connected line segments with ordered vertices denoted by (column,row) pairs; if the first and last vertices are the same, it is a closed polygon.

The following example illustrates one sample use of RegionOfInterest. In this case, the clinician has identified a rash upon physical examination of the skin, and indicates this by creating a region of interest atop a hand image drawn from an image library. The narrative block references the RegionOfInterest via the <renderMultiMedia> tag, and the referenced RegionOfInterest references the hand image.

Example 8: Sample use of RegionOfInterest

```
<section>
  <code code="8709-8"
  codeSystem="2.16.840.1.113883.6.1"
  codeSystemName="LOINC"/>
  <title>Skin Exam</title>
    <text>Erythematous rash, palmar surface, left index finger.
      <renderMultiMedia referencedObject="MM2"/>
       </text>
       <entry>
          <Observation>
             <code code="106076001"
                codeSystem="2.16.840.1.113883.6.96"
                codeSystemName="SNOMED CT"
                displayName="Skin finding"/>
             <value xsi:type="CD" code="271807003"
                codeSystem="2.16.840.1.113883.6.96"
                codeSystemName="SNOMED CT"
                displayName="Rash"/>
             <targetSiteCode code="48856004"
                codeSystem="2.16.840.1.113883.6.96"
                codeSystemName="SNOMED CT"
                displayName="Skin of palmer surface of index finger">
                <qualifier>
                  <name code="78615007"
                  codeSystem="2.16.840.1.113883.6.96"
                  codeSystemName="SNOMED CT"
                  displayName="with laterality"/>
                  <value code="7771000"
                  codeSystem="2.16.840.1.113883.6.96"
                  codeSystemName="SNOMED CT"
                  displayName="left"/>
             </qualifier>
             </targetSiteCode>
             <entryRelationship typeCode="SPRT">
                  <RegionOfInterest MMID="MM2">
                    <id root="10.23.4567.4489"/>
                   <code code="ELLIPSE"/>
                   <value>3 1 3 7 2 4 4 4</value>
                   <entryRelationship typeCode="SUBJ">
                     <ObservationMedia>
                     <id root="10.23.4567.345"/>
                     <value xsi:type="ED" mediaType="image/jpeg">
                     <reference value="lefthand.jpeg"/>
                     </value>
                       </ObservationMedia>
                   </entryRelationship>
                 </RegionOfInterest>
```

```
            </entryRelationship>
    </Observation>
  </entry>
</section>
```

SubstanceAdministration — A derivative of the RIM SubstanceAdministration class, used for representing medication-related events such as medication history or planned medication administration orders.

Table 108: Value set for SubstanceAdministration.classCode (CNE)

Code	Definition
SBADM (substance administration) [**default**]	The act of introducing or otherwise applying a substance to the subject.

Table 109: Value set for SubstanceAdministration.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	The entry defines an actual occurrence of an event.
INT (intent)	The entry is intended or planned.
PRMS (promise)	A commitment to perform the stated entry.
PRP (proposal)	A proposal that the stated entry be performed.
RQO (request)	A request or order to perform the stated entry.

SubstanceAdministration.priorityCode categorizes the priority of a substance administration. SubstanceAdministration.doseQuantity indicates how much medication is given per dose. SubstanceAdministration.rateQuantity can be used to indicate the rate at which the dose is to be administered (e.g., the flow rate for intravenous infusions). SubstanceAdministration.maxDoseQuantity is used to capture the maximum dose of the medication that can be given over a stated time interval (e.g., maximum daily dose of morphine, maximum lifetime dose of doxorubicin). SubstanceAdministration. effectiveTime is used to describe the timing of administration. It is modeled using the GTS data type to accommodate various dosing scenarios, as illustrated in the following example.

Example 9: Sample representation of the GTS data type used for SubstanceAdministration.effectiveTime "take captopril 25mg PO every 12 hours, starting on Jan 01, 2002, ending on Feb 01, 2002"

```
<SubstanceAdministration moodCode="RQO">
        <effectiveTime xsi:type="IVL_TS">
                <low value="20020101"/>
                <high value="20020201"/>
        </effectiveTime>
        <effectiveTime xsi:type="PIVL_TS"
        operator="A">
                <period value="12" unit="h"/>
        </effectiveTime>
        <routeCode code="PO"
        codeSystem="2.16.840.1.113883.5.112"
        codeSystemName="RouteOfAdministration"/>
        <consumable>
                <manufacturedProduct>
                        <manufacturedLabeledDrug>
                                <code code="318821008"
                                codeSystem="2.16.840.1.113883.6.96"
                                        codeSystemName="SNOMED CT"
                                        displayName=
                                        "Captopril 25mg tablet"/>
                        </manufacturedLabeledDrug>
                </manufacturedProduct>
        </consumable>
</SubstanceAdministration>
```

The capture of medication-related information also involves the interrelationship of SubstanceAdministration with several other classes. The consumable participation is used to bring in the LabeledDrug or Material entity that describes the administered substance. The LabeledDrug class, which is an Entity class playing the Role of Manufactured Product, identifies the drug that is consumed in the substance administration. The medication is identified by means of the LabeledDrug.code or the LabeledDrug.name. The Material entity is used to identify non-drug administered substances such as vaccines and blood products.

Table 110: Value set for consumable.typeCode (CNE)

Code	Definition
TPA (therapeutic agent) [**default**]	A substance that is administered to achieve a physiologic effect (e.g., heal, relieve, provoke a condition, etc.).
CSM (consumable)	A substance that is taken up or consumed as part of the substance administration. If the substance is therapeutic, use TPA. For other substances (such as radiographic contrast), use CSM.

Table 111: Value set for ManufacturedProduct.classCode (CNE)

Code	Definition
MANU (manufactured) [**default**]	A manufactured product

Table 112: Value set for LabeledDrug.classCode (CNE)

Code	Definition
MMAT (manufactured) [**default**]	A manufactured material.

Table 113: Value set for LabeledDrug.determinerCode (CNE)

Code	Definition
KIND (kind) [**default**]	The described determiner is used to indicate that the given Entity is taken as a general description of a kind of thing that can be taken in whole, in part, or in multiples.

Table 114: Value set for Material.classCode (CNE)

Code	Definition
MMAT (manufactured) [**default**]	A manufactured material.

Table 115: Value set for Material.determinerCode (CNE)

Code	Definition
KIND (kind) [**default**]	The described determiner is used to indicate that the given Entity is taken as a general description of a kind of thing that can be taken in whole, in part, or in multiples.

Supply — A derivative of the RIM Supply class, used for representing the provision of a material by one entity to another.

Table 116: Value set for Supply.classCode (CNE)

Code	Definition
SPLY (supply) [**default**]	The act of dispensing or delivering a product.

Table 117: Value set for Supply.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	The entry defines an actual occurrence of an event.
INT (intent)	The entry is intended or planned.
PRMS (promise)	A commitment to perform the stated entry.
PRP (proposal)	A proposal that the stated entry be performed.
RQO (request)	A request or order to perform the stated entry.

The dispensed product is associated with the Supply act via a product participant, which connects to the same ManufacturedProduct role used for SubstanceAdministration.

Table 118: Value set for product.typeCode (CNE)

Code	Definition
PRD (product) [**default**]	A material target that is brought forth (e.g. dispensed) in the service.

The Supply class represents dispensing, whereas the SubstanceAdministration class represents administration. Prescriptions are complex activities that involve both an administration request to the patient (e.g. take digoxin 0.125mg by mouth once per day) and a supply request to the pharmacy (e.g. dispense 30 tablets, with 5 refills). This should be represented in CDA by a SubstanceAdministration entry that has a component Supply entry. The nested Supply entry can have Supply.independentInd set to "false" to signal that the Supply cannot stand alone, without it's containing SubstanceAdministration. The following example illustrates a prescription representation in CDA.

Example 10: Sample prescription representation in CDA "Digoxin 0.125mg, 1 PO qDay, #30, 5 refills"

```
<SubstanceAdministration moodCode="RQO">
        <effectiveTime xsi:type="PIVL_TS">
                <period value="24" unit="h"/>
        </effectiveTime>
        <routeCode code="PO"
        codeSystem="2.16.840.1.113883.5.112"
        codeSystemName="RouteOfAdministration"/>
        <consumable>
                <manufacturedProduct>
                        <manufacturedLabeledDrug>
                                <code code="317896006"
                                codeSystem="2.16.840.1.113883.6.96"
                                codeSystemName="SNOMED CT"
                                displayName=
                                "Digoxin 125micrograms tablet"/>
                        </manufacturedLabeledDrug>
                </manufacturedProduct>
        </consumable>
        <entryRelationship typeCode="COMP">
                <Supply moodCode="RQO">
                        <repeatNumber>
                                <center value="5"/>
                        </repeatNumber>
                        <independentInd value="false"/>
                        <quantity value="30"/>
                </Supply>
        </entryRelationship>
</SubstanceAdministration>
```

2.3.3.7 CDA Entry Participants

CDA structures and entries can have various participants, some of which are also defined in the CDA header. As described in the discussion of CDA context (see CDA Context (§ 2.3.4)), participants propagated from the header can be overridden within the body.

author — The author participant (described above, see CDA Header Participants (§ 2.3.2.2)), can be ascribed to a CDA section, where it overrides the value(s) propagated from the CDA header.

consumable — The consumable participant is described above (see CDA Entry Acts (§ 2.3.3.6)).

informant — The informant participant (described above, see CDA Header Participants (§ 2.3.2.2)), can be ascribed to a CDA section where it overrides the value(s) propagated from the CDA header, or can be ascribed to a CDA entry, where it overrides the value(s) propagated from a CDA section.

participant — Can be used to represent any other participant that cannot be represented with one of the more specific participants. The participant can be ascribed to a CDA entry, and propagates to nested CDA entries, unless overridden.

Table 119: Value set for participant.typeCode (CNE)

Code	Definition
Any ParticipationType value	

Table 120: Value set for participant.contextControlCode (CNE)

Code	Definition
OP (overriding propagating) [**default**]	The participant overrides associations with the same or more specific typeCode. This overriding association will propagate to any descendant Acts reached by conducting ActRelationships. (See)

A participant is an entity playing one of several possible roles (ParticipantRole class). The entity playing the role is a device (Device class) or other entity (PlayingEntity class). The scoper is any entity (Entity class).

Table 121: Value set for ParticipantRole.classCode (CNE)

Code	Definition
Any ROL (RoleClassRoot) subtype	

Table 122: Value set for Device.classCode (CNE)

Code	Definition
DEV (device) [**default**]	An entity used in an activity, without being substantially changed through that activity.
Any DEV subtype	

Table 123: Value set for Device.determinerCode (CNE)

Code	Definition
INSTANCE (instance) [**default**]	The specific determiner indicates that the given Entity is taken as one specific thing instance. For example, a human INSTANCE (quantity = 1,) stands for exactly one human being.

Table 124: Value set for PlayingEntity.classCode (CNE)

Code	Definition
ENT (entity) [**default**]	A physical thing, group of physical things or an organization capable of participating in Acts, while in a role.
Any ENT subtype	

Table 125: Value set for PlayingEntity.determinerCode (CNE)

Code	Definition
INSTANCE (instance) [**default**]	The specific determiner indicates that the given Entity is taken as one specific thing instance. For example, a human INSTANCE (quantity = 1,) stands for exactly one human being.

performer — The performer is a person or department or organization in the role of an assigned entity (AssignedEntity class) who carries out or will carry out a particular act. When the performer is a department or service, this can be represented as an AssignedEntity.code (e.g. by choosing a suitable value from the ServiceDeliveryLocationRoleType vocabulary domain), scoped by an organization. When the performer is an organization, the value for AssignedEntity.classCode is "ASSIGNED", and the performing organization is reflected by the presence of a scoping Organization, without a playing entity.

Table 126: Value set for performer.typeCode (CNE)

Code	Definition
PRF (performer) [**default**]	A person who actually and principally carries out or will carry out the action. The traditional order filler is a performer.

product — The product participant is described above (see CDA Entry Acts (§ 2.3.3.6)).

specimen — The specimen participant is a part of some entity, typically the subject, that is the target of focused laboratory, radiology or other observations. In many clinical observations, such as physical examination of a patient, the patient is the subject of the observation, and there is no specimen. The specimen participant is only used when observations are made against some object that is derived from the subject.

