Quick Start Guide

HL7 Implementation Guide:
CDA Release 2 –
Continuity of Care Document (CCD)

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> **NOTE:** Any discrepancy between requirements described here and in the base specifications is inadvertent and in all cases, implementers must follow the conformance requirements of CCD and CDA. Examples are largely drawn from the sample file distributed with the CCD. However, additions, deletions, and alterations have been made to illustrate the specific points discussed here.

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I. WHO SHOULD READ THIS DOCUMENT

This document is intended for application designers, developers, and implementers of standards-based, interoperable healthcare information systems. Readers must have access to the specifications referenced in this *Quick Start Guide*. (See Resources for full information on how to access HL7 specifications.) The Continuity of Care Document (CCD) builds upon the Clinical Document Architecture (CDA), so readers are assumed to be familiar with that specification. Those without prior experience with CDA can refer to the *CDA Quick Start Guide (CDA QSG)* available on www.alschulerassociates.com. For further guidance, see the training and certification available through Health Level Seven (HL7) at www.HL7.org.

The CDA Certification program defines a minimum level of knowledge about the specification – implementers can review the sample certification test and study guide. If comfortable with this level of knowledge, no further study is needed. If not, implementers should review the specification and take advantage of the educational opportunities.

CCD and, of course, CDA utilize Extensible Markup Language (XML). Readers and implementers must be versed in XML and should read XPath syntax as well. While not required, many applications use XSLT to display CCD and a sample XSLT style sheet is available with the specification. For more information on these recommendations from the World Wide Web Consortium, see www.W3.org.

The HL7 Structured Documents Technical Committee maintains a listserv that hosts ongoing discussion on the implementation of CDA and related specifications, including CCD. Implementers should subscribe to the list where they can post implementation questions and stay current with issues raised by others. There is no charge and no membership requirement for joining the list. (There is also a CCD-specific list that was used during development of the specification that is not in active use.)

CDA and CCD are derived from the HL7 Reference Information Model (RIM) and user-controlled terminology such as SNOMED CT, LOINC, CPT, ICD, and RxNorm. Knowledge of the RIM is not necessary for CDA and CCD implementers. Some familiarity with terminology systems is required. See the *CDA QSG* for more information on use of identifiers and codes within CDA and other essential and basic topics.

II. INTRODUCTION

1. The Continuity of Care Document

1.1. CCD Scope

The Continuity of Care Document is an electronic document exchange standard for sharing patient summary information among providers and within personal health records. It summarizes the most commonly needed pertinent information about current and past health status in a form that can be shared by all computer applications, from web browsers to electronic medical records.

In a formal, technical sense, the Continuity of Care Document CCD is a set of constraints on CDA that define how to use the CDA to communicate clinical summaries.

> "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." [CDA 1.1]

The specific clinical content and the scope of CCD is fixed by the other parent specification, the ASTM Continuity of Care Record (CCR), an XML specification for patient-centric summary data. The CCD is an XML-based specification for exchange of clinical summary information. It has two antecedents: The underlying design derives from the HL7 Reference Information Model (RIM) as expressed in the Clinical Document Architecture Release 2 (CDA R2), an information exchange specification generic to any type of clinical information.

> CCD was "developed as a collaborative effort between ASTM and HL7. It is intended as an alternate implementation to the one specified in ASTM ADJE2369 for those institutions or organizations committed to implementation of the HL7 Clinical Document Architecture." [CCD 1.1]

CCD was the first implementation guide to define an extensive set of detailed constraints for CDA. These patterns of constraints, or templates, support interoperability between CCD documents and other document types defined as constraints on CDA that reuse the same patterns or templates defined by CCD, such as emerging HL7, IHE and HITSP specifications.

HL7 will publish two Implementation Guides, the History & Physical and Consult Note in late 2007, that reuse templates defined in CCD. These Guides were developed through CDA for Common Document Types (CDA4CDT), a privately funded initiative of the healthcare transcription and document management industries. It was started by M*Modal, American Health Information Management Association (AHIMA), and the Association for Healthcare Document Integrity (AHDI) [formerly the American Association of Medical Transcriptionists and now affiliated with the Medical Transcription Industry Association (MTIA)]. A guide for Diagnostic Imaging Reports, developed by DICOM and the HL7 Imaging Integration SIG will go to ballot in December 2007. See the CDA4CDT wiki for more information.

The IHE Patient Care Coordination (PCC) Technical Framework defines specific implementations of established standards to promote appropriate exchange of medical information and to coordinate optimal patient care among care providers in different care settings. The PCC Technical Framework

provides a library of over 120 reusable templates for CDA sections and entries, including those in the CCD Implementation Guide. It also defines a number of specific CDA document content profiles such as for the Exchange of Personal Health Record Content (XPHR), which reuses the sections and entries of the CCD.

ANSI/HITSP has defined a content specification used within several of its specifications. The Registration and Medication History Document Content Component (HITSP C32) describes the document content that summarizes a consumer's registration and medication data information contained within a Personal Health Record (PHR) for the purpose of information exchange. This content component is being revised in 2007 to include additional CCD sections. See Resources for link to this specification.

The core model for the CCD is the Clinical Statement pattern, which is comprised of the CDA entries and associated participations and references. Clinical statements are the most general patterns for clinical content based on the HL7 RIM. To bring these patterns to a level of specificity required for exchange, CCD introduces templates at the section, clinical statement, and entry or supporting (subclinical statement) level. These templates reduce optionality and bind patterns to vocabulary as required for semantic interoperability. These CCD-defined templates are being reused in other CDA-compliant specifications; they are critical building blocks within CCD.

1.2. CCD Advantage

A CCD is the semantic equivalent of a CCR – both are in XML and both adhere to ANSI-based specifications. Implementers must choose either one or the other standard as the primary data format, so why should implementers choose CCD?

Shared Syntax and Architecture

Not all information that needs to be exchanged between clinicians is a summary. Clinicians use other specialized clinical documents, including the History & Physical, Consultation Note, Pathology or Radiology Report, and Discharge Summary. This last document, Discharge Summary, is specifically out of scope for CCR and therefore CCD.

Implementation Guides for traditional types of clinical documents such as the H&P are plug-and-play-compatible with CCD, reusing CCD templates for problems, medications, alerts, procedures, and other fundamental constructs.

Ease of Rendering

CCD uses a small, fixed XML tag set so that any CCD – in fact, any CDA – can be unambiguously rendered in any application, including a web browser, without prior negotiation between exchange partners, exchange of specialized style sheets, or reducing the XML to a single static display.

CDA's generic markup – tags like <section>, <paragraph>, <title> – is easily rendered as HTML, PDF, or on any type of display device, including local EMRs.

Shared Model Provides Extensibility

CCD shares an underlying UML model, the Reference Information Model, with the full spectrum of new-generation specifications from HL7. While specific to healthcare, RIM is both abstract and

sufficiently general to embrace requirements that transcend enterprise boundaries and that support the most general international exchange requirements in addition to these new areas:

- Public Health: Comprehensive and accurate reporting that can be responsive to changing conditions requires a comprehensive, general, and shared information model. The new generation reports on drug safety and infectious disease use RIM-based messages and documents fully compatible with CCD and CDA.
- Clinical Trials: Lowering the burden of widespread participation in clinical trials will speed time to market, lower costs, and could improve quality through larger, more comprehensive sampling. Clinical Data Interchange Standards Consortium (CDISC) is compatible with the RIM, the model shared by CCD and CDA. (See the "STARBRITE" article on use of CDA in clinical trials.)
- Quality Monitoring: Reporting requirements must be met without redundant data entry. Mapping report requirements to the RIM means that standard electronic medical/health records (EMRs/EHRs) can meet quality reporting requirements using data derived from CCD and CDA.

eDocument Integration Into the Electronic Health Record

All EMRs and EHRs import, manage, and export clinical documents. CCD and all CDA documents are designed for this type of exchange and integration. Thus, documents of all types imported as conformant CDA documents contain data that can be readily integrated into document management systems, EMR-based patient charts, and record locator services.

CDA defines the minimal metadata set required to support each of these types of applications. It has been used extensively in production in each of these scenarios since 2000.

The transcription industry strongly supports CDA through the CDA for Common Document Types initiative (CCD), which seeks to raise the level of interoperability and reuse through dictation and transcription.