Table 127: Value set for specimen.typeCode (CNE)

Code	Definition
SPC (specimen) [**default**]	The subject of non-clinical (e.g. laboratory) observation services.

Table 128: Value set for SpecimenRole.classCode (CNE)

Code	Definition
SPEC (specimen) [**default**]	A role played by a material entity that is a specimen for an act.

subject — The subject participant (described above, see CDA Section Participants (§ 2.3.3.3)), can be ascribed to a CDA section, and propagates to nested sections and entries.

2.3.3.8 CDA Entry Relationships

component — The component relationship (described above, see CDA Entry Acts (§ 2.3.3.6)), has a source of Organizer, and a target that is another CDA entry.

precondition — The precondition class, derived from the ActRelationship class, is used along with the Criterion class to express a condition that must hold true before some over activity occurs.

Table 129: Value set for precondition.typeCode (CNE)

Code	Definition
PRCN (precondition) [**default**]	A requirement to be true before a service is performed.

Table 130: Value set for Criterion.classCode (CNE)

Code	Definition
OBS (observation) [**default**]	Observations are actions performed in order to determine an answer or result value.
Any OBS subtype	

Table 131: Value set for PRNCriterion.moodCode (CNE)

Code	Definition
EVN.CRT (event criterion) [**default**]	A criterion or condition that must apply for an associated service to be considered.

referenceRange — The referenceRange relationship (described above, see CDA Entry Acts (§ 2.3.3.6)), has a source of Observation, and a target that is another CDA entry.

entryRelationship — CDA has identified and modeled various link and reference scenarios. These scenarios enable CDA documents to be semantically linked to entries that exist within the same document (by traversing the entryRelationship class) or to objects external to it (by traversing the reference class).

> **NOTE:** The CDA specification permits any CDA entry to relate to any CDA entry using any of the following relationship types. In many cases, this would result in nonsensical relationships. The following table is a guideline for reasonable relationships between CDA entries, and is not a conformance constraint.

Table 132: CDA entryRelationship Types

ActRelationship Type	Reasonable Source and Target entries	Comments
CAUS (is etiology for)	[Act | Observation | Procedure | SubstanceAdministration] **CAUS** [Observation]	Used to show that the source caused the target observation (for instance, source "diabetes mellitus" is the cause of target "kidney disease").
COMP (has component)	[Act | Observation | Procedure | SubstanceAdministration | Supply] **COMP** [Act | Observation | Procedure | SubstanceAdministration | Suppply]	Used to show that the target is a component of the source (for instance "hemoglobin measurement" is a component of a "complete blood count").
GEVL (evaluates (goal))	[Observation] **GEVL** [Observation]	Used to link an observation (intent or actual) to a goal to indicate that the observation evaluates the goal (for instance, a source observation of "walking distance" evaluates a target goal of "adequate walking distance").

MFST (is manifestation of)	[Observation] **MFST** [Observation]	Used to say that the source is a manifestation of the target (for instance, source "hives" is a manifestation of target "penicillin allergy").
REFR (refers to)	[Act | Observation | Procedure | SubstanceAdministration | Supply] **REFR** [Act | Observation | ObservationMedia | Procedure | RegionOfInterest | SubstanceAdministration | Supply]	Used to show a general relationship between the source and the target, when the more specific semantics of the relationship isn't known.
RSON (has reason)	[Act | Encounter | Observation | Procedure | SubstanceAdministration | Supply] **RSON** [Act | Encounter | Observation | Procedure | SubstanceAdministration | Supply]	Used to show the reason or rational for a service (for instance source "treadmill test" has reason "chest pain").
SAS (starts after start)	[Act | Encounter | Observation | Procedure | SubstanceAdministration | Supply] **SAS** [Act | Encounter | Observation | Procedure | SubstanceAdministration | Supply]	The target Act starts after the start of the source Act (for instance target "diaphoresis" starts after the start of source "chest pain").

SPRT (has support)	[Observation] **SPRT** [Observation | ObservationMedia | RegionOfInterest]	Used to show that the target provides supporting evidence for the source (for instance source "possible lung tumor" has support target "mass seen on chest-x-ray").
SUBJ (has subject)	[Observation | RegionOfInterest] **SUBJ** [Observation | ObservationMedia]	Used to relate a source region of interest to a target image, or to relate an observation to its subject observation (for instance, source "moderate severity" has subject target "chest pain"). The ActRelationshipType "has subject" is similar to the ParticipationType "subject". Entries that primarily operate on physical subjects use the Participation, whereas entries that primarily operate on other entries use the ActRelationship.

XCRPT (is excerpt of)	[Act | Observation] **XCRPT** [Act | Observation | Procedure | SubstanceAdministration | Supply]	Used to show that the source is excerpted from the target (for instance source "hemoglobin value of 12" is an excerpt of target "complete blood count"). The distinction between an excerpt and an informant participant can be blurry — such as in the case of recording a patient's medication history where the clinician may obtain the information from an informant or may excerpt the information from another computer system. An informant (or source of information) is a person who provides relevant information. An informant class is in the header, and can be overridden in the body. An excerpt is a sub portion of some other act.

reference — CDA entries can reference external objects such as external images and prior reports. These external objects are not part of the authenticated document content. They contain sufficient attributes to enable an explicit reference rather than duplicating the entire referenced object. Each object allows for an identifier and a code, and contains the RIM Act.text attribute, which can be used to store the URL and MIME type of the object. External objects always have a fixed moodCode of "EVN".

The reference class contains the attribute reference.seperatableInd, which indicates whether or not the source is intended to be interpreted independently of the target. The indicator cannot prevent an individual or application from separating the source and target, but indicates the author's desire and willingness to attest to the content of the source if separated from the target. Typically, where seperatableInd is "false", the exchanged package should include the target of the reference so that the recipient can render it.

A description of allowable reference.typeCode values are shown in the following table. As in the table above (CDA entryRelationship Types), the following table is a guideline for reasonable relationships between CDA entries and external objects, and is not a conformance constraint.

Table 133: CDA reference Types

ActRelationship Type	Reasonable Source and Target classes	Comments
ELNK (episode link)	[Observation] **ELNK** [ExternalObservation]	Used to show that the source and the target are part of the same episode (for instance, a diagnosis of "pneumonia" can be linked to an external problem list entry of "pneumonia" to show that the current diagnosis is part of the ongoing episode of pneumonia).

REFR (refers to)	[Act | Observation | Procedure | SubstanceAdministration | Supply] **REFR** [ExternalAct | ExternalDocument | ExternalObservation | ExternalProcedure]	Used to show a general relationship between the source and the target, when the more specific semantics of the relationship isn't known.
SPRT (has support)	[Observation] **SPRT** [ExternalDocument | ExternalObservation]	Used to show that the target provides supporting evidence for the source.
SUBJ (has subject)	[Observation | RegionOfInterest] **SUBJ** [ExternalObservation]	Used to relate a source region of interest to a target image, or to relate an observation to its subject observation.
XCRPT (is excerpt of)	[Act | Observation] **XCRPT** [ExternalAct | ExternalDocument | ExternalObservation | ExternalProcedure]	Used to show that the source is excerpted from the target (for instance "the hemoglobin is 10.7" is an excerpt of an externally referenced "complete blood count").

Target classes of the reference relationship include ExternalAct, ExternalDocument, ExternalObservation, and External Procedure.

ExternalAct is a derivative of the RIM Act class, to be used when the other more specific classes are not appropriate.

Table 134: Value set for ExternalAct.classCode (CNE)

Code	Definition
ACT (act) [**default**]	A healthcare service.
Any ACT subtype.	

Table 135: Value set for ExternalAct.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	An actual occurrence of an event.

ExternalDocument is a derivative of the RIM Document class, used for representing external documents. ExternalDocument.text is modeled as an ED data type - allowing for the expression of the MIME type of the external document.

Table 136: Value set for ExternalDocument.classCode (CNE)

Code	Definition
DOC (document) [**default**]	The notion of a document comes particularly from the paper world, where it corresponds to the contents recorded on discrete pieces of paper. In the electronic world, a document is a kind of composition that bears resemblance to their paper world counter-parts. Documents typically are meant to be human-readable. HL7's notion of document differs from that described in the W3C XML Recommendation, in which a document refers specifically to the contents that fall between the root element's start-tag and end-tag. Not all XML documents are HL7 documents.
Any DOC subtype	

Table 137: Value set for ExternalDocument.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	An actual occurrence of an event.

ExternalObservation is a derivative of the RIM Observation class, used for representing external coded and other observations.

Table 138: Value set for ExternalObservation.classCode (CNE)

Code	Definition
OBS (observation) [**default**]	Observations are actions performed in order to determine an answer or result value.
Any OBS subtype	

Table 139: Value set for ExternalObservation.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	An actual occurrence of an event.

ExternalProcedure is a derivative of the RIM Procedure class, used for representing external procedures.

Table 140: Value set for ExternalProcedure.classCode (CNE)

Code	Definition
PROC (procedure) [**default**]	An Act whose immediate and primary outcome (post-condition) is the alteration of the physical condition of the subject.
Any PROC subtype	

Table 141: Value set for ExternalProcedure.moodCode (CNE)

Code	Definition
EVN (event) [**default**]	An actual occurrence of an event.

2.3.4 CDA Context

CDA context is set in the CDA header and applies to the entire document. Context can be overridden at the level of the body, section, and/or CDA entry.

2.3.4.1 Overview of CDA Context

A document, in a sense, is a contextual wrapper for its contents. Assertions in the document header are typically applicable to statements made in the body of the document, unless overridden. For instance, the patient identified in the header is assumed to be the subject of observations described in the body of the document, unless a different subject is explicitly stated, or the author identified in the header is assumed to be the author of the entire document, unless a different author is explicitly identified on a section. The objective of the CDA context rules are to make these practices explicit with relationship to the RIM, such that a computer will understand the context of a portion of a document the same way that a human interprets it.

At the same time, there is no guarantee that machine processing will identify a mistaken application of contextual rules. If a physician records an "outside diagnosis" in narrative but does not nullify the "informant" context, machine processing will not identify the switch in attribution. This is a special case illustrating the limits of automated validation of electronic records and would apply regardless of the context inheritance mechanism. In other words, from some errors of encoding, there is no recovery other than human review.

CDA's approach to context, and the propagation of that context to nested document components, follows these design principles:

- CDA uses the RIM context mechanism (contextControlCode for Participations; contextConductionInd for ActRelationships), and assigns fixed values to these attributes to accomplish the design objectives below, thus constraining the RIM context model. CDA extends the context propagation property to designated attributes of the CDA Header, which also propagate through any ActRelationship for which contextConductionInd="true".
- The CDA Header sets context for the entire document. A propagating value specified in the document header holds true throughout the document, unless explicitly overridden. This principal applies to both Participations and to designated attributes of the CDA Header. Contextual header components (i.e., those that have propagating values) include:
    - Author
    - Confidentiality
    - Data enterer
    - Human language
    - Informant
    - Legal authenticator
    - Participant
    - Record target
- Context components that can be overridden at the level of the document body include:
    - Confidentiality
    - Human language
- Context components that can be overridden at the level of a document section include:
    - Author
    - Confidentiality
    - Human language
    - Informant
    - Subject
- Context components that can be overridden at the level of a CDA entry include:
    - Author
    - Human language
    - Informant
    - Participant
    - Subject
- Context propagates from outer tags to nested tags. Context that is specified on an outer tag holds true for all nested tags, unless overridden on a nested tag. Context specified on a tag within the CDA body always overrides context propagated from an outer tag. For instance, the specification of authorship at a document section level overrides all authorship propagated from outer tags.
- Context is sometimes known precisely, and is sometimes unknown, such as in the case where a document is comprised of a large unparsed narrative block that potentially includes statements that contradict outer context. Because CDA context always propagates unless overridden, the

representation of unknown context is achieved by overriding with a null value.

2.3.4.2 Technical Aspects of CDA Context

The RIM defines the "context" of an act as those participants of the act that can be propagated to nested acts. In the RIM, whether or not contextual participants do propagate to nested acts depends on whether or not the intervening act relationship between parent and child act allows for conduction of context. The explicit representation of context, and whether or not the context on an act can propagate to nested acts, is expressed via the RIM attributes Participation.contextControlCode and ActRelationship. contextConductionInd. CDA constrains the general RIM context mechanism such that context always overrides and propagates, as shown in the following table.

Table 142: CDA constraints on RIM context attributes

RIM attribute	Cardinality	Conformance	Fixed Value
Participation. contextControlCode	1..1	Mandatory (NULL values not permitted)	"OP" (overriding, propagating)
ActRelationship. contextConductionInd	1..1	Mandatory (NULL values not permitted)	"true"

Where the context of a nested component is unknown, the propagated context must be overridden with a null-valued component, as shown in the following table.

Table 143: Blocking context propagation with null values

Context	Null value representation
Author	AssignedAuthor.id = NULL; No playing entity; No scoping entity.
Confidentiality	confidentialityCode = NULL.
Human language	languageCode = NULL.
Informant	AssignedEntity.id = NULL; No playing entity; No scoping entity.
Participant	ParticipantRole.id = NULL; No playing entity; No scoping entity.

The following exhibit illustrates the CDA context model. ClinicalDocument has an author participant, a confidentialityCode, and a languageCode, all of which will propagate to nested acts. The component act relationship going from ClinicalDocument to bodyChoice has contextConductionInd fixed as "true", thus allowing for the propagation of context. The bodyChoice classes, NonXMLBody and StructuredBody, contain a confidentialityCode and languageCode which can be used to override the value specified in the header. The component act relationship going from StructuredBody to Section has contextConductionInd fixed at "true", thus the context on StructuredBody will propagate through to Section. Section can override confidentialityCode, languageCode, and author. A null value for the Section's author participant indicates that the author for that particular section is unknown.

Figure 2: Portion of CDA R-MIM to illustrate "context"

Link to graphic (opens in a new window)

Because context is always overriding and propagating, one can compute the context of a given node by looking for the most proximate assertion. The following example is a sample XPath expression that can be used to identify the <author> context of a section or entry:

Example 11: Sample XPath expression for the author of the current node

```
(ancestor-or-self::*/author)[position()=last()]
```

2.4 CDA Hierarchical Description

NOTE: The definitive description of HL7 Hierarchical Description development and interpretation can be found here.

The CDA Hierarchical Description POCD_HD000020 can be found here.

The CDA HD is the definitive source for CDA conformance rules, and serves as the source from which the CDA Schema is derived. While a CDA instance must validate against the CDA Schema, it must also adhere to the conformance rules stated in the CDA Hierarchical Description.

HL7 enables conformance specification at the level of each RIM attribute. RIM attributes can be defined as "Required", in which case the originator must populate the attribute where a value is known even if the cardinality is optional, and "Mandatory", in which case the originator must populate the attribute with a non-NULL value in all cases.

In CDA, Release Two, the "Required" and "Mandatory" conformance indicators are applied only to the following attributes:

- Required attributes:
  - Section.text
- Mandatory attributes:
  - ClinicalDocument.typeId [fixed: ClinicalDocument.typeId.Root = "2.16.840.1.113883.1.3" (which is the OID for HL7 Registered models); ClinicalDocument.typeId.Extension = "POCD_HD000020"]
  - RIM Structural Attributes [defaulted where possible in the CDA HD and Schema]
    - ClassCode
    - MoodCode
    - TypeCode
    - DeterminerCode
  - Context attributes
    - contextControlCode [fixed: "OP"]
    - ContextConductionInd [fixed: "true"]

NOTE: Note that where Mandatory attributes have a default or fixed value supplied in the CDA HD, the instance need not contain a value. In such cases, the receiver must assume the default value.

2.5 CDA Schema

NOTE: The definitive description of HL7 XML Implementation Technology Specification and the process used to go from Hierarchical Description to Schema can be found here.

The CDA Schema can be found here

The CDA Schema is derived from the CDA HD using the normal V3 XML ITS, such that the CDA Schema is fully conformant with the V3 XML ITS. In addition, the CDA Schema is enhanced with the addition of a few features:

- CDA Narrative Block - The XML content model of Section.text is manually crafted, as described above (see CDA Section Narrative Block (§ 2.3.3.5)).
- XML ID/IDREFS - To enable specific use cases for referencing out from the CDA Narrative Block, CDA adds an "MMID" attribute of type XML ID to ObservationMedia and RegionOfInterest (see CDA Section Relationships (§ 2.3.3.4)).

3 Appendices

The appendices contain non-normative material supplied as aids to understanding and implementing the technical specifications described above.

3.1 Samples

3.1.1 Sample Document

Good Health Clinic Consultation note

Consultant: Robert Dolin, MD

Date: April 7, 2000

Patient: Henry Levin, the 7th MRN: 12345 Sex: Male

Birthdate: September 24, 1932

History of Present Illness

Henry Levin, the 7th is a 67 year old male referred for further asthma management. Onset of asthma in his twenties teens. He was hospitalized twice last year, and already twice this year. He has not been able to be weaned off steroids for the past several months.

Past Medical History

- Asthma
- Hypertension (see HTN.cda for details)
- Osteoarthritis, right knee

Medications

- Theodur 200mg BID
- Albuterol inhaler 2puffs QID PRN
- Prednisone 20mg qd
- HCTZ 25mg qd

Allergies and Adverse Reactions

- Penicillin - Hives
- Aspirin - Wheezing
- Codeine - Itching and nausea

Family History

- Father had fatal MI in his early 50's.
- No cancer or diabetes.

Social History

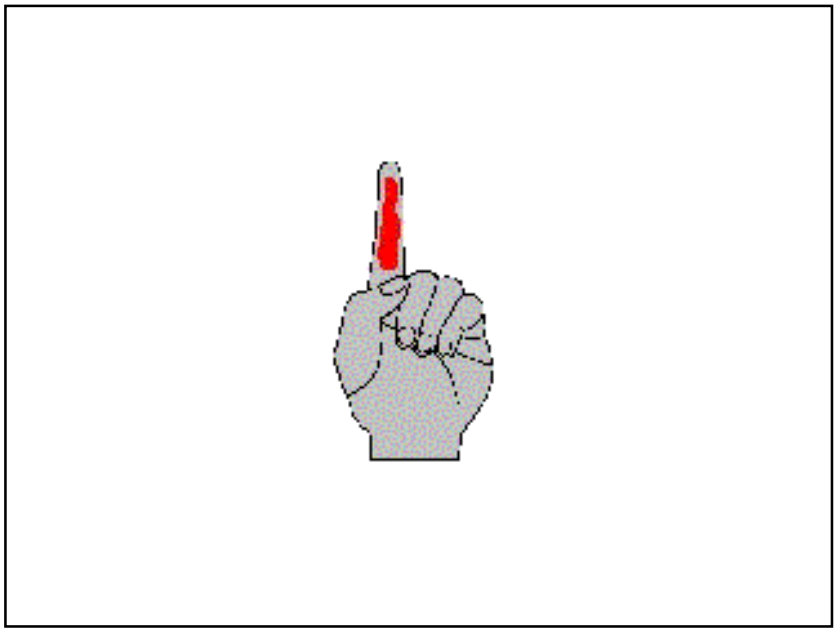
- Smoking :: 1 PPD between the ages of 20 and 55, and then he quit.
- Alcohol :: Rare

Physical Exam

- Vital Signs

Date / Time	April 7, 2000 14:30	April 7, 2000 15:30
Height	177 cm (69.7 in)	
Weight	194.0 lbs (88.0 kg)	
BMI	28.1 kg/m2	
BSA	2.05 m2	
Temperature	36.9 C (98.5 F)	
Pulse	86 / minute	84 / minute
Rhythm	Regular	Regular
Respirations	16 / minute, unlabored	14 / minute
Systolic	132 mmHg	135 mmHg
Diastolic	86 mmHg	88 mmHg
Position - Cuff	Left Arm	Left Arm

- Skin :: Erythematous rash, palmar surface, left index finger.



- Lungs :: Clear with no wheeze. Good air flow.
- Cardiac :: RRR with no murmur, no S3, no S4.

Labs

- CXR 02/03/1999: Hyperinflated. Normal cardiac silhouette, clear lungs.
- Peak Flow today: 260 l/m.

In-office Procedure

- Suture removal, left forearm.

Assessment

- Asthma, with prior smoking history. Difficulty weaning off steroids. Will try gradual taper.
- Hypertension, well-controlled.
- Contact dermatitis on finger.

Plan

- Complete PFTs with lung volumes.
- Chem-7 tomorrow
- Teach peak flow rate measurement.
- Decrease prednisone to 20qOD alternating with 18qOD.
- Hydrocortisone cream to finger BID.
- RTC 1 week.

Signed by: Robert Dolin, MD April 8, 2000

3.1.2 Sample CDA Instance

This is a valid and conformant CDA instance based on the sample document above.

Open the Sample File

3.2 Implementation Notes

3.2.1 Creating CDA Documents

Introduction

There are an ever-increasing variety of tools and techniques for creating CDA documents:

1. Transcription: most clinical documents are created through a voice interface. CDA is available as an output from transcription vendors large and small today. Some are integrating natural language processing to provide coded structures within dictated CDAs.
2. EMR/EHR: many electronic medical record vendors have CDA output capability, although they provide it on-demand, not as a standard feature. For EMRs, CDA is relatively simple type of report.
3. XML forms: a new generation of XML tools for forms generation can create CDA on output.
4. Knowledge base: at least one major US provider has built a CDA editor on top of a knowledge base for guided, structured entry.
5. Dynamic query: dynamic assembly of CDA documents is used in some distributed applications to prepopulate documents from existing data stores, such as lab result databases. This method can be used in conjunction with any of the others.

This appendix considers not the specific tools and technologies, but is intended as a general guide to use of CDA in document creation.

Before you start: RIM compliance

- structures, vocabulary, datatypes

Creating a CDA-compliant instance, by definition, means that the information contained within is defined by the HL7 RIM. Regardless of your starting point or method of document generation, when you are done, the computable semantics of the document will derive their meaning from the relationship between RIM classes, controlled vocabulary and the V3 RIM datatypes. Any CDA-generation implementation must start with an examination of how document requirements relate to the RIM, the datatypes and vocabulary.

The RIM, however, is a highly abstract model and recognizes many extensive vocabulary domains. While RIM-mapping is a necessary condition for CDA generation, it is not sufficient to determine the method of generation or to drive a user interface for document creation.

An exchange specification, not an authoring specification

- CDA is not deterministic for document creation

CDA is a specification for the exchange form of a clinical document. A CDA schema can validate many of the conformance requirements, but will be too general for most authoring applications. In general, standards for interoperability and broadbased exchange will not directly drive an authoring GUI. Given the extent of the CDA domain – clinical care – the requirements for generalized exchange overlap with, but don't match, the requirements for driving an authoring interface.

For example, the CDA requirement for human readability demands that a single stylesheet render the authenticated clinical content of any CDA document. If CDA elements were defined in the generic schema that corresponds to the sections of a document, <historyOfPresentIllness> or <Subjective>, for example, a stylesheet would need to recognize each of these tags as section-level tags and render them accordingly. The CDA approach, defining <section> and asserting the type of section through coded vocabulary means that not only is the CDA extensible through the externally-maintained vocabulary domains, but that document designers have the flexibility to create hierarchies of sections and to name and tag them according to local requirements, while maintaining compatibility for the exchange context. Thus, while specific tagging that makes it easier to drive a GUI is fine locally, where practice can be more tightly constrained, CDA needs to take a more general approach.

Both sets of requirements, for authoring and for exchange, should be recognized. Within a defined community of interest, such as a single business enterprise, a professional society or in some cases, local and regional health authorities, there can be tight agreement on the form of a document so that the authoring definitions and the exchange definitions coincide. Unless and until there is universal agreement, there can be no universal exchange unless the diversity of local requirements is acknowledged. This is a long-winded way of saying that CDA will remain a general exchange standard, and other approaches must be available to define data entry and document creation validation requirements.