International and National Acceptance

CDA is at the heart of every standards-based health information exchange architecture, from Asia/Pacific to England, Europe, Canada, and Mexico, including, of course, the ONC-led efforts in the U.S. Countries that adopted simple CDA-based architectures five years ago are now meeting substantial portions of their information exchange requirements (over half, in the case of Finland)with CDA. Resource-strapped countries have adopted CDA because it allows them to immediately share information at the point of care without sacrificing scalability or reuse in the future:

- Argentina: CDA solves immediate interchange requirements, will scale as resources available.
- England: CDA is the core component of the National Health Service strategy for interoperability.
- Finland: Adopted CDA Release 1 in 2000; exchange network covers most of the country; experimenting with distributed decision support using CDA Release 2.
- Greece: Using sophisticated satellite-based telemedicine system using CDA, web services.
- France and Italy: CDA documents are the core of patient-controlled health information accounting.
- Canada: CDA is the electronic source for claims adjudication.

In the United States, institutions like Mayo Clinic that place a high value on information as an asset have committed to CDA because it provides a single architectural foundation for their clinical information requirements that can be sustained over generations of application development. The University of Pittsburgh Medical Center relies on CDA to link clinical notes and diagnostic images. New York Presbyterian uses CDA and natural language processing in conjunction with structured and narrative data entry to achieve a unified, patient-centric view of care across the institution.

A key to this acceptance is the "A" for architecture in CDA, which promotes reusability across a sufficiently wide range of documents to cover clinical information sharing, public health, quality reporting, and clinical trials. The templates defined within CCD are the cornerstones of this interoperability.

2. The *CCD Quick Start Guide*

2.1. *QSG* Intent

This *Quick Start Guide (QSG)* was developed by the EHR Vendors Association to support CCD implementers. The scope is "just enough" to get started – it is *not* a standalone or complete guide or reference. ***Implementers must have access to and reference both the CDA and the CCD specifications.***

The *QSG* is an initial aid, not a substitute for the CCD and CDA. Implementation assistance at the just-enough level for CDA is provided through the sister publication, the *CDA Quick Start Guide,* which covers general CDA constructs such as use of object identifiers and other common data types.

> **NOTE:** Any discrepancy between requirements described here and in the base specifications is inadvertent and in all cases, implementers must follow the conformance requirements of CCD and CDA. Examples are largely drawn from the sample file distributed with the CCD. However, changes have been made to illustrate specific points discussed within this document.

The volunteer group responsible for creating and publishing within HL7 is the Structured Documents Technical Committee (SDTC), which maintains a useful forum for implementation queries and discussion through its CCD listserv. Anyone can join the list; subscription through an email account is the only precondition for posting. To join, go to www.hl7.org, follow the link to listservs and look under "Structured Documents Technical Committee" and CCD. If you not already subscribed, you may also wish to subscribe to the primary SDTC list, as many CCD issues appear there rather than in the specialized list.

2.2. *QSG* Organization

Overall, this *QSG* follows the internal structure and logic of a CDA document, as do CCD instances. The CCD specification, in contrast, is organized according to the CCR because it was constructed to cover the CCR use case and to provide the basis for mapping and translation. Thus aspects of the CCD header, such as healthcare providers, are specified under the "CCR Body Representation" section of the CCD specification. They are covered here as they would appear in CCD (or CDA): in the Header section.

After this Introduction, the next section of the *QSG* covers some basic concepts critical to understanding the construction and validation of CCD and its relationship to CDA. The following section covers the CCD header. (Again, note that you will find here those aspects specific to CCD and that fixed aspects of the header required for all CDA documents and not specific to CCD are covered in the *CDA QSG*.)

The treatment of the CCD body is divided into two sections. The first section treats general patterns employed throughout the CCD body and the second section reviews the patterns used in each section. In contrast to the CCD specification, the sections here are covered in the order in which they are likely to be found within an actual instance.

III. Document Notation Conventions

For the most part, this *QSG* uses the shorthand notations described here. Where used, the keywords, shown here in bold and all caps – **SHALL, SHALL NOT, SHOULD, SHOULD NOT, MAY, NEED NOT** – take on the specific meaning defined by HL7 in the *HL7 Version 3 Publishing Facilitator's Guide* and described by CCD [CCD 1.2].

Throughout the Document

Templates are key to understanding the interoperable structure and semantics of CCD (see III3.2 Templates, Conformance, and Validation). In this *QSG,* they are identified as follow:

- Section-level templates: Advance directives❐
- Clinical Statement-level templates: Advance directive **observation🗗,** where "observation" is bold to indicate the name of the top-level XML element in the pattern
- Supporting templates used within Clinical Statements: Advance directive **reference▞**
- XML **elementName** and **attributeName** are bold
- XML hierarchical structure uses XPath notation:
    - observation/code represents **`<observation> <code>`**
    - performer/@typeCode = "PRF" represents **`<performer typeCode = "PRF">`**
    - **[act | observation]/id** indicates that either an **act** or **observation** may be used, but both must have an **id**.
- References to CCD and CDA use a short form: [CDA 1.1] refers to Section 1.1 within the ANSI/ HL7 Clinical Document Architecture, Release 2.0; [CCD 1.1] refers to Section 1.1 within CCD. Note that for hyperlinks in this document to function correctly, reference documents must be installed per the scheme in the appendix Installation Notes.

In Tables

The *QSG* summarizes each section template in a table. Here is an example:

Purpose Section❐	templateId; 48764-5 (Summary purpose); purpose
purpose activity🗗	class = ACT; mood = EVN; templateId; statusCode = completed
	code/@code = 23745001 (documentation procedure, SNOMED CT)
entryRelationship	◎purpose activity🗗 typeCode = RSON (has reason)
act, **encounter**, **observation**, **procedure**, **substanceAdministration**, or **supply**	class = ACT; mood = EVN

The shaded first row shows constraints on the section element for this section type. The second row shows the entries and in some cases, supporting or entry-level template appropriate to the section type.

Any subsequent rows each show a template for a significant part of an entry template such as a participant.

Note that the labeled templates in the tables link to the corresponding template identifiers in the appendix CCD Template Identifiers. Conversely, the template descriptions in this appendix link back to the sections and tables where the templates are defined.

The notational conventions are:

- XML **elementName** of a high-level element is bold and in the left-hand cell
    - The constraints directly on **elementName** are in the right-hand cell, not bold. For attributes:
        - the value follows an equal sign (=)
        - values supplied by users are in square brackets, e.g., [payer's identifier]
        - display names for vocabulary are in parentheses, e.g., (policyholder)
    - The contained elements that are clinical statements are beneath **elementName**, bold
- Cardinality is exactly one unless:
    - [SD] indicates **SHOULD**
    - [M] indicates **MAY**
    - [+] indicates that more than one is allowed (in contrast to XML notation, here it does not indicate required, only that more than one allowed; may or may not be required)
- Value sets are **STATIC** unless explicitly labeled as **DYNAMIC** using the convention: [D]
- **entryRelationship** and **component** use ◎ to indicate the target, thus, in the preceding example, a purpose activity🗗 (clinical statement-level template) is the target of an **entryRelationship;** if both source and target are described, they are on the same row of the table with required **typeCodes** in the right-hand column.
- classCode, moodCode, templateId, statusCode at the top of a cell are abbreviated indicating all are required, values for classCode and moodCode are shown, templateId is a look-up:

  class = ACT mood = EVN statusCode = completed templateId
- Explanatory text is in *italics*

In XML Examples

XML examples are set in a monospaced font with a specific color to differentiate required, optional, variable, and fixed content:

```
Black = required markup and all delimiters, e.g., =, ""
Red = fixed content, enter exactly as shown
Blue = optional elements, attributes or content
Green = variable – new content is required
```

Thus:

```
<requiredElement requiredAtt = “fixedValue” optionalAtt = “variableValue”>
<optionalElement requiredAtt = “variableValue” optionalAtt = “variableValue”>
```

Vocabulary examples show required elements and the **displayName** of the code if it is not clear from the context. If the code is part of an established pattern drawn from a single coding system, such as use of LOINC for section codes, the **codeSystemName** may be omitted:

```
<code code="34133-9" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"
displayName="Summarization of episode note"/>
```

Explanatory notes and summary tables within this *Guide* that do not reference a specific code system are drawing from an HL7 vocabulary domain.

> **NOTE:** for brevity within this *Guide*, examples may not be well-formed and will not parse. See the complete CCD examples that accompany this *Guide* for complete, parsable examples.

III. KEY CONCEPTS

In a formal and a very practical sense, CCD is a set of constraints on CDA. For basic CDA requirements, see the specification itself and the *CDA Quick Start Guide* (*CDA QSG*), which covers the core specification, including the basic use of object identifiers (OIDs and GUIDs), codes, date/time stamps, and optionality and cardinality in the CDA header and body. Advanced topics in CDA, including mood codes and use of xsi:type, are covered briefly in the *CDA QSG*.

This section reviews briefly some of the more critical aspects of CDA most pertinent to implementing CCD and then key areas where CCD has constrained or extended CDA.