General approaches: constrain or transform

- constrain: emit valid CDA directly from the authoring system using a schema that isn't CDA
- transform: example - emit local XML, map to CDA

Given that CDA is not an authoring schema, there are two logical alternatives to creating valid CDA instances.

The first is to add constraints to the CDA schema so that the resulting specification defines a particular document type (see the following exhibit "Creating a CDA through a local schema"). There are several technologies available for adding constraints. One approach is to modify the CDA schema itself to a local variant (local.cda.xsd below). Modifications could include limiting the levels of nesting; constraining vocabulary and sequence, for example requiring that a section with a LOINC code for "Subjective" initiate the document body and be followed by a section coded "Objective". These modifications could be expressed in W3C Schema or as Xpath statements within the local schema. Instances that validate against this constrained, local version of CDA are, by definition, also valid CDA instances.

Figure 3: Creating a CDA through a local schema

Link to graphic (opens in a new window)

Templates are one type of constraint. HL7 is in the process of defining a formal template mechanism (see The "A" in "CDA" (§ 1.2.2)).

The second approach is to create a local schema and then transform the local XML instance to CDA

Figure 4: Creating a CDA through transformation from local XML

Link to graphic (opens in a new window)

3.2.2 LOINC Document Codes

The following table is drawn from LOINC, version 2.12, February 2004, and equals the subset whose scale = "DOC" (and whose status <> "DEL"). The LOINC document model includes a component for "type of service" (conveyed in the Component field), "setting" (conveyed in the System field), "subject matter domain" (conveyed in the Method_Type field), and "training / professional level" (also conveyed in the Method_Type field).

The type of service characterizes the kind of service or activity that was provided to/for the patient (or other subject of the service) as described in the note. Common subclasses of service would be examinations, evaluations, and management. The notion of time sequence, e.g. at the beginning (admission) at the end (discharge) and is subsumed in the axis.

The setting is a modest extension of the Centers for Medicare and Medicaid Services (CMS) coarse definition of settings. Setting is not equivalent to location, which typically has more locally defined meanings.

The subject matter domain characterized the subject matter or clinical categorization of a note. The training / professional level characterizes the training or professional level of the author of the document.

Table 144: LOINC document codes

LOINC_NUM	COMPONENT (Type of Service)	SYSTEM (Setting)	METHOD_TYPE (Subject Matter Domain and/or Training / Professional Level)
34744-3	ADMISSION EVALUATION NOTE	{SETTING}	NURSING
34873-0	ADMISSION EVALUATION NOTE	{SETTING}	SURGERY
34862-3	ADMISSION EVALUATION NOTE	INPATIENT	ATTENDING PHYSICIAN.GENERAL MEDICINE
34763-3	ADMISSION HISTORY AND PHYSICAL NOTE	{SETTING}	GENERAL MEDICINE

34094-3	ADMISSION HISTORY AND PHYSICAL NOTE	HOSPITAL	CARDIOLOGY
18743-5	AUTOPSY NOTE	{SETTING}	{PROVIDER}
34095-0	COMPREHENSIVE HISTORY & PHYSICAL NOTE	{SETTING}	{PROVIDER}
34096-8	COMPREHENSIVE HISTORY AND PHYSICAL	NURSING HOME	{PROVIDER}
34098-4	CONFERENCE EVALUATION NOTE	{SETTING}	{PROVIDER}
34097-6	CONFERENCE EVALUATION NOTE	NURSING HOME	{PROVIDER}
24611-6	CONFIRMATORY CONSULTATION NOTE	OUTPATIENT	{PROVIDER}
11488-4	CONSULTATION NOTE	{SETTING}	{PROVIDER}

34099-2	CONSULTATION NOTE	{SETTING}	CARDIOLOGY
34756-7	CONSULTATION NOTE	{SETTING}	DENTISTRY
34758-3	CONSULTATION NOTE	{SETTING}	DERMATOLOGY
34760-9	CONSULTATION NOTE	{SETTING}	DIABETOLOGY
34879-7	CONSULTATION NOTE	{SETTING}	ENDOCRINOLOGY
34761-7	CONSULTATION NOTE	{SETTING}	GASTROENTEROLOGY
34764-1	CONSULTATION NOTE	{SETTING}	GENERAL MEDICINE
34771-6	CONSULTATION NOTE	{SETTING}	GENERAL SURGERY
34776-5	CONSULTATION NOTE	{SETTING}	GERONTOLOGY
34777-3	CONSULTATION NOTE	{SETTING}	GYNECOLOGY

34779-9	CONSULTATION NOTE	{SETTING}	HEMATOLOGY+ONCOLOGY
34781-5	CONSULTATION NOTE	{SETTING}	INFECTIOUS DISEASE
34783-1	CONSULTATION NOTE	{SETTING}	KINESIOTHERAPY
34785-6	CONSULTATION NOTE	{SETTING}	MENTAL HEALTH
34795-5	CONSULTATION NOTE	{SETTING}	NEPHROLOGY
34797-1	CONSULTATION NOTE	{SETTING}	NEUROLOGY
34798-9	CONSULTATION NOTE	{SETTING}	NEUROSURGERY
34800-3	CONSULTATION NOTE	{SETTING}	NUTRITION+DIETETICS
34803-7	CONSULTATION NOTE	{SETTING}	OCCUPATIONAL HEALTH
34855-7	CONSULTATION NOTE	{SETTING}	OCCUPATIONAL THERAPY

34805-2	CONSULTATION NOTE	{SETTING}	ONCOLOGY
34807-8	CONSULTATION NOTE	{SETTING}	OPHTHALMOLOGY
34810-2	CONSULTATION NOTE	{SETTING}	OPTOMETRY
34812-8	CONSULTATION NOTE	{SETTING}	OROMAXILLOFACIAL SURGERY
34814-4	CONSULTATION NOTE	{SETTING}	ORTHOPEDICS
34816-9	CONSULTATION NOTE	{SETTING}	OTORHINOLARYNGOLOGY
34820-1	CONSULTATION NOTE	{SETTING}	PHARMACY
34822-7	CONSULTATION NOTE	{SETTING}	PHYSICAL MEDICINE AND REHABILITATION
34824-3	CONSULTATION NOTE	{SETTING}	PHYSICAL THERAPY
34826-8	CONSULTATION NOTE	{SETTING}	PLASTIC SURGERY

34828-4	CONSULTATION NOTE	{SETTING}	PODIATRY
34788-0	CONSULTATION NOTE	{SETTING}	PSYCHIATRY
34791-4	CONSULTATION NOTE	{SETTING}	PSYCHOLOGY
34103-2	CONSULTATION NOTE	{SETTING}	PULMONARY
34831-8	CONSULTATION NOTE	{SETTING}	RADIATION ONCOLOGY
34833-4	CONSULTATION NOTE	{SETTING}	RECREATIONAL THERAPY
34835-9	CONSULTATION NOTE	{SETTING}	REHABILITATION
34837-5	CONSULTATION NOTE	{SETTING}	RESPIRATORY THERAPY
34839-1	CONSULTATION NOTE	{SETTING}	RHEUMATOLOGY
34841-7	CONSULTATION NOTE	{SETTING}	SOCIAL WORK

34845-8	CONSULTATION NOTE	{SETTING}	SPEECH THERAPY+AUDIOLOGY
34847-4	CONSULTATION NOTE	{SETTING}	SURGERY
34849-0	CONSULTATION NOTE	{SETTING}	THORACIC SURGERY
34851-6	CONSULTATION NOTE	{SETTING}	UROLOGY
34853-2	CONSULTATION NOTE	{SETTING}	VASCULAR SURGERY
34100-8	CONSULTATION NOTE	CRITICAL CARE UNIT	{PROVIDER}
34104-0	CONSULTATION NOTE	HOSPITAL	{PROVIDER}
34102-4	CONSULTATION NOTE	HOSPITAL	PSYCHIATRY
34749-2	CONSULTATION NOTE	OUTPATIENT	ANESTHESIA
34101-6	CONSULTATION NOTE	OUTPATIENT	GENERAL MEDICINE

34864-9	COUNSELING NOTE	{SETTING}	MENTAL HEALTH
34869-8	COUNSELING NOTE	{SETTING}	PHARMACY
34865-6	COUNSELING NOTE	{SETTING}	PSYCHIATRY
34866-4	COUNSELING NOTE	{SETTING}	PSYCHOLOGY
34872-2	COUNSELING NOTE	{SETTING}	SOCIAL WORK
28622-9	DISCHARGE ASSESSMENT NOTE	{SETTING}	NURSING
28574-2	DISCHARGE NOTE	{SETTING}	{PROVIDER}
18842-5	DISCHARGE SUMMARIZATION NOTE	{SETTING}	{PROVIDER}
28655-9	DISCHARGE SUMMARIZATION NOTE	{SETTING}	ATTENDING PHYSICIAN

29761-4	DISCHARGE SUMMARIZATION NOTE	{SETTING}	DENTISTRY
34745-0	DISCHARGE SUMMARIZATION NOTE	{SETTING}	NURSING
11490-0	DISCHARGE SUMMARIZATION NOTE	{SETTING}	PHYSICIAN
34105-7	DISCHARGE SUMMARIZATION NOTE	HOSPITAL	{PROVIDER}
34106-5	DISCHARGE SUMMARIZATION NOTE	HOSPITAL	PHYSICIAN
34895-3	EDUCATION NOTE	{SETTING}	{PROVIDER}
34897-9	EDUCATION NOTE	{SETTING}	DIABETOLOGY
34902-7	EDUCATION NOTE	OUTPATIENT	GERONTOLOGY
34107-3	EDUCATION PROCEDURE NOTE	HOME HEALTH	{PROVIDER}

34108-1	EVALUATION AND MANAGEMENT	OUTPATIENT	{PROVIDER}
34109-9	EVALUATION AND MANAGEMENT NOTE	{SETTING}	{PROVIDER}
34750-0	EVALUATION AND MANAGEMENT NOTE	{SETTING}	ANESTHESIA
34856-5	EVALUATION AND MANAGEMENT NOTE	{SETTING}	ANTICOAGULATION SERVICE
34769-0	EVALUATION AND MANAGEMENT NOTE	{SETTING}	ATTENDING PHYSICIAN.GENERAL MEDICINE
34773-2	EVALUATION AND MANAGEMENT NOTE	{SETTING}	ATTENDING PHYSICIAN.GENERAL SURGERY
34752-6	EVALUATION AND MANAGEMENT NOTE	{SETTING}	CARDIOLOGY
34754-2	EVALUATION AND MANAGEMENT NOTE	{SETTING}	CRITICAL CARE

34757-5	EVALUATION AND MANAGEMENT NOTE	{SETTING}	DENTISTRY
34759-1	EVALUATION AND MANAGEMENT NOTE	{SETTING}	DERMATOLOGY
34861-5	EVALUATION AND MANAGEMENT NOTE	{SETTING}	DIABETOLOGY
34878-9	EVALUATION AND MANAGEMENT NOTE	{SETTING}	EMERGENCY MEDICINE
34898-7	EVALUATION AND MANAGEMENT NOTE	{SETTING}	ENDOCRINOLOGY
34762-5	EVALUATION AND MANAGEMENT NOTE	{SETTING}	GASTROENTEROLOGY
34765-8	EVALUATION AND MANAGEMENT NOTE	{SETTING}	GENERAL MEDICINE
34772-4	EVALUATION AND MANAGEMENT NOTE	{SETTING}	GENERAL SURGERY

34778-1	EVALUATION AND MANAGEMENT NOTE	{SETTING}	GYNECOLOGY
34780-7	EVALUATION AND MANAGEMENT NOTE	{SETTING}	HEMATOLOGY+ONCOLOGY
34859-9	EVALUATION AND MANAGEMENT NOTE	{SETTING}	HYPERLIPIDEMIA
34860-7	EVALUATION AND MANAGEMENT NOTE	{SETTING}	HYPERTENSION
34782-3	EVALUATION AND MANAGEMENT NOTE	{SETTING}	INFECTIOUS DISEASE
34784-9	EVALUATION AND MANAGEMENT NOTE	{SETTING}	KINESIOTHERAPY
34767-4	EVALUATION AND MANAGEMENT NOTE	{SETTING}	MEDICAL STUDENT.GENERAL MEDICINE
34786-4	EVALUATION AND MANAGEMENT NOTE	{SETTING}	MENTAL HEALTH

34794-8	EVALUATION AND MANAGEMENT NOTE	{SETTING}	MULTIDISCIPLINARY
34796-3	EVALUATION AND MANAGEMENT NOTE	{SETTING}	NEPHROLOGY
34905-0	EVALUATION AND MANAGEMENT NOTE	{SETTING}	NEUROLOGY
34799-7	EVALUATION AND MANAGEMENT NOTE	{SETTING}	NEUROSURGERY
34768-2	EVALUATION AND MANAGEMENT NOTE	{SETTING}	NURSE.GENERAL MEDICINE
34746-8	EVALUATION AND MANAGEMENT NOTE	{SETTING}	NURSING
34801-1	EVALUATION AND MANAGEMENT NOTE	{SETTING}	NUTRITION+DIETETICS
34802-9	EVALUATION AND MANAGEMENT NOTE	{SETTING}	OCCUPATIONAL HEALTH

34804-5	EVALUATION AND MANAGEMENT NOTE	{SETTING}	OCCUPATIONAL THERAPY
34806-0	EVALUATION AND MANAGEMENT NOTE	{SETTING}	ONCOLOGY
34808-6	EVALUATION AND MANAGEMENT NOTE	{SETTING}	OPHTHALMOLOGY
34811-0	EVALUATION AND MANAGEMENT NOTE	{SETTING}	OPTOMETRY
34813-6	EVALUATION AND MANAGEMENT NOTE	{SETTING}	OROMAXILLOFACIAL SURGERY
34815-1	EVALUATION AND MANAGEMENT NOTE	{SETTING}	ORTHOPEDICS
34817-7	EVALUATION AND MANAGEMENT NOTE	{SETTING}	OTORHINOLARYNGOLOGY
34858-1	EVALUATION AND MANAGEMENT NOTE	{SETTING}	PAIN MANAGEMENT

34819-3	EVALUATION AND MANAGEMENT NOTE	{SETTING}	PATHOLOGY
34821-9	EVALUATION AND MANAGEMENT NOTE	{SETTING}	PHARMACY
34823-5	EVALUATION AND MANAGEMENT NOTE	{SETTING}	PHYSICAL MEDICINE AND REHABILITATION
34825-0	EVALUATION AND MANAGEMENT NOTE	{SETTING}	PHYSICAL THERAPY
34827-6	EVALUATION AND MANAGEMENT NOTE	{SETTING}	PLASTIC SURGERY
34829-2	EVALUATION AND MANAGEMENT NOTE	{SETTING}	PODIATRY
34789-8	EVALUATION AND MANAGEMENT NOTE	{SETTING}	PSYCHIATRY
34792-2	EVALUATION AND MANAGEMENT NOTE	{SETTING}	PSYCHOLOGY

34830-0	EVALUATION AND MANAGEMENT NOTE	{SETTING}	PULMONARY
34832-6	EVALUATION AND MANAGEMENT NOTE	{SETTING}	RADIATION ONCOLOGY
34834-2	EVALUATION AND MANAGEMENT NOTE	{SETTING}	RECREATIONAL THERAPY
34836-7	EVALUATION AND MANAGEMENT NOTE	{SETTING}	REHABILITATION
34838-3	EVALUATION AND MANAGEMENT NOTE	{SETTING}	RESPIRATORY THERAPY
34840-9	EVALUATION AND MANAGEMENT NOTE	{SETTING}	RHEUMATOLOGY
34842-5	EVALUATION AND MANAGEMENT NOTE	{SETTING}	SOCIAL WORK
34846-6	EVALUATION AND MANAGEMENT NOTE	{SETTING}	SPEECH THERAPY+AUDIOLOGY

34857-3	EVALUATION AND MANAGEMENT NOTE	{SETTING}	SUBSTANCE ABUSE
34848-2	EVALUATION AND MANAGEMENT NOTE	{SETTING}	SURGERY
34852-4	EVALUATION AND MANAGEMENT NOTE	{SETTING}	UROLOGY
34111-5	EVALUATION AND MANAGEMENT NOTE	EMERGENCY DEPARTMENT	{PROVIDER}
34112-3	EVALUATION AND MANAGEMENT NOTE	INPATIENT	{PROVIDER}
34113-1	EVALUATION AND MANAGEMENT NOTE	NURSING HOME	{PROVIDER}
34753-4	EVALUATION AND MANAGEMENT NOTE	OUTPATIENT	CARDIOLOGY
34110-7	EVALUATION AND MANAGEMENT NOTE	OUTPATIENT	DIABETOLOGY

34766-6	EVALUATION AND MANAGEMENT NOTE	OUTPATIENT	GENERAL MEDICINE
34850-8	EVALUATION AND MANAGEMENT NOTE	OUTPATIENT	THORACIC SURGERY
34854-0	EVALUATION AND MANAGEMENT NOTE	OUTPATIENT	VASCULAR SURGERY
34787-2	GROUP COUNSELING NOTE	{SETTING}	MENTAL HEALTH
34790-6	GROUP COUNSELING NOTE	{SETTING}	PSYCHIATRY
34793-0	GROUP COUNSELING NOTE	{SETTING}	PSYCHOLOGY
34843-3	GROUP COUNSELING NOTE	{SETTING}	SOCIAL WORK
34114-9	GROUP COUNSELING NOTE	HOSPITAL	{PROVIDER}

34774-0	HISTORY & PHYSICAL NOTE	{SETTING}	GENERAL SURGERY
28626-0	HISTORY & PHYSICAL NOTE	{SETTING}	PHYSICIAN
11492-6	HISTORY & PHYSICAL NOTE	HOSPITAL	{PROVIDER}
34115-6	HISTORY & PHYSICAL NOTE	HOSPITAL	MEDICAL STUDENT
34116-4	HISTORY & PHYSICAL NOTE	NURSING HOME	PHYSICIAN
34117-2	HISTORY AND PHYSICAL NOTE	{SETTING}	{PROVIDER}
28636-9	INITIAL EVALUATION NOTE	{SETTING}	{PROVIDER}
28654-2	INITIAL EVALUATION NOTE	{SETTING}	ATTENDING PHYSICIAN

28581-7	INITIAL EVALUATION NOTE	{SETTING}	CHIROPRACTOR
18763-3	INITIAL EVALUATION NOTE	{SETTING}	CONSULTING PHYSICIAN
28572-6	INITIAL EVALUATION NOTE	{SETTING}	DENTISTRY
28621-1	INITIAL EVALUATION NOTE	{SETTING}	NURSE PRACTITIONER
29753-1	INITIAL EVALUATION NOTE	{SETTING}	NURSING
18734-4	INITIAL EVALUATION NOTE	{SETTING}	OCCUPATIONAL THERAPY
18735-1	INITIAL EVALUATION NOTE	{SETTING}	PHYSICAL THERAPY
18736-9	INITIAL EVALUATION NOTE	{SETTING}	PHYSICIAN

18737-7	INITIAL EVALUATION NOTE	{SETTING}	PODIATRY
28635-1	INITIAL EVALUATION NOTE	{SETTING}	PSYCHIATRY
18738-5	INITIAL EVALUATION NOTE	{SETTING}	PSYCHOLOGY
18739-3	INITIAL EVALUATION NOTE	{SETTING}	SOCIAL SERVICE
18740-1	INITIAL EVALUATION NOTE	{SETTING}	SPEECH THERAPY
34118-0	INITIAL EVALUATION NOTE	HOME HEALTH	{PROVIDER}
34119-8	INITIAL EVALUATION NOTE	NURSING HOME	{PROVIDER}
34120-6	INITIAL EVALUATION NOTE	OUTPATIENT	{PROVIDER}

34121-4	INTERVENTIONAL PROCEDURE NOTE	{SETTING}	{PROVIDER}
34896-1	INTERVENTIONAL PROCEDURE NOTE	{SETTING}	CARDIOLOGY
34899-5	INTERVENTIONAL PROCEDURE NOTE	{SETTING}	GASTROENTEROLOGY
34903-5	NOTE	{SETTING}	MENTAL HEALTH
34906-8	NOTE	{SETTING}	PASTORAL CARE
11536-0	NOTES	{SETTING}	NURSING
34868-0	OPERATIVE NOTE	{SETTING}	ORTHOPEDICS
34818-5	OPERATIVE NOTE	{SETTING}	OTORHINOLARYNGOLOGY
34870-6	OPERATIVE NOTE	{SETTING}	PLASTIC SURGERY

34871-4	OPERATIVE NOTE	{SETTING}	PODIATRY
34874-8	OPERATIVE NOTE	{SETTING}	SURGERY
34877-1	OPERATIVE NOTE	{SETTING}	UROLOGY
34122-2	PATHOLOGY PROCEDURE NOTE	{SETTING}	PATHOLOGY
34863-1	POST-OPERATIVE EVALUATION AND MANAGEMENT NOTE	{SETTING}	GENERAL SURGERY
34880-5	POST-OPERATIVE EVALUATION AND MANAGEMENT NOTE	{SETTING}	NURSE.SURGERY
34875-5	POST-OPERATIVE EVALUATION AND MANAGEMENT NOTE	{SETTING}	SURGERY
34867-2	POST-OPERATIVE EVALUATION AND MANAGEMENT NOTE	OUTPATIENT	OPHTHALMOLOGY

34751-8	PRE-OPERATIVE EVALUATION AND MANAGEMENT NOTE	{SETTING}	ANESTHESIA
34775-7	PRE-OPERATIVE EVALUATION AND MANAGEMENT NOTE	{SETTING}	GENERAL SURGERY
34881-3	PRE-OPERATIVE EVALUATION AND MANAGEMENT NOTE	{SETTING}	NURSE.SURGERY
34747-6	PRE-OPERATIVE EVALUATION AND MANAGEMENT NOTE	{SETTING}	NURSING
34809-4	PRE-OPERATIVE EVALUATION AND MANAGEMENT NOTE	{SETTING}	OPHTHALMOLOGY
34876-3	PRE-OPERATIVE EVALUATION AND MANAGEMENT NOTE	{SETTING}	SURGERY

34123-0	PRE-OPERATIVE EVALUATION AND MANAGEMENT NOTE	HOSPITAL	ANESTHESIA
28570-0	PROCEDURE NOTE	{SETTING}	{PROVIDER}
28577-5	PROCEDURE NOTE	{SETTING}	DENTISTRY
11505-5	PROCEDURE NOTE	{SETTING}	PHYSICIAN
28625-2	PROCEDURE NOTE	{SETTING}	PODIATRY
28580-9	PROGRESS NOTE	{SETTING}	CHIROPRACTOR
28575-9	PROGRESS NOTE	{SETTING}	NURSE PRACTITIONER
18748-4	REPORT	XXX	RADIOLOGY
11526-1	STUDY REPORT	{SETTING}	PATHOLOGY
11527-9	STUDY REPORT	{SETTING}	PSYCHIATRY

11529-5	STUDY REPORT	{SETTING}	SURGICAL PATHOLOGY
11506-3	SUBSEQUENT EVALUATION NOTE	{SETTING}	{PROVIDER}
18733-6	SUBSEQUENT EVALUATION NOTE	{SETTING}	ATTENDING PHYSICIAN
18762-5	SUBSEQUENT EVALUATION NOTE	{SETTING}	CHIROPRACTOR
28569-2	SUBSEQUENT EVALUATION NOTE	{SETTING}	CONSULTING PHYSICIAN
28617-9	SUBSEQUENT EVALUATION NOTE	{SETTING}	DENTISTRY
34900-1	SUBSEQUENT EVALUATION NOTE	{SETTING}	GENERAL MEDICINE
34904-3	SUBSEQUENT EVALUATION NOTE	{SETTING}	MENTAL HEALTH