1. Common to CDA and CCD

1.1. Vocabulary and Datatypes

> "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." [CDA 2.3]

In CDA and CCD instances, vocabulary is represented with both the code and code system from which the code is drawn represented explicitly. CDA establishes coding constraints that may or may not allow local extensions -- the familiar "Coded, No Extensions (CNE); Coded, With Extensions (CWE)" distinction.

Following HL7 conventions, CCD states:

> "Value set constraints can be '**STATIC**', meaning that they are bound to a specified version of a value set, or '**DYNAMIC**', meaning that they are bound to the most current version of the value set." [CCD 1.2]

Static value sets are listed or referenced here in Vocabularies and Value Sets and links are provided to dynamic code sets[1]. As noted in Document Notation Conventions, if no domain is given for a value set, it is an HL7 domain.

> "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... Every attribute in the RIM is associated with one and only one data type.
>
> "CDA, Release Two uses the HL7 V3 Data Types, Release One abstract and XML-specific specification." [CDA 2.2]

It is important to have a solid understanding of the HL7 V3 data types that underlie all CDA, and therefore CCD, constructs. These data types range from simple strings to hierarchical name and address constructs. Note that CCD uses the data type specification contemporary with CDA Release 2.0.

[1] The HL7 formalism for defining a value set is to use bold, full caps: **DYNAMIC** or **STATIC**. In this *Guide*, assume they are **STATIC** unless followed by the string: [D].

1.2. Templates, Conformance, and Validation

Templates define patterns at the document, section, clinical statement, and entry level. These patterns include required, optional, and allowable structures and vocabulary that further constrain CDA. Templates are identified by a **templateId** with a valid OID[2], which indicates that the identified document, section, clinical statement, or entry not only conforms to the requirements of CDA, but also conforms to the pattern of constraints identified by the template. By convention, the HL7 SDTC uses only OID roots, not OID extensions, for template identifiers. See the appendix CCD Template Identifiers.

The CCD constraints on CDA are expressed in a technology-neutral formalism that defines conformance requirements for CCD instances. There are many ways to validate that an instance meets these conformance requirements. The SDTC publishes validating rule sets – in the case of CDA, using a W3C schema (.xsd) and in the case of CCD, using XPath statements compiled into a Schematron schema. Schematron is "a language for making assertions about patterns found in XML documents" (www.schematron.com). For more information on Schematron and related applications, see http://xml.ascc.net/schematron/.

The CCD schematron is continually updated and maintained at the HL7 wiki site. See the appendix Web Resources for complete access information.

It should be noted that while instances that conform to CCD must not break these validation rule sets, alternate methods of validation can be used. Instances that extend CDA using a foreign namespace must create another schema with the named elements in the SDTC namespace and import that into the original schema, declaring the namespace. For full guidance and examples of validating foreign namespaces, see the *CDA QSG*.

1.3. Context Propagation

> "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." [CDA 4.4]

Implementers should be thoroughly familiar with CDA context rules and how to use them to efficiently and precisely convey author, informant, language, subject, confidentiality, participant, and other parameters within the document. These rules state that contextual parameters defined at the document header apply to the entire document unless overridden and they define which parameters can be overridden at the body, section, and entry level.

CCD leverages these rules to assert the source. In the example that follows, an **informant** element in the Medications section indicates that the patient is the source of the information in this section, not the informant identified in the CDA header.

[2] An OID is an ISO Object Identifier and is a legal type of CDA instance identifier. See the *CDA QSG*.

Setting Section Informant Context

```
<section>
   <templateId root="2.16.840.1.113883.10.20.1.8"/>
      <!-- Medications section template -->
   <code code="10160-0" codeSystem="2.16.840.1.113883.6.1"/>
   <title>Medications</title>
   <text>
      ...
   </text>
   <informant>
      <assignedEntity>
         <id extension="PatientIDGoesHere" root="ScopingIDGoesHere"/>
         <representedOrganization>
            <id root="ScopingIDGoesHere"/>
            <name>Good Health Clinic</name>
         </representedOrganization>
      </assignedEntity>
   </informant>
   <entry typeCode="DRIV">... </entry>
```

1.4. Rendering

> "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 1.2.3]

CDA's requirement for ease of rendering is defined in terms of sender and receiver responsibilities for the portions of the document that must contain the definitive rendering. These requirements amount to a contract between sender and receiver such that when adhered to, any conformant document can be rendered with a single style sheet of their choice, regardless of how or where or when that document was created. CDA requires that the portion of the information that comprises the attested legal content be contained within a defined, limited set of XML tags. The markup specifies where to render nontext media, including graphics and multimedia files.

At the same time, senders and recipients can customize presentation for local requirements and for diverse print and display requirements without violating the principles of human readability and without jeopardizing the integrity of the clinical information. The assertion that a single style sheet can be used means that the particular content of any given instance need not be known to ensure that what is rendered is exactly what the sender wished to be rendered. The particular details of rendering – typeface, size, et cetera – can be customized. There is a style sheet called CCD.xsl that will render any CCD instance. However, its use is optional and it is merely one publicly available example of how those pieces of a CCD that must be rendered for human readability can be rendered.

See both the *CDA QSG* and the CDA specification on rendering, the narrative block, and sender and receiver responsibilities for more information. [CDA 1.2.3, 4.3.5, 1.3.1-2]

Sample style sheets have been developed by volunteers and distributed with both CDA and CCD. These are maintained on the HL7 wiki site. Implementers should not expect that all possible features of CDA and CCD have been incorporated in the samples and should feel free to enhance these as their experience provides a richer set of rendering requirements.

1.5. Levels

"CDA levels" is an informal concept that describes the degree of semantic interoperability of the document instance. A document is considered "Level 1" if it guarantees conformance using the CDA header and a body that may or may not be XML. (CDA allows the body to be any easily rendered MIME type and provides a list of suggested formats.[CDA 4..3.1.1]) "Level 2" guarantees that the minimum requirements are met, that the body is XML, and that section codes are provided for each section. "Level 3" guarantees that the requirements of Level 2 are met and that at least some of the sections contain CDA entries.

CCD requires section-level coding. Asserting conformance to CCD thus guarantees at least a Level 2 document. A CCD that complies with any of the entry-level templates would be considered a Level 3.

Keep in mind that the concept of CDA levels, while useful, provides a rough approximation of the degree of reusability. Assertion of template identifiers indicating conformance with defined constraints describes expected levels of semantic interoperability with greater precision.

2. Unique to CCD

2.1. Type and Status

Type and status can be expressed explicitly through a value set for **code** or **statusCode**. Some templates restrict these value sets. In some cases, type and status are implied by related **observations.**

> Often times, the **Type** or **Status** is implied by the codes used to characterize the observation (e.g. an observation of "Do Not Resuscitate" implies an Advance Directive Type "Resuscitation Status"), and/or by values asserted in other RIM attributes (e.g. an Observation.negationInd of "true" implies a Problem Status "Ruled out"). [CCD 5.1]

CCD also defines a status **observation** template as follows:

Table 1: Status Observation Template

Status Observation	templateId
entryRelationship	◎status **observation** typeCode = REFR (Refers to)
	class = OBS; mood = EVN; statusCode = completed
code	@code = 33999-4 (Status, LOINC)
value	datatype = CE
	prohibited: additional **observation** attributes; any **participants**; source of **observation** relationships

2.2. Source

CCD requires that the source of information be explicit for all information within the report and stated if unknown. The source can be a person, organization, or a reference. [CCD 5.2] The easiest way to identify the information source is to define an **informant** in the header and use the CDA context

model to propagate that source through the instance.[CDA 4.4] The informant identified in the following example is the organization "Good Health Clinic."

Source as an Organizational Informant

```
<informant>
   <assignedEntity>
      <id nullFlavor="NI"/>
      <representedOrganization>
         <id root="IDGoesHere"/>
         <name>Good Health Clinic</name>
      </representedOrganization>
   </assignedEntity>
</informant>
```

If no other sources of information are identified, then through the rules of context conduction, this will be the source for all sections within CCD. Other informants can interrupt the context in a CDA section or entry. See the previous section on CDA Context Propagation for an example.

CCD describes two additional mechanisms to define source of information. One is a **reference** of **@typeCode** "XCRPT" (excerpt) and the other is a source of information **observation,** where the target is an **observation** coded as "Information source" as follows:

Table 2: Source of Information Observation

Source of Information	
entryRelationship	◎source of information **observation** typeCode = REFR (Refers to)
	class = OBS; mood = EVN; statusCode = completed
code	@code = 48766-0 (Information source, LOINC)
value	*if unknown* = "Unknown" (text)

2.3. Extensions

> "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." [CDA 1.4]
>
> "An extension is a collection of element or attribute declarations and rules for their application to the CDA Release 2.0.
>
> "All extensions are optional." [CCD 7.4]

CCD uses extensions to CDA to express certain concepts that go beyond the concepts and relationships defined in CDA R2. CCD extensions use a single namespace and the same vocabulary and datatypes as CCD.