18764-1	SUBSEQUENT EVALUATION NOTE	{SETTING}	NURSE PRACTITIONER
28623-7	SUBSEQUENT EVALUATION NOTE	{SETTING}	NURSING
11507-1	SUBSEQUENT EVALUATION NOTE	{SETTING}	OCCUPATIONAL THERAPY
11508-9	SUBSEQUENT EVALUATION NOTE	{SETTING}	PHYSICAL THERAPY
11509-7	SUBSEQUENT EVALUATION NOTE	{SETTING}	PODIATRY
28627-8	SUBSEQUENT EVALUATION NOTE	{SETTING}	PSYCHIATRY
11510-5	SUBSEQUENT EVALUATION NOTE	{SETTING}	PSYCHOLOGY
28656-7	SUBSEQUENT EVALUATION NOTE	{SETTING}	SOCIAL SERVICE

11512-1	SUBSEQUENT EVALUATION NOTE	{SETTING}	SPEECH THERAPY
34126-3	SUBSEQUENT EVALUATION NOTE	CRITICAL CARE UNIT	{PROVIDER}
15507-7	SUBSEQUENT EVALUATION NOTE	EMERGENCY DEPARTMENT	{PROVIDER}
34129-7	SUBSEQUENT EVALUATION NOTE	HOME HEALTH	{PROVIDER}
34125-5	SUBSEQUENT EVALUATION NOTE	HOME HEALTH CARE	CASE MANAGER
34130-5	SUBSEQUENT EVALUATION NOTE	HOSPITAL	{PROVIDER}
34131-3	SUBSEQUENT EVALUATION NOTE	OUTPATIENT	{PROVIDER}
34124-8	SUBSEQUENT EVALUATION NOTE	OUTPATIENT	CARDIOLOGY

34127-1	SUBSEQUENT EVALUATION NOTE	OUTPATIENT	DENTAL HYGIENIST
34128-9	SUBSEQUENT EVALUATION NOTE	OUTPATIENT	DENTISTRY
34901-9	SUBSEQUENT EVALUATION NOTE	OUTPATIENT	GENERAL MEDICINE
34132-1	SUBSEQUENT EVALUATION NOTE	OUTPATIENT	PHARMACY
34133-9	SUMMARIZATION OF EPISODE NOTE	{SETTING}	{PROVIDER}
34134-7	SUPERVISORY NOTE	OUTPATIENT	ATTENDING PHYSICIAN
34135-4	SUPERVISORY NOTE	OUTPATIENT	ATTENDING PHYSICIAN. CARDIOLOGY
34136-2	SUPERVISORY NOTE	OUTPATIENT	ATTENDING PHYSICIAN. GASTROENTEROLOGY

11504-8	SURGICAL OPERATION NOTE	{SETTING}	{PROVIDER}
28583-3	SURGICAL OPERATION NOTE	{SETTING}	DENTISTRY
28573-4	SURGICAL OPERATION NOTE	{SETTING}	PHYSICIAN
28624-5	SURGICAL OPERATION NOTE	{SETTING}	PODIATRY
34137-0	SURGICAL OPERATION NOTE	OUTPATIENT	{PROVIDER}
34138-8	TARGETED HISTORY AND PHYSICAL NOTE	{SETTING}	{PROVIDER}
34748-4	TELEPHONE ENCOUNTER NOTE	{SETTING}	{PROVIDER}
34139-6	TELEPHONE ENCOUNTER NOTE	{SETTING}	NURSING

34844-1	TELEPHONE ENCOUNTER NOTE	OUTPATIENT	SOCIAL WORK
34140-4	TRANSFER OF CARE REFERRAL NOTE	{SETTING}	{PROVIDER}
18761-7	TRANSFER SUMMARIZATION NOTE	{SETTING}	{PROVIDER}
34755-9	TRANSFER SUMMARIZATION NOTE	{SETTING}	CRITICAL CARE
34770-8	TRANSFER SUMMARIZATION NOTE	{SETTING}	GENERAL MEDICINE
28651-8	TRANSFER SUMMARIZATION NOTE	{SETTING}	NURSING
28616-1	TRANSFER SUMMARIZATION NOTE	{SETTING}	PHYSICIAN
28618-7	VISIT NOTE	{SETTING}	DENTISTRY

28578-3	VISIT NOTE	{SETTING}	OCCUPATIONAL THERAPY
28579-1	VISIT NOTE	{SETTING}	PHYSICAL THERAPY
28628-6	VISIT NOTE	{SETTING}	PSYCHIATRY
28653-4	VISIT NOTE	{SETTING}	SOCIAL SERVICE
28571-8	VISIT NOTE	{SETTING}	SPEECH THERAPY
28568-4	VISIT NOTE	EMERGENCY DEPARTMENT	PHYSICIAN

3.2.3 CDA and Semantic Interoperability

A long term objective of CDA and other specifications in the V3 family is to achieve increasingly greater and greater "semantic interoperability", which might be defined as the ability of two applications to share data, with no prior negotiations, such that decision support within each application continues to function reliably when processed against the received data.

CDA seeks to achieve the highest level of constraint that can exist in an international standard. Where international consensus is lacking, and where uses cases in different realms currently preclude consensus, CDA will need to be necessarily inclusive. In such areas, ongoing harmonization and consensus building will further enable semantic interopability, which will be reflected in future iterations of CDA.

While the framework provided by the RIM and by CDA and by the shared HL7 Clinical Statement Model are a critical component of semantic interoperability, they are not currently sufficient, particularly given the lack of global terminology solution, and the fact that each terminology overlaps with the RIM in different ways. Such terminology solutions are outside the scope of CDA, and will need to be addressed in various national and international forums.

3.3 Enumeration of Changes Between Release One and Release Two

CDA, Release One became an ANSI-approved HL7 Standard in November, 2000, representing the first specification derived from the HL7 Reference Information Model (RIM). Since then, the RIM has matured, as has the methodology used to derive RIM-based specifications. In addition, early adopters are posing new use cases for incorporation.

The basic model of CDA, Release Two is essentially unchanged. A CDA document has a header and a body. The body contains nested structures (such as sections). These structures can be coded using standard vocabularies, and can contain "entries". CDA, Release One entries included such things as character data, hyperlinks, and multimedia.

The main evolutionary steps in CDA, Release Two are that both header and body are fully RIM-derived, and there is a much richer assortment of entries to use within CDA structures. CDA, Release Two enables clinical content to be formally expressed to the extent that is it modeled in the RIM.

CDA, Release Two takes advantage of HL7's growing expertise in creating model-based XML standards. Given the evolution of the RIM and the HL7 development methodology since November 2000, there are a number of changes between the new and the old CDA.

3.3.1 Changes from CDA Release 2, Committee Ballot 2

3.3.1.1 CDA Model Changes

- Act
  - Remove Act.uncertaintyCode.
  - Add constraint to Act.classCode - that it cannot include a value from the ActContainer hierarchy.
- AssignedAuthor
  - [technical correction] Change AssignedAuthor.id cardinality from SET<II> [1..1] to II [1..1].
- AssignedCustodian
  - Change cardinality of association to Organization from [0..1] to [1..1].
- AssignedEntity
  - [technical correction] Change AssignedEntity.id cardinality from SET<II> [1..1] to II [1..1].
- Authenticator
  - Change value set of authenticator.signatureCode from (S, I, X) to (S).
- AuthoringDevice
  - See **Device**.
- ClinicalDocument
  - [technical correction] Change ClinicalDocument.id cardinality from SET<II> [1..1] to II [1..1].
  - Change cardinality of ClinicalDocument.confidentialityCode from [0..1] to [1..1] (retaining the default value of "N").
  - Changed ClinicalDocument.typeId (attribute inherited from InfrastructureRoot) to be mandatory, referencing the CDA Hierarchical Description. Value is fixed in the Schema.
- Consent
  - [technical correction] Change Consent.id cardinality from SET<II> [0..1] to II [0..1].
  - Change cardinality of Constne.statusCode from [0..1] to [1..1] (retaining the fixed value of "completed").
- Consumable
  - Change cardinality on association to SubstanceAdministration from [0..*] to [1..1].
  - Change default value of Consumable.typeCode from CSM to TPA.
- CustodianOrganization
  - Change cardinality of CustodianOrganization from [0..1] to [1..1]
- Criterion
  - See **PRNCriterion**.
- CurrentEncounter
  - See **Encounter**.
- DataEnterer
  - Add DataEnterer.contextControlCode, value fixed at OP.
- Device
  - Rename to AuthoringDevice.
  - PlayingDevice in the body has been renamed to Device. See **PlayingDevice**.

- Encounter
  - Rename to CurrentEncounter.
  - [technical correction] Change CurrentEncounter.id cardinality from SET<II> [0..1] to II [0..1].
  - Add CurrentEncounter.dischargeDispositionCode: CE CWE [0..1] <= **EncounterDischarageDisposition**
- Entity
  - Change Entity.id cardinality from SET<II> [0..*] to II [0..1].
- EntryRelationship
  - Remove "REFV" from allowable EntryRelationship.typeCode values. (REFV is included in a new actRelationship "referenceRange")
  - Add "SAS" to allowable EntryRelationship.typeCode values.
  - [technical correction] Add "SUBJ" to allowable EntryRelationship.typeCode values.
- Event
  - Change Event.id from SET<II> [1..*] to II [0..1].
  - Add Event.effectiveTime: IVL<TS> [0..1].
- ExternalAct
  - [technical correction] Change ExternalAct.id from SET<II> [0..1] to II [0..1]
- ExternalObservation
  - Change ExternalObservation.id from SET<II> [0..*] to II [0..1]
- ExternalProcedure
  - [technical correction] Change ExternalProcedure.id from SET<II> [0..1] to II [0..1]
- FutureEncounter
  - Rename to Encounter
  - Add Encounter.id: II [0..1].
  - Add EVN to allowable Encounter.moodCode values.
- Guardian
  - [technical correction] Change Guardian.id cardinality from SET<II> [0..1] to II [0..1].
- HealthCareFacility
  - [technical correction] Change HealthCareFacility.id cardinality from SET<II> [0..1] to II [0..1].
- HealthChart
  - Remove HealthChart.name.
- Informant — can now be played by a choice of roles
  - AssignedEntity — uses the same AssignedEntity clone defined elsewhere in the model.
  - RelatedEntity — used to represent an informant without a role.id (e.g. a parent or guy on the street). ClassCode is RoleClassMutualRelationship. The role is unscoped — with the assumption that the patient is always the implied scoper. The role.code can be used to specify the nature of the relationship.

- InFulfillmentOf
  - See **RelatedOrder**.
- IntendedRecipient
  - [technical correction] Change IntendedRecipient.id cardinality from SET<II> [1..1] to II [1..1].
- LegalAuthenticator
  - Change value set of legalAuthenticator.signatureCode from (S, I, X) to (S).
- ManufacturedProduct
  - Add ManufacturedProduct.id [0..1].
  - Add scoping relationship to Organization.
- Observation
  - Remove Observation.uncertaintyCode.
  - Change Observation.interpretationCode from SET<CS> CNE [0..*] to SET<CE> CNE [0..*].
- Order
  - o Remove Performer participant. (Performer participant moved to entryChoice).
- Organization
  - [technical correction] Change Organization.id cardinality from SET<II> [0..1] to II [0..1].
  - [technical correction] Change Organization.name cardinality from BAG<ON> [0..1] to ON [0..1].
  - [technical correction] Change Organization.telecom cardinality from BAG<TEL> [0..1] to TEL [0..1].
  - [technical correction] Change Organization.addr cardinality from BAG<AD> [0..1] to AD [0..1].
- Organizer
  - Add new Organizer clone
- ParticipantRole
  - Add ParticipantRole.addr: BAG<AD> [0..*]
  - Add ParticipantRole.telecom: BAG<AD> [0..*]
  - [technical correction] Change ParticipantRole.id cardinality from SET<II> [0..1] to II [0..1].
- ParticipatingEntity
  - [technical correction] Change ParticipatingEntity.id cardinality from SET<II> [0..1] to II [0..1].
- PatientRole
  - Change PatientRole.id cardinality from SET<II> [1..1] to SET<II> [1..*].
- Performer
  - Add Performer.time: IVL_TS [0..1].
  - Source is changed from Order to entryChoice.
  - Cardinality is changed from [0..1] to [0..*] (an entry can have zero to many performers)
- Place

- [technical correction] Change Place.name cardinality from BAG<EN> [0..1] to EN [0..1].
- PlayingDevice
  - Rename PlayingDevice to Device.
- PlayingEntity
  - Add PlayingEntity.name: EN [0..1].
- Precondition
  - Change source from SubstanceAdministration to entryChoice.
  - Rename target clone from PRNCriterion to Criterion.
- PRNCriterion
  - Rename PRNCriterion to Criterion.
- Procedure
  - Remove Procedure.activityTime
- ReferenceRange
  - Add new act relationship "ReferenceRange", with typeCode="REFV", and target of ObservationRange.
- RelatedOrder
  - Rename RelatedOrder to inFulfillmentOf.
  - Change inFulfillmentOf.typeCode to "FLFS".
- RelatedSubject
  - See **SubjectRole**
- Section
  - [technical correction] Change Section.id cardinality from SET<II> [0..1] to II [0..1].
- Specimen
  - Addd new Specimen participant
- SubjectRole
  - Rename to RelatedSubject
  - Remove RelatedSubject.id
  - Remove scoping Organization
  - Change allowable values of SubjectRole.role from from (PRS (default), SPEC, PAT) to (PRS (default), PAT).
- SubstanceAdministration
  - Change SubstanceAdministration.effectiveTime datatype from PIVL to GTS.
- Supply
  - Add new Supply clone

3.3.1.2 CDA Narrative Block Changes

Figure 5: CDA Narrative Block Changes

```
<!ELEMENT text (#PCDATA | content | link | delete | insert | sub | sup | br |
renderMultiMedia | paragraph | list | table)*>
<!ELEMENT content (#PCDATA | content | link | delete | insert | sub | sup | br |
renderMultiMedia)*>
<!ATTLIST content
  %textAtts;
  style (bold | underline | italics | emphasis) #IMPLIED
  ignore (all | markup) "markup"
  emphasis (bold | underline | italics | yes) #IMPLIED
  revised (insert | delete) #IMPLIED>
<!ELEMENT delete (#PCDATA | content | link | sub | sup | br | renderMultiMedia)*>
<!ELEMENT insert (#PCDATA | content | link | sub | sup | br | renderMultiMedia)*>
<!ELEMENT paragraph (#PCDATA | caption | content | link | delete | insert | sub | sup |
br | renderMultiMedia)*>
<!ELEMENT item (#PCDATA | caption | content | link | delete | insert | sub | sup | br |
renderMultiMedia | paragraph | list | table)*>
<!ELEMENT caption (#PCDATA | link | sub | sup | localCaptionCode)*>
<!ELEMENT th (#PCDATA | link | sub | sup | localCaptionCode)*>
<!ELEMENT td (#PCDATA | content | link | delete | insert | sub | sup | br |
renderMultiMedia | paragraph | list)*>
```

3.3.2 Deprecated Components

The following components are retained for backwards compatibility with CDA, Release One, and have been deprecated:

- ClinicalDocument.copyTime.
- MaintainedEntity.
- CodedEntry.

Further use of these components is discouraged.

3.3.3 Vocabulary Changes

NOTE: This section is out of date, and will be updated in the Membership Ballot. Voters should comment on the format and utility of this section rather than the content.

The following table enumerates vocabulary changes between CDA, Release One and CDA, Release Two. Vocabulary domains that have not changed are not included here.

Table 145: Substantive vocabulary changes

CDA, Release OneComponent and Vocabulary Domain	CDA, Release Two Vocabulary Changes
confidentiality_cd <= ServiceConfidentiality (CWE)	• Vocabulary domain renamed to "x_BasicConfidentialityKind" . • Removed values: "C", "D", "I", "S", "T". • Added values: "V". • Set default: "N".
document_relationship. type_cd <= ServiceRelationship (CNE)	• Vocabulary domain renamed to "x_ActRelationshipDocument". • Added values: "XFRM".
practice_setting_cd <= PracticeSetting (CWE)	• Vocabulary domain renamed to "Ser viceDeliveryLocationRoleType".

authenticator.type_cd <= ServiceActor (CNE)	• Fixed value for authenticator.typeCode changed from "VRF" to "AUTHEN". •
signature_cd <= ServiceActorSignature (CNE)	• Vocabulary domain renamed to "ParticipationSignature". • Added values: "I".
person_name.type_cd <= PersonNamePurpose (CWE)	• Vocabulary domain renamed to "EntityNameUse".
legal_authenticator.type_cd <= ServiceActor (CNE)	• Fixed value for legalAuthenticator.typeCode changed from "SPV" to "LA". •
intended_recipient.type_cd <= ServiceActor (CNE)	• Vocabulary domain renamed to "x_InformationRecipient". • Added values: "PRCP".

provider.type_cd <= ServiceActor (CNE)	• Fixed value for responsibleParty.typeCode is "RESP". • Vocabulary domain for encounterProvider.typeCode renamed to "x_EncounterPerformerParticipation". • Renamed values: "ASS" renamed to "SPRF".
function_cd <= ServiceActorFunction (CWE)	• Vocabulary domain renamed to "ParticipationFunction".
service_actor.type_cd <= ServiceActor (CWE)	• Vocabulary domain renamed to "ParticipationType". • Vocabulary coding strength changed from CWE to CNE.
patient.type_cd <= ServiceTargetType (CNE)	• Fixed value for recordTarget.typeCode is "RCT". Values "PAT" and "PATSBJ" have been removed.
originating_device.type_cd <= ServiceTargetType (CNE)	• Fixed value for author.typeCode is "AUT". Value "ODV" has been removed.

responsibility.type_cd <= MaterialResponsibility (CWE)	• Vocabulary coding strength changed from CWE to CNE.
service_target.type_cd <= ServiceTargetType (CWE)	• Vocabulary domain renamed to "ParticipationType". • Vocabulary coding strength changed from CWE to CNE.

3.3.4 CDA Header Changes

NOTE: This section is out of date, and will be updated in the Membership Ballot. Voters should comment on the format and utility of this section rather than the content.

Table 146: Substantive CDA Header changes

CDA, Release One component	Description of change
<clinical_document_header>	Wrapping header tag no longer present.
<origination_dttm>	Removed (rather than deprecated) because it was redundant with <service_tmr>
<copy_dttm>	Deprecated

<fulfills_order>	The referenced order has a new attribute, ActOrder. priorityCode.
<practice_setting_cd>	The practice setting is no longer an attribute of the encounter, but of a health care facility serving as the location of an encounter (HealthCareFacility.code).
<intended_recipient>	[1] An intended recipient can now be an organization or a health chart in addition to a person. [2] Can now indicate whether the recipient is a primary or secondary recipient.
<originating_organization>	Cardinality tightened from 0..1 to 1..1
<transcriptionist>	Participation time changed from an interval to a point in time.
<provider>	The prior notion of a provider was split into two distinct participants - the responsible party and encounter performers.
<service_actor>	Service actor and service target have been merged.

<service_target>	Service actor and service target have been merged.
<patient>	[1] The prior notion of a patient was split into two distinct participants - the medical record target where the document is kept, and the subject of observations being described. [2] The cardinality of recordTarget has been increased to 1..*. [3] The recordTarget participant does not have a participation time. [4] A Guardian clone has been added, to indicate the patient's guardian(s).
<originating_device>	Is merged in with the author participant.
<local_header>	CDA, Release Two approach to extensibility has been revised.

3.3.5 CDA Body Changes

NOTE: This section is out of date, and will be updated in the Membership Ballot. Voters should comment on the format and utility of this section rather than the content.

The most significant change has to do with the clarification and distinction between the CDA Narrative Block and CDA entries, along with the related conformance requirements (see CDA Conformance (§ 1.3)).

Table 147: Substantive CDA Body changes

CDA, Release One component	Description of change
CDA Body	Changes to CDA, Release One body markup include: [1] New elements <insert> and <delete>. [2] Add a "style" and "ignore" attribute to <content>. [3] In the content model of <paragraph>, change the cardinality of <content> from * to +. [4] Add element <renderMultiMedia>
<section>	[1] In CDA, Release Two, section is derived from the RIM Act class. [2] A section has an optional Section.id. [3] A section has an optional Section.title.

<local_markup>	CDA, Release Two approach to extensibility has been revised. The "ignore" attribute has been moved into <content>
<local_attr>	CDA, Release Two approach to extensibility has been revised.

3.3.6 CDA XML Changes

NOTE: This section is out of date, and will be updated in the Membership Ballot. Voters should comment on the format and utility of this section rather than the content.

HL7 has adopted a consistent camelCase approach to naming for all of the V3 family of standards, which has been adopted by CDA, Release Two.

Table 148: CDA XML Element Name changes

CDA, Release One XML Element Name	CDA, Release Two XML Element / Attribute Name
levelone	ClinicalDocument
clinical_document_header	--doesn't exist--
id	id

set_id	setId
version_nbr	versionNumber
document_type_cd	code
service_tmr	effectiveTime
origination_dttm	--doesn't exist--
copy_dttm	copyTime
confidentiality_cd	confidentialityCode
document_relationship	relatedDocument
document_relationship.type_cd	typeCode
related_document	parentDocuments

fulfills_order	relatedOrder
fulfills_order.type_cd	typeCode
order	Order
patient_encounter	Encounter
practice_setting_cd	code
encounter_tmr	effectiveTime
service_location	HealthCareFacility, Place
addr	addr
authenticator	authenticator
authenticator.type_cd	typeCode

participation_tmr	time
signature_cd	signatureCode
person	assignedPerson
person_name	name
effective_tmr	validTime
nm	--not present--
person_name.type_cd	"use" attribute on <name>
telecom	telecom
legal_authenticator	legalAuthenticator
legal_authenticator.type_cd	typeCode

intended_recipient	informationRecipient
intended_recipient.type_cd	typeCode
originator	author
originator.type_cd	typeCode
originating_organization	custodian
originating_organization. type_cd	typeCode
organization	representedOrganization
organization.nm	name
transcriptionist	dataEnterer

transcriptionist.type_cd	typeCode
provider	responsibleParty, encounterPerformer
provider.type_cd	typeCode
function_cd	functionCode
service_actor.type_cd	typeCode
patient	recordTarget, subject
patient.type_cd	typeCode
is_known_by	id
is_known_to	providerOrganization
birth_dttm	birthTime

administrative_gender_cd	administrativeGenderCode
originating_device	author
originating_device.type_cd	typeCode
device	Device
responsibility	maintainer
responsibility.type_cd	classCode
responsibility_tmr	effectiveTime
service_target	participant
service_target.type_cd	typeCode
body	StructuredBody