Implementers wishing to use extensions must review the guidance in the specification. These defined extensions cover entity identifiers required for tracking genetic relationships, deceased indicator and time, and relationships to patient that fall outside the category of relative or provider with a participant role.

See the *CDA QSG* for support on validation of CCD instances using extensions.

IV. CCD HEADER

The CDA header defines the document itself (document ID, document type classification, version, et cetera), the participants (e.g., care providers, authors, patients), and the document's relationships to other documents. CDA R2 requires a minimal set of elements and defines others that may be used. To these elements, CCD adds constraints and gives guidance on how to make use of optional elements.

The first chapter that follows covers the CDA elements where CCD has added constraints or guidance and the second chapter briefly reiterates the remaining elements of the CDA header.

1. CCD Constraints and Guidance

CCD provides additional constraints or guidance on these header elements:

- templateId
- languageCode
- code (document type)
- effectiveTime
- documentationOf/serviceEvent
- header participants: next of kin, emergency contact, caregiver

CCD instances must include the **templateId** at the document root level (i.e., in the header) which asserts that the document conforms to the CCD IG. The value of the **templateId** must be as follows:

```
<!-- CCD v1.0 Templates Root -->
<templateId root="2.16.840.1.113883.10.20.1"/>
```

CCD requires the **languageCode** be present and take the form *nn*, or *nn-CC*. The *nn* variables are drawn from ISO-639 and are lowercase. The CC variables are from ISO-3166 country code and are in uppercase

```
<languageCode code="en-US"/>
```

At the document root (header) level, **code** is defined as the document type code used to categorize and classify types of CDA documents. CCD requires that the **ClinicalDocument/code** element must be set as follows:

```
<code code="34133-9" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"
displayName="Summarization of episode note"/>
```

EffectiveTime represents the time the summary document was created. It is required in CDA. CCD adds the constraint that it must be precise to the second and must have an explicit time zone offset:

```
<effectiveTime value="20000407130000+0500"/>
```

The main activity described by a CCD is represented in the header as the required element **documentationOf/serviceEvent** where the **classCode is** "PCPR" (Care Provision). In **serviceEvent**,

effectiveTime is a range with high and low values representing the period of time spanned by the summary.

Time Period Covered by a CCD

```
<documentationOf>
   <serviceEvent classCode="PCPR">
      <effectiveTime>
         <low value="19320924" />
         <high value="20000407" />
      </effectiveTime>
```

A CCD may contain one or more identified next of kin in the header represented as **participant/associatedEntity**, for which the **@typeCode** must be "IND" (Indirect Participant) and the **@classCode** must be "NOK" (Next of Kin). Emergency contacts use the same construct as next of kin, where **@classCode** must be "ECON" (Emergency Contact). A caregiver uses the same construct where **@classCode** must be "CAREGIVER" (Caregiver).

AssociatedEntity/code in a next of kin participant should be selected from the value set FamilyHistoryRelatedSubjectCode [D] or FamilyHistoryPersonCode [D].

Header Participant Example (NOK)

```
<participant typeCode="IND">
   <associatedEntity classCode="NOK">
      <id root="IDGoesHere"/>
      <code code="65656005" codeSystem="2.16.840.1.113883.6.96" displayName="Natural
mother"/>
      <telecom value="tel:(999)555-1212"/>
      <associatedPerson>
         <name>
            <given>Henrietta</given>
            <family>Levin</family>
         </name>
      </associatedPerson>
   </associatedEntity>
</participant>
```

2. Other CDA Header Elements

In addition to those elements listed and described above, CDA defines the following elements:

- typeID: fixed; asserts conformance with CDA Release 2.0
- id: uniquely identifies the document
- recordTarget: identifies the patient and organization, and other people and personal data associated with the patient
- author: person or device who created the summary
- confidentialityCode: assigns a level of confidentiality to the summary
- custodian: the steward of the document
- guardian: optional; if recorded, must be in the header

- informant: source of information
- authenticator and legalAuthenticator: those legally responsible for its contents
- relatedDocument, versionNumber, and setId: used for versioning and succession management

For implementation information on all of these, see CDA and the *CDA Quick Start Guide*.

V. CCD BODY

This section contains a chapter on general patterns within the CDA body, then describes the general structure of templates defined in CCD. These chapters assume knowledge of the general form for section-level templates and therefore provide only those variables specific to each section (section-level **code** and title string).

The XML CDA body consists of one or more **sections** that can nest and that are related through a **component** relationship. Within the **section**, the **title**, and **text** elements constitute the narrative block that must be rendered. Also, **section** may contain **entries** that convey the machine-computable semantics of the section and links to related information. Collections of entries are called "clinical statements."

There are several potential relationships between the narrative block and the **entries** depending on how the two parts were generated. In the special case where the narrative block was fully derived from the **entries**, the **entry@typeCode** should be DRIV (derived). [CCD 3]. In other cases, the **typeCode** will be COMP (component). **Entries** can link to related text within the narrative block. All references to acts, observations, procedures, and documents come from within the CDA **entries.**

1. General Patterns Within CCD

1.1. Section-level Templates □

CCD does not require any particular section as long as there is at least one section and no more than one of the defined sections. The sequence of sections within the document is not fixed and may be re-sequenced for display.

The pattern for section templates specifies required elements and attributes that establish an unambiguous context for each section.

> **NOTE**: CCD body section templates share a common pattern that applies across all sections. This pattern is described here and ***is not repeated*** in the chapters devoted to individual sections.

All CCD section-level templates share these requirements:

- CCD contains one, but not more than one, instance of a type of **section**
- **section SHALL** contain a **templateId** with the value assigned to that type of section
- **section SHALL** contain a narrative block
- **section SHOULD** contain clinical statements
- **section SHALL** contain a **code** specific to that **section** type; all sections in the CCD body are assigned LOINC codes.
- **section SHALL** contain a **title**, and the text string within the **title SHALL** include a string specific to that section. (Case and language are not significant.)

The following example illustrates the pattern for section-level templates:

Section-level Template

```
<component>
   <section>
      <templateId root="2.16.840.1.113883.10.20.1.13" />
         <!--  Purpose section template -->
      <code code="LOINCSectionCodeGoesHere" codeSystem="2.16.840.1.113883.6.1"/>
      <title>section title text goes here</title>
      <text>
         <!-- Tables, lists or paragraphs go here. -->
      </text>
      <entry typeCode="DRIV"> <!-- can also be "COMP" -->
         <!-- Clinical statements (entries, acts, etc.) go here -->
      </entry>
   </section>
</component>
```

> **NOTE:** For brevity, all subsequent examples include only the **entry** elements, excluding the wrapping **component**, **section**, section-level **templateId**, and required **code**, **title**, and **text** elements.

Each chapter that follows describes the unique requirements for each CCD section-level template.

1.2. Clinical Statement Templates

Collectively, the nine **act** classes within the CDA RMIM and their associated relationships and **participants** constitute the Clinical Statement pattern and constraints on the pattern are called "clinical statements." Combining the semantic classes within the CDA body in a defined pattern is an example of use of the Clinical Statement pattern developed by HL7 and used in CDA and other RIM-based specifications. Therefore, such constructs are called clinical statements.

A key component of the Clinical Statement is the **entryRelationship** and **entryRelationship@typeCode**, which create relationships between the **entries.** While CDA allows arbitrary **entry** to **entryRelationship** structures, only certain combinations of source, target, and typeCode make sense. [CDA 4.3.8.4] Where CCD allows use of any clinical statement, the guidelines within CDA must be followed.

Clinical statement templates describe patterns that can be used within one or more sections. Thus, a problem template may also be used in a family history section, possibly with addition constraints required for that section.

Clinical Statement Template Example

```
<entry typeCode="DRIV">
   <observation classCode="OBS" moodCode="RQO">
      <templateId root="2.16.840.1.113883.10.20.1.25"/>
         <!-- Plan of Care Activity template -->
      <id root="someIdString"/>
      <code code="23426006" codeSystem="2.16.840.1.113883.6.96" displayName="Pulmonary
function test"/>
      <statusCode code="new"/>
      <effectiveTime><center value="20000421"/></effectiveTime>
   </observation>
```

```
</entry>
```

1.3. Supporting (Entry) Templates

Supporting templates are used for recurring concepts such as status, age, product, and reaction observation. In the example that follows, the reaction observation template is the target of an alert observation. Taken together, they assert that hives is a manifestation of an allergic reaction to penicillin. Supporting templates may be used within clinical statement templates.

Supporting Template Example

```
<observation classCode="OBS" moodCode="EVN">
   <templateId root="2.16.840.1.113883.10.20.1.18" />
      <!--  Alert observation template -->
   <id root="IDGoesHere" />
   <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4" />
   <statusCode code="completed" />
   <value xsi:type="CD" code="282100009" codeSystem="2.16.840.1.113883.6.96"
displayName="Adverse reaction to substance" />
   <participant typeCode="CSM">
      <participantRole classCode="MANU">
         <playingEntity classCode="MMAT">
            <code code="70618" codeSystem="2.16.840.1.113883.6.88"
displayName="Penicillin" />
         </playingEntity>
      </participantRole>
   </participant>
   <entryRelationship typeCode="MFST" inversionInd="true">
      <observation classCode="OBS" moodCode="EVN">
         <templateId root="2.16.840.1.113883.10.20.1.54" />
            <!-- Reaction observation template  -->
         <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4" />
         <statusCode code="completed" />
         <value xsi:type="CD" code="247472004" codeSystem="2.16.840.1.113883.6.96"
displayName="Hives" />
      </observation>
   </entryRelationship>
   <!-- Alert status observation template goes here -->
</observation>
```

2. CCD Sections

2.1. Purpose

> "Represents the specific reason for which the summarization was generated, such as in response to a request...[used only] when the CCD has a specific purpose such as a transfer, referral, or patient request." [CCD 2.8]

The purpose is represented by an **act** with the SNOMED CT code for "documentation procedure." This **act** has an **entryRelationship** with **typeCode "**RSON" (has reason) to indicate the reason or purpose for creating the CCD. The target of the **entryRelationship** may be an **act**, **encounter**, **observation**, **procedure**, **substanceAdministration**, or **supply**.

Table 3: Purpose Section Template

Purpose Section	templateId; 48764-5 (Summary purpose); purpose
purpose activity	class = ACT; mood = EVN; templateId; statusCode = completed code = 23745001 (documentation procedure, SNOMED CT);
entryRelationship	class = ACT; mood = EVN; typeCode = RSON (has reason) ◎ **act**, **encounter**, **observation**, **procedure**, **substanceAdministration**, or **supply**

Purpose Entry Example

In this example, the purpose of the document is transfer of care.

```
<entry typeCode="DRIV">
   <act classCode="ACT" moodCode="EVN">
      <templateId root='2.16.840.1.113883.10.20.1.30'/>
         <!-- Purpose activity template -->
      <code code="23745001" codeSystem="2.16.840.1.113883.6.96"
displayName="Documentation procedure"/>
      <statusCode code="completed"/>
      <entryRelationship typeCode="RSON">
         <act classCode="ACT" moodCode="EVN">
            <code code="308292007" codeSystem="2.16.840.1.113883.6.96"
displayName="Transfer of care"/>
            <statusCode code="completed"/>
         </act>
      </entryRelationship>
   </act>
</entry>
```

2.2. Problems

> "This section lists and describes all relevant clinical problems at the time the summary is generated. At a minimum, all pertinent current and historical problems should be listed." [CCD 3.5]

A problem is represented by an **act**. The period over which the problem is a concern is recorded in **act/effectiveTime**. Each **act** contains one or more **entryRelationship**s detailing the problem in contained problem **observations** (or an episode observation, alert observation, or other clinical statements). A problem **act** relates to the patient who was identified as a **participant** in the CCD header, unless otherwise specified by an **act/entryRelationship/subject**.

A problem **observation** specifies the problem by means of a **code** and **value**. The **observation** may also, by means of a contained **entryRelationship**, specify problem status and problem health status.

In the case of multiple episodes of a single problem, each episode is represented by an episode **observation**. [refer to CCD 3.5.2.3].

Patient awareness is represented by a **participant** in a problem activity or problem **observation**. The value of the participant's **id** must be present in **ClinicalDocument/recordTarget/patientRole/id**.

Table 4: Problem Section Template

Problem Section	templateId; 11450-4 (Problem list); problems
problem **act** patient awareness **participant**[M] entryRelationship[+]	class = ACT; mood = EVN; templateId; id [+]; effectiveTime [M] code/@nullFlavor = NA typeCode = SUBJ (has subject) ◎problem **observation** or episode **observation** or alert **observation** or other clinical statements
problem observation patient awareness **participant**[M] entryRelationship[M]	mood = EVN; templateId; effectiveTime [SD]; statusCode = completed; code from ProblemTypeCode [M]; ◎problem status **observation**, problem healthstatus **observation**, and age **observation**
problem status **observation**	Status Observation Template code = 33999-4; value from ProblemStatuscode
problem healthstatus **observation**	Status Observation Template code = 11323-3; value from ProblemHealthStatuscode
episode **observation** **code** **value** **entryRelationship**	class = OBS; mood = EVN; templateId; statusCode = completed value = 2.16.840.1.113883.5.4 (“ASSERTION”, ActCode) [SD] ◎problem **act** or social history **observation**; typeCode = SUBJ (subject) ◎problem **act** or social history **observation**; typeCode = SAS (start after start, represents temporal sequence) [M]
patient awareness **participant**	typeCode = SBJ; awarenessCode; participant/participantRole/id

Problem Entry Example

This example shows a problem act with an entryRelationship to an observation of asthma active now and since 1950.

```
<entry typeCode="DRIV">
   <act classCode="ACT" moodCode="EVN">
      <templateId root='2.16.840.1.113883.10.20.1.27'/>
         <!-- Problem act template -->
      <id root="IDGoesHere"/>
      <code nullFlavor="NA"/>
      <entryRelationship typeCode="SUBJ">
         <observation classCode="OBS" moodCode="EVN">
            <templateId root='2.16.840.1.113883.10.20.1.28'/>
               <!-- Problem observation template -->
            <id root="IDGoesHere"/>
            <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>
            <statusCode code="completed"/>
            <effectiveTime>
               <low value="1950"/>
            </effectiveTime>
            <value xsi:type="CD" code="195967001" codeSystem="2.16.840.1.113883.6.96"
displayName="Asthma"/>
            <entryRelationship typeCode="REFR">
               <observation classCode="OBS" moodCode="EVN">
                  <templateId root='2.16.840.1.113883.10.20.1.50'/>
                     <!-- Problem status observation template -->
                  <code code="11323-3" codeSystem="2.16.840.1.113883.6.1"
displayName="Status"/>
                  <statusCode code="completed"/>
                  <value xsi:type="CE" code="55561003"
codeSystem="2.16.840.1.113883.6.96" displayName="Active"/>
               </observation>
            </entryRelationship>
         </observation>
      </entryRelationship>
   </act>
</entry>
```

2.3. Procedures

> "This section defines all interventional, surgical, diagnostic, or therapeutic procedures or treatments pertinent to the patient historically at the time the document is generated. The section may contain all procedures for the period of time being summarized, but should include notable procedures." [CCD 3.14]

A **procedure** activity is represented as an **act**, **observation**, or **procedure**. There are two additional procedure-related templates: **product** and **product instance**.

A consent associated with a procedure is represented in the header under **authorization.**

Table 5: Procedures Section Template

Procedures Section	templateId; 47519-4 (History of procedures); procedures
procedure activity **act, observation,** or **procedure** **methodCode** [M+] **targetSiteCode** [M+] location participation [M+] **performer** [M+] **entryRelationship** [M+] patient instructions [M+] **specimen** [M+] **entryRelationship** [M] **entryRelationship** [M+]	mood = EVN; templateId; id [+];effectiveTime [SD]; statusCode from ProcedureStatuscode; code from LOINC or SNOMED CT [SD] or from CPT-4, ICD9 Procedures or ICD10 Procedures [M] if not inherent in **code**, or if needed to specialize **code**; **SHALL NOT** conflict if not inherent in **code**, or if needed to specialize **code**; **SHALL NOT** conflict ◎problem **act**, problem **observation**, or some other clinical statement typeCode = RSON (reason); see **typeCode** table below. **specimenRole/id** = **organizer/specimen.specimenRole/id** [SD] ◎age **observation**; typeCode = SUBJ (subject) [M] ◎medication activity **act**; typeCode = COMP (component)
procedure-related **product** [M+] **act, observation, procedure/participant**	typeCode=DEV; ◎target = product instance participantRole/classCode = MANU [see CCD CONF 451-452 for use of id]
procedure-related **product instance** **particpantRole**	templateId; [see CCD CONF 451-452 for use of id] class=MANU

TypeCode Table: The allowed value and behavior for entryRelationship /typeCode varies as follows:

entryRelationship / typeCode=RSON	Must have ◎problem **act**, problem **observation**, or some other clinical statement.

entryRelationship / typeCode=SUBJ	May have ◎ age **observation**; see Family History example code for representation per template.
entryRelationship / typeCode=COMP	May have ◎ medication activity to describe substances administered during the procedure.