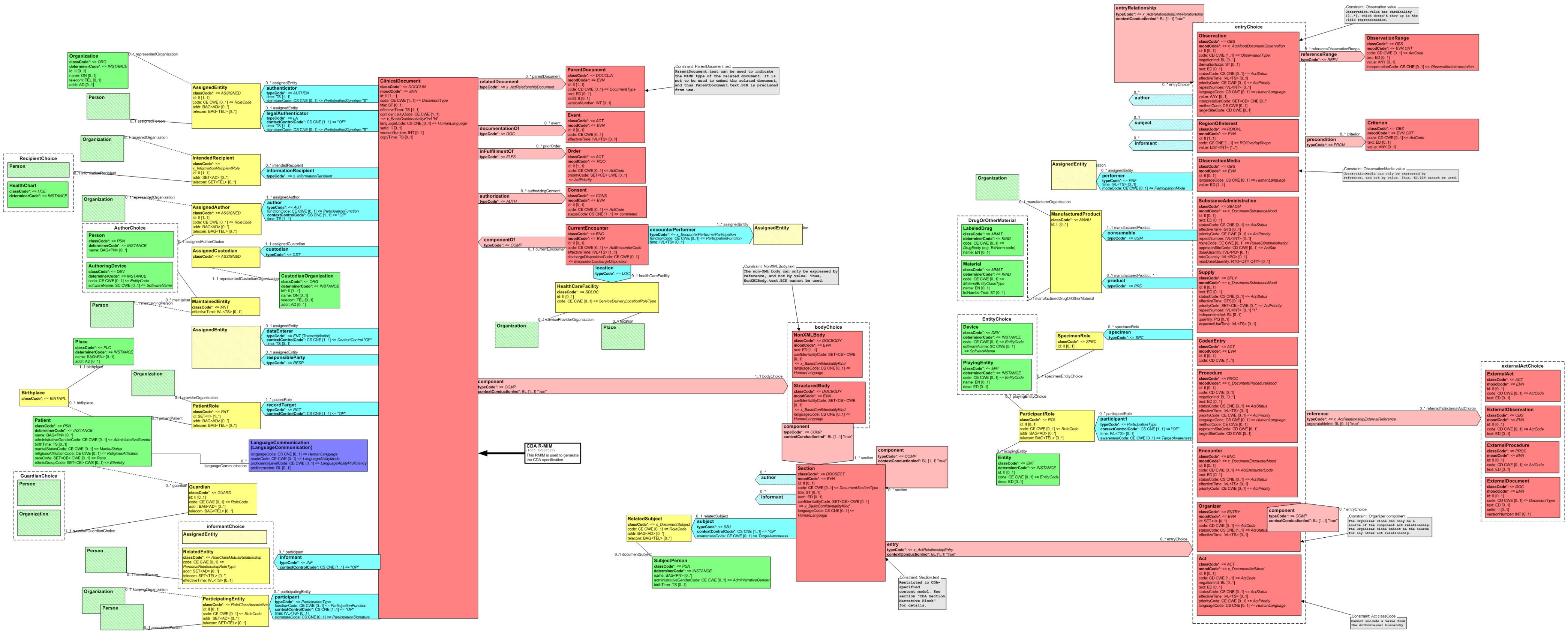
section	section
non_xml	NonXMLBody
content	content
link	link
link_html	linkHtml
coded_entry	CodedEntry
coded_entry.id	id
coded_entry.value	value
observation_media	ObservationMedia
observation_media.id	id

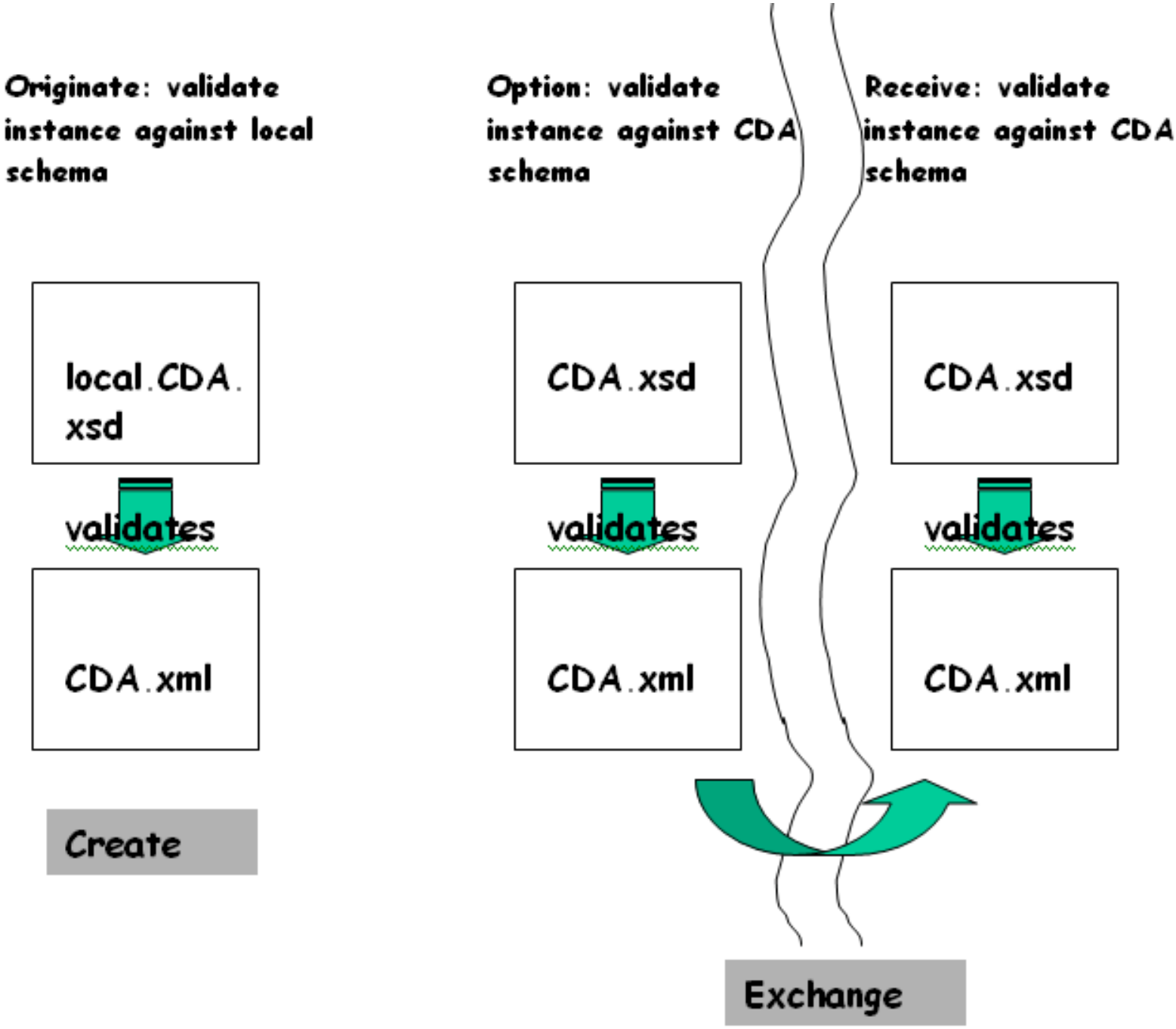
observation_media.value	value
local_markup	--doesn't exist--
local_header	--doesn't exist--
local_attr	--doesn't exist--
paragraph	paragraph
list	list
item	item
table	table
caption	caption
caption_cd	localCaptionCode

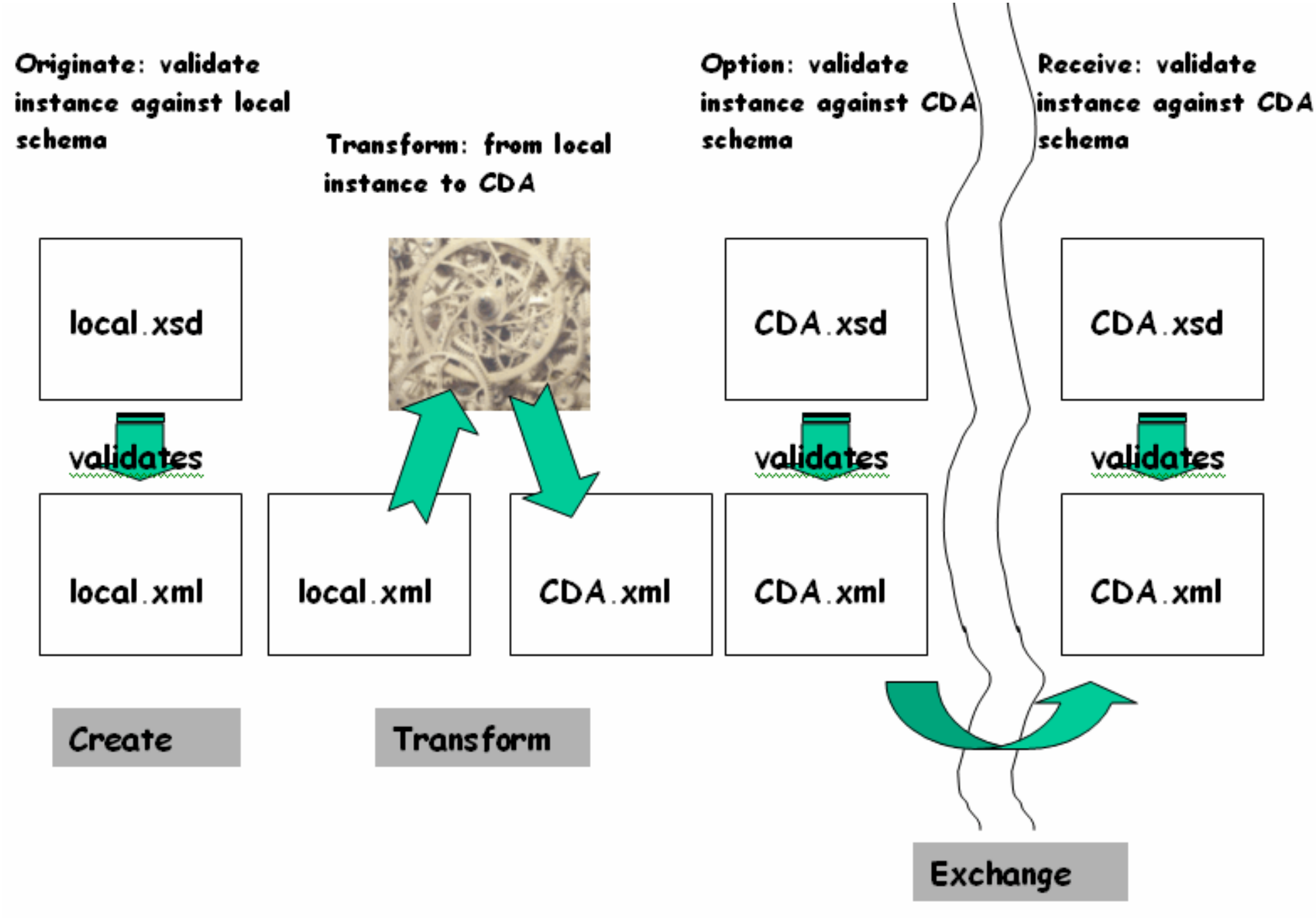
other table elements	--unchanged--

Endnotes

1. [source] There is a distinct scope of persistence for a clinical document, independent of the persistence of any XML-encoded CDA document instance.


ClinicalDocument
CDA R-MIM
This RMIM is used to generate the CDA specification.
Organization
Person
AssignedEntity
authenticator
legalAuthenticator
RecipientChoice
HealthChart
IntendedRecipient
informationRecipient
AssignedAuthor
author
AuthorChoice
AuthoringDevice
AssignedCustodian
custodian
CustodianOrganization
MaintainedEntity
dataEnterer
responsibleParty
Place
Birthplace
Patient
PatientRole
recordTarget
LanguageCommunication
GuardianChoice
Guardian
informantChoice
RelatedEntity
informant
ParticipatingEntity
participant
relatedDocument
ParentDocument
documentationOf
Event
inFulfillmentOf
Order
authorization
Consent
componentOf
CurrentEncounter
encounterPerformer
location
HealthCareFacility
component
bodyChoice
NonXMLBody
StructuredBody
Section
RelatedSubject
subject
SubjectPerson
entry
entryRelationship
entryChoice
Observation
referenceRange
ObservationRange
RegionOfInterest
precondition
Criterion
ObservationMedia
SubstanceAdministration
Supply
CodedEntry
Procedure
Encounter
Organizer
Act
performer
consumable
product
ManufacturedProduct
DrugOrOtherMaterial
LabeledDrug
Material
EntityChoice
Device
PlayingEntity
SpecimenRole
specimen
ParticipantRole
participant1
Entity
reference
externalActChoice
ExternalAct
ExternalObservation
ExternalProcedure
ExternalDocument


Originate: validate instance against local schema
Option: validate instance against CDA schema
Receive: validate instance against CDA schema
local.CDA.xsd
CDA.xsd
CDA.xsd
validates
validates
validates
CDA.xml
CDA.xml
CDA.xml
Create
Exchange


Originate: validate instance against local schema
Transform: from local instance to CDA
Option: validate instance against CDA schema
Receive: validate instance against CDA schema
local.xsd
validates
local.xml
local.xml
CDA.xml
CDA.xsd
validates
CDA.xml
CDA.xsd
validates
CDA.xml
Create
Transform
Exchange