Procedure Example

This example illustrates a total hip replacement procedure done on the left hip in 1998, including the identifier of the device manufacturer.

```
<entry typeCode="DRIV">
   <procedure classCode="PROC" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.1.29"/>
         <!-- Procedure activity template -->
      <id root="IDGoesHere"/>
      <code code="52734007" codeSystem="2.16.840.1.113883.6.96" displayName="Total hip
replacement">
         <qualifier>
            <name code="272741003" displayName="Laterality"/>
            <value code="7771000" displayName="Left"/>
         </qualifier>
      </code>
      <statusCode code="completed"/>
      <effectiveTime value="1998"/>
      <participant typeCode="DEV">
         <participantRole classCode="MANU">
            <templateId root="2.16.840.1.113883.10.20.1.52"/>
               <!-- Product instance template -->
            <id root="IDGoesHere"/>
         </participantRole>
      </participant>
   </procedure>
</entry>
```

2.4. Family History

> "This section contains data defining the patient's genetic relatives in terms of possible or relevant health risk factors that have a potential impact on the patient's healthcare risk profile." [CCD 3.6]

The Family History template contains three templates: Family history **observation**, family history **organizer**, and family history cause of death **observation**. This template may contain one or more family history **observation** entries or may use an **organizer** to group one or more **observations** about a specific family member. An **organizer** may contain other **organizers**[3]. This section also defines age **observation** which is used here and throughout CCD.

Organizers must have exactly one **subject** participant who is the subject for all the contained **observations** and these observations. **Observations** not contained in **organizers** must have exactly one **subject** participant. If an **observation code** has an explicit subject, the subject **participant**

[3] Those familiar with HL7 V2 will recognize the pattern: here the organizer is the V2 ORU and the observation elements are the OBX segments.

on the **observation** or **organizer** must be equivalent to or specialize the **code.** The section must not use **section/subject.**

A family history cause of death **observation** requires at least one **entryRelationship** with a **typeCode** of "cause" and a target family history observation of "death." This special type of **observation** extends the CDA R2 model with the addition of **subject/id, subjectPerson/deceasedInd**, and **subjectPerson/deceasedTime**. See CCD 7.4 Extensions to CDA R2 for more details.

A **subject** must contain a **relatedSubject/@classCode =** PRS, and also **relatedSubject/code**, whose value should be selected from the value set FamilyHistoryRelatedSubjectCode [D] or FamilyHistoryPersonCode [D]. A **relatedSubject/subject/administrativeGenderCode** should also be present. A pedigree graph uses **relatedSubject/code** values to create a hierarchical family tree where **relatedSubject/code** values contain a **RelatedSubject/subject**.

Age is represented in an age **observation** with a single **Observation/statusCode** and **Observation/value**. The **entryRelationship** typeCode can be the subject and **Observation/code** is the SNOMED CT code for "age." Age can also be inferred by comparing **RelatedSubject/subject/birthTime** with **relatedSubject /subject/sdtc:deceasedTime** or with **Observation/effectiveTime.**

Table 6: Family History Section Template

Family History Section	templateId; 10157-6 (History of family member diseases); family history
family history **observation**	mood = EVN; templateId; id [+]; statusCode = completed; effectiveTime [SD]
family history cause of death observation **entryRelationship**	family history **observation** ◎family history **observation** typeCode = CAUS
family history **organizer** **component** [+]	class = CLUSTER; mood = EVN; templateId; statusCode = completed ◎family history **observation** [SD] or other clinical statement [M]
age **observation**	class = OBS; mood = EVN; templateId; statusCode = completed code = 397659008 (age, SNOMED CT) typeCode = SUBJ [M] See narrative above and also CCD CONF 219-224

Family History Example

This example shows a family history about the patient's natural father, born in 1912, identified as the subject by an **organizer**. A **component** within the **organizer** contains a family history **observation** of myocardial infarction (MI) as the cause of death at age 57.

```
<entry typeCode="DRIV">
   <organizer moodCode="EVN" classCode="CLUSTER">
      <templateId root="2.16.840.1.113883.10.20.1.23"/>
         <!-- Family history organizer template -->
      <statusCode code="completed"/>
      <subject>
         <relatedSubject classCode="PRS">
            <code code="9947008" codeSystem="2.16.840.1.113883.6.96"
displayName="Natural father"/>
            <subject>
               <administrativeGenderCode code="M" codeSystem="2.16.840.1.113883.5.1"
displayName="Male"/>
               <birthTime value="1912"/>
            </subject>
         </relatedSubject>
      </subject>
      <component>
         <observation classCode="OBS" moodCode="EVN">
            <templateId root="2.16.840.1.113883.10.20.1.22"/>
               <!-- Family history observation template -->
            <id root="IDGoesHere"/>
            <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>
            <statusCode code="completed"/>
            <value xsi:type="CD" code="22298006" codeSystem="2.16.840.1.113883.6.96"
displayName="MI"/>
            <entryRelationship typeCode="CAUS">
               <observation classCode="OBS" moodCode="EVN">
                  <templateId root="2.16.840.1.113883.10.20.1.42"/>
                     <!-- Family history cause of death observation template -->
                  <id root="IDGoesHere"/>
                  <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>
                  <statusCode code="completed"/>
                  <value xsi:type="CD" code="419099009"
codeSystem="2.16.840.1.113883.6.96" displayName="Dead"/>
               </observation>
            </entryRelationship>
            <entryRelationship typeCode="SUBJ" inversionInd="true">
               <observation classCode="OBS" moodCode="EVN">
                  <templateId root="2.16.840.1.113883.10.20.1.38"/>
                     <!-- Age observation template -->
                  <code code="397659008 " codeSystem="2.16.840.1.113883.6.96"
displayName="Age"/>
                  <statusCode code="completed"/>
                  <value xsi:type="INT" value="57"/>
               </observation>
            </entryRelationship>
         </observation>
      </component>
   </organizer>
</entry>
```

2.5. Social History

> "This section contains data defining the patient's occupational, personal (e.g. lifestyle), social, and environmental history and health risk factors, as well as administrative data such as marital status, race, ethnicity and religious affiliation." [CCD 3.7]

The social history template contains three templates: social history **observation**, social history status **observation**, and episode **observation**. Some aspects of social history are covered in the CDA Header as follows:

Table 7: Social History Aspects of the CDA Header

CDA document root	
ClinicalDocument / recordTarget / patientRole / patient [SD]	**maritalStatuscode** **religiousAffiliationCode** **raceCode** value = Race [M] **ethnicGroupCode** value = Ethnicity [M]

Table 8: Social History Section Template

Social History Section	templateId; 29762-2 (Social history); social history
Social history **observation**	class = OBS; mood = EVN; templateId; id; statusCode = completed
code	LOINC or SNOMED [SD] or SocialHistoryTypeCode [M]
value	any datatype; if PQ, units **SHALL** be UCUM social history status observation or episode **observation**
social history status **observation**	status **observation** with value from SocialHistoryStatuscode
episode **observation**	See Problems

Social History Example

This example uses the social history observation template and describes a history of smoking a pack of cigarettes per day that lasted from 1947 to 1972.

```
<entry typeCode="DRIV">
   <observation classCode="OBS" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.1.33"/>
         <!-- Social history observation template -->
      <id root="IDGoesHere"/>
```

```
      <code code="230056004" codeSystem="2.16.840.1.113883.6.96" displayName="Cigarette
smoking"/>
      <statusCode code="completed"/>
      <effectiveTime>
         <low value="1947"/>
         <high value="1972"/>
      </effectiveTime>
      <value xsi:type="ST">1 pack per day</value>
   </observation>
</entry>
```

2.6. Payers

> "This section describes payers and the coverage they provide for defined activities. For each payer, "all the pertinent data needed to contact, bill to, and collect from that payer should be included. Authorization information that can be used to define pertinent referral, authorization tracking number, procedure, therapy, intervention, device, or similar authorizations for the patient or provider or both should be included." [CCD 3.1]

There are three templates based on **act** defined within the Payers section template: Coverage must contain one or more policies that contain an authorization template or a generic act with an identifier describing the coverage plan.

2.6.1. *Coverage Template*

Coverage is a completed **act** in definition mood and it contains, through an **entryRelationship**, at least one policy **act.** If there is more than one policy, the coverage **act** can identify payment priority between policies with an **entryRelationship/sequenceNumber**.

2.6.2. *Policy Template*

A policy is an **act** in event mood with status of completed. **Act/code** represents the type of coverage and the value should be drawn from ActCoverageType, an HL7 vocabulary. The payer is the **performer** in the policy **act** and contains an **assignedEntity/id**, which should contain the payer identifier. CCD provides specific guidance on use of this id:

> "For pharmacy benefit programs, this can be valued using the RxBIN and RxPCN numbers assigned by ANSI and NCPDP respectively." [CCD CONF-57].

The covered party is a **participant** within the policy **act** and should include a **participantRole/id**, which is the covered party's member or subscriber number for that payer. The **participant** should contain a **participantRole/code**, which is the reason for coverage (self, family, et cetera). As an option, there can be an additional **participant** to identify the holder of the policy. For both the holder of the policy and the covered entity, the **time** represents the period of coverage. Through an **entryRelationship**, a policy **act** contains either the authorization template or an **act** in definition mood. The latter type of **act** must contain an **act/id** for the plan identifier.

2.6.3. *Authorization Template*

Authorizations are specific to a policy and are subordinate to the policy through **entryRelationship** of the type "REFR." The **organizer** class groups multiple treatments that share common properties, such

as the reason for authorization. The treatments are represented with subordinate clinical statements and may identify providers authorized for these treatments.

Table 9: Payers Section Template

Payers Section	templateId; 48768-6 (Payment sources); insurance...OR...payer
coverage activity	class = ACT; mood = DEF; templateId; id; statusCode = completed
code	**@code** = 48768-6
act/entryRelationship	◎ActRelationshipType@typeCode = COMP (+) policy; sequenceNumber [M]
policy activity	class = ACT; mood = EVN; templateId; id [+]; statusCode = completed
code	**@code** = ActCoverageType [D] [SD]
Performer	typeCode = PRF; assignedEntity/id = [payer ID]
Participant	typeCode = COV (covered entity) participantRole/id; participantRole/code = PolicyOrProgramCoverageRoleType [D] time (of coverage)
Participant [M]	typeCode = HLD (subscriber holding the policy) participantRole/id = [subscriber's id] time (of coverage)
act/entryRelationship	◎authorization activity or **Act** typeCode = REFR
authorization activty	class = ACT; mood = EVN; templateId; id[+]
entryRelationship	◎clinical statement where typeCode = SUBJ (subject) **moodCode = PRMS** (Promise)
Performer [M+]	[providers authorized to provide treatment]

Payers Example

This example describes self-insured coverage with authorization for a colonoscopy.

```
<entry typeCode="DRIV">
   <act classCode="ACT" moodCode="EVN">
      <templateId root='2.16.840.1.113883.10.20.1.20'/>
         <!-- Coverage activity template -->
      <id root="IDGoesHere"/>
      <code code="48768-6" codeSystem="2.16.840.1.113883.6.1" displayName="Financing and
insurance"/>
      <statusCode code="completed"/>
      <entryRelationship typeCode="COMP">
         <act classCode="ACT" moodCode="EVN">
            <templateId root='2.16.840.1.113883.10.20.1.26'/>
               <!-- Policy activity template -->
            <id root="IDGoesHere"/>
            <code code="EHCPOL" codeSystem="2.16.840.1.113883.5.4" displayName="Extended
healthcare"/>
            <statusCode code="completed"/>
            <performer typeCode="PRF">
               <assignedEntity>
                  <id root="IDGoesHere"/>
                  <representedOrganization>
                     <name>Good Health Insurance</name>
                  </representedOrganization>
               </assignedEntity>
            </performer>
            <participant typeCode="COV">
               <participantRole>
                  <id root="IDGoesHere"/>
                  <code code="SELF" codeSystem="2.16.840.1.113883.5.111"
displayName="Self"/>
               </participantRole>
            </participant>
            <entryRelationship typeCode="REFR">
               <act classCode="ACT" moodCode="EVN">
                  <templateId root='2.16.840.1.113883.10.20.1.19'/>
                     <!-- Authorization activity template -->
                  <id root="IDGoesHere"/>
                  <code nullFlavor="NA"/>
                  <entryRelationship typeCode="SUBJ">
                     <procedure classCode="PROC" moodCode="PRMS">
                        <code code="73761001" codeSystem="2.16.840.1.113883.6.96"
displayName="Colonoscopy"/>
                     </procedure>
                  </entryRelationship>
               </act>
            </entryRelationship>
         </act>
      </entryRelationship>
   </act>
</entry>
```

2.7. Advance Directives

> "This section contains data defining the patient's advance directives and any reference to supporting documentation... This section contains data such as the existence of living wills, healthcare proxies, and CPR and resuscitation status." [CCD 3.2]

In the context of CCD, "advanced directives" are instructions; "advanced directive documents" are legal documents containing these directives. This section describes four templates: advance directive **observation**, verification of an advance directive **observation**, advance directive status **observation**, and advance directive **reference** (to an external document).

The patient's directions are expressed as an **observation** within the CCD, while other documents can be referenced through an **externalDocument**. Verification is done through a **participant** on an **observation**. The timestamp on the verification indicates when it was done. Each advance directive **observation** must have a status **observation**. An advance directive **observation** may contain exactly one **externalDocument** reference; if multiple documents are to be referenced, each will require a separate **observation**.

Conformance statements 105-107 in CCD describe the exact mechanism of linking to external advance directive documents.

Table 10: Advance Directives Section Template

Advance Directives Section	templateId; 42348-3 (Advance directives); advance directives
Advance directive **observation**	class = OBS; mood = EVN; templateId; id; statusCode = completed; effectiveTime [SD]
code advanced directive status **observation**	AdvanceDirectiveTypeCode [M]; code = 304251008 (SNOMED CT, resuscitation status)
Verification of an advance directive **observation** [M] [+] **Observation/participant** [SD] **Observation/participant/ time**	typeCode = VRF (Verifier) data type = TS
Advance directive status **observation** **value**	AdvanceDirectiveStatuscode
Advance directive **reference** **observation/reference/ ExternalDocument**	Class = Observation/reference/ExternalDocument Observation/reference /@typeCode = REFR id

Advance Directive Example

This description of a "Do not resuscitate" order is verified, current and links to a PDF document.

```
<entry typeCode="DRIV">
   <observation classCode="OBS" moodCode="EVN">
      <templateId root='2.16.840.1.113883.10.20.1.17'/>
         <!-- Advance directive observation template -->
      <id root="IDGoesHere"/>
      <code code="304251008" codeSystem="2.16.840.1.113883.6.96"
displayName="Resuscitation"/>
      <statusCode code="completed"/>
      <value xsi:type="CD" code="304253006" codeSystem="2.16.840.1.113883.6.96"
displayName="Do not resuscitate">
         <originalText><reference value="#AD1"/></originalText>
      </value>
      <participant typeCode="VRF">
         <templateId root='2.16.840.1.113883.10.20.1.58'/>
            <!-- Verification of an advance directive observation template -->
         <time value="19991107"/>
         <participantRole>
            <id root="IDGoesHere"/>
         </participantRole>
      </participant>
      <entryRelationship typeCode="REFR">
         <observation classCode="OBS" moodCode="EVN">
            <templateId root='2.16.840.1.113883.10.20.1.37'/>
               <!-- Advance directive status observation template -->
            <code code="33999-4" codeSystem="2.16.840.1.113883.6.1"
displayName="Status"/>
            <statusCode code="completed"/>
            <value xsi:type="CE" code="15240007" codeSystem="2.16.840.1.113883.6.96"
displayName="Current and verified"/>
         </observation>
      </entryRelationship>
      <reference typeCode="REFR">
         <templateId root='2.16.840.1.113883.10.20.1.36'/>
            <!-- Advance directive reference template -->
         <externalDocument>
            <id root="IDGoesHere"/>
            <code code="371538006" codeSystem="2.16.840.1.113883.6.96"
displayName="Advance directive"/>
            <text mediaType="application/pdf">
               <reference value="AdvanceDirective.someIDhere.pdf"/>
            </text>
         </externalDocument>
      </reference>
   </observation>
</entry>
```

2.8. Alerts (Allergies, Adverse Reactions)

> "This section is used to list and describe any allergies, adverse reactions, and alerts that are pertinent to the patient's current or past medical history." [CCD 3.8]

Alerts are a type of problem and use the problem **act** template. As with problems, the alert **observations** use an outer "concern" wrapper containing an alert **observation**. An alert **observation/effectiveTime** may be present and indicates the biological timing of the condition. The

absence of known allergies, adverse reactions, or alerts is asserted via an **observation** with a value drawn from SNOMED CT for "No known allergies" (160244002).

An agent is the cause of the allergy or adverse reaction. This may be indicated in the alert **observation** itself ("allergy to penicillin") and if so, should still be represented as an explicit **entity** with a **participantRole** in the **observation.**

A reaction represents an adverse event due to administration or exposure to a substance. It can have an associated severity and intervention.

Table 11: Alerts Template

Alerts Section	templateId; 48765-2 (Allergies, adverse reactions, alerts); alert and/or allergies and adverse reactions
Problem **act**	
Alert **observation** **entryRelationship** **entryRelationship** **entryRelationship**	mood = EVN; statusCode = completed; templateId; effectiveTime [M] value = AlertTypeCode [M] *absence of known allergies:* value = 160244002 (No known allergies, SNOMED CT) [SD] ◎ Reaction observation; typeCode = MFST (manifestation of) ◎ Reaction intervention; typeCode = RSON (has reason) ◎ Severity observation; typeCode = SUBJ (has subject)
Alert status **observation** [M] **value**	status **observation** valueset = AlertStatuscode
Representation of agent **observation/participant** [SD+] **participantRole/ playingEntity**	typeCode = CSM (consumable) **participantRole** class = MANU (manufactured) class = MMAT (manufactured material) ◎**code** = RxNorm and CDC Vaccine code [SD]
Reaction **observation** **[M+]** **entryRelationship**	class = OBS; mood = EVN; statusCode = completed ◎Severity observation typeCode = SUBJ (has subject)
Severity **observation** **[M+]** **code** **value**	class = OBS; mood = EVN; statusCode = completed code = SEV (severity observation)

Reaction Intervention	**procedure** activity or some other clinical statement

Alerts Example

This alert asserts an allergic reaction to the manufactured material penicillin that manifests as hives.

```
<entry typeCode="DRIV">
   <act classCode="ACT" moodCode="EVN">
      <templateId root='2.16.840.1.113883.10.20.1.27'/>
         <!-- Problem act template -->
      <id root="IDGoesHere"/>
      <code nullFlavor="NA"/>
      <entryRelationship typeCode="SUBJ">
         <observation classCode="OBS" moodCode="EVN">
            <templateId root='2.16.840.1.113883.10.20.1.18'/>
               <!-- Alert observation template -->
            <id root="IDGoesHere"/>
            <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>
            <statusCode code="completed"/>
            <value xsi:type="CD" code="282100009" codeSystem="2.16.840.1.113883.6.96"
displayName="Adverse reaction to substance"/>
            <participant typeCode="CSM">
               <participantRole classCode="MANU">
                  <playingEntity classCode="MMAT">
                     <code code="70618" codeSystem="2.16.840.1.113883.6.88"
displayName="Penicillin"/>
                  </playingEntity>
               </participantRole>
            </participant>
            <entryRelationship typeCode="MFST" inversionInd="true">
               <observation classCode="OBS" moodCode="EVN">
                  <templateId root='2.16.840.1.113883.10.20.1.54'/>
                     <!-- Reaction observation template -->
                  <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>
                  <statusCode code="completed"/>
                  <value xsi:type="CD" code="247472004"
codeSystem="2.16.840.1.113883.6.96" displayName="Hives"/>
               </observation>
            </entryRelationship>
            <entryRelationship typeCode="REFR">
               <observation classCode="OBS" moodCode="EVN">
                  <templateId root='2.16.840.1.113883.10.20.1.39'/>
                     <!-- Alert status observation template -->
                  <code code="33999-4" codeSystem="2.16.840.1.113883.6.1"
displayName="Status"/>
                  <statusCode code="completed"/>
                  <value xsi:type="CE" code="55561003"
codeSystem="2.16.840.1.113883.6.96" displayName="Active"/>
               </observation>
            </entryRelationship>
         </observation>
      </entryRelationship>
   </act>
</entry>
```

2.9. Medications

"The Medications section defines a patient's current medications and pertinent medication history." [CCD 3.9]

The medications section defines two clinical statement-level templates, medication activity and supply activity, and several medication-related supporting templates.

The medication activity template describes what is administered using **substanceAdministration** and the supply activity template describes what has been dispensed using a **supply** act. Reconciliation of a medication list requires indicating the source of information and the mood, which may be event (EVN) or intent (INT)[4]. Note that medications in intent mood are not orders; rather, they indicate what the physician intends that a patient should take. From the perspective of a pharmacy, orders that have been filled are **supply** events and intended use is a **substanceAdministration** in intent mood. Consents for the administration of medication are represented in the CCD header as **ClinicalDocument/authorization/consent**.

In a medication activity, **effectiveTime** indicates start/stop and frequency of medication. The **supply** may also contain an effectiveTime to indicate the actual or intended time of dispensing of the medication. Note that in **supply,** the **repeatNumber** represents the number of "fills," not refills.

The Medications section had the following supporting templates and patterns:

- Indications: describes the rationale for an activity (e.g., "as needed") using **substanceAdministration /precondition/Criterion.**
- Patient instruction: states the conditions, times, and frequency information for administration of the product.
- Fulfillment instructions: provides additional information to the prescriber, e.g., "no childproof caps."
- Medication series number **observation**: indicates which in a series of administrations a particular administration is sequenced.
- Reaction **observation**: an adverse event due to an administered substance. Note that significant reactions should be listed in the Alerts section. The template is defined in Alerts; a single constraint is added here.
- Severity **observation**: Defined in the Alerts section; may be associated with a reaction.
- Medication status **observation**: a type of status **observation** with value constrained.
- Product: a consumable.

Note that while the product is defined here, the product instance is defined in the Procedures section. Setting the **participant/participantRole/id** for **supply** equal to the equivalent element in a procedure-related product indicates that the references are to the same instances.

The absence of known medications **SHALL** be explicitly asserted in the document.

[4] The Reference Information Model underlying CDA uses the concept of "mood" like the concept of tense in a natural language grammar. The same action in different moods, then, reflect different stages of the life cycle of the event. See the CDA QSG for more information.

Table 12: Medications Template

Medications Section	templateId; 10160-0 (History of medication use) medication
medication activity **substanceAdministration** **routeCode** [SD] **doseQuantity** or **rateQuantity** [SD] **maxDoseQuantity** **performer** **substanceAdministration/ consumable** product instance [+] [M]	 mood = EVN or INT; id, statusCode [SD]; effectiveTime [+][SD] RouteOfAdministration [SD] ◎ product
supply activity **repeatNumber** [M] **author** [+][M] **performer** [+][M] **participant** [M] **supply/product** [M] product instance [+] [M]	mood = EVN or INT; id, statusCode [SD]; effectiveTime [+][SD] *"fills," not refills* *the prescriber* *the person dispensing the medication* **typeCode** = LOC (supply location) ◎ product
substanceAdministration / precondition/Criterion [M] **substanceAdministration/ entryRelationship** [M]	*Indications: indicates PRN (as needed)* **typeCode** = RSON (has reason) ◎ problem **act**, ◎ problem **observation**, or other clinical statement
patient instruction **act** [+] [M] **entryRelationship**	templateId; mood = INT typeCode = SUBJ (subject) *(when patient instruction is the target)*

Medications Section	templateId; 10160-0 (History of medication use) medication
fulfillment instruction **act** [+][M]	templateId; mood = INT
entryRelationship	typeCode = SUBJ (subject) *(when fulfillment instruction is the target)*
medication series number **observation** [M]	class = OBS; mood = EVN; statusCode
code	code = 30973-2 (dose number)
value	*data type* = INT (integer)
entryRelationship	typeCode = SUBJ (subject) *(when fulfillment instruction is the target)*
reaction **observation** [+] [M]	*(Medication activity may contain 1+ reaction* ***observation,*** *each of which may contain 1 severity* ***observation****)*
severity **observation** [M]	
entryRelationship	typeCode = CAUS (is etiology for) *(when reaction* ***observation*** *is the target)*
medication status **observation** [M]	status **observation** **value** = MedicationStatusCode
product	templateId;
manufacturedProduct	**manufacturedMaterial** [M]
manufacturedProduct/code	value = RxNorm [SD] *(for medications)*; value = CDC Vaccine Code [SD] *(for immunizations);* value = MedicationTypeCode [M]; see CCD CONF 360-362 on use of pre-coordinated product strength
material/code	**originalText** = generic name of product
material/name [M]	value = brand name of the product
manufacturerOrganization [M] *([SD] if* **id** *used)*	*an organization*
id [M]	uniquely identifies a kind of product

Medication Example

In the example below, the patient is actively taking an albuterol inhalant for wheezing.

```
<entry typeCode="DRIV">
   <substanceAdministration classCode="SBADM" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.1.24"/>
      <!-- Medication activity template -->
      <id root="IDGoesHere"/>
      <text><reference value="#ReferenceGoesHere"></reference></text>
      <statusCode code="active"/>
      <effectiveTime xsi:type="PIVL_TS">
         <period value="6" unit="h"/>
      </effectiveTime>
      <routeCode code="IPINHL" codeSystem="2.16.840.1.113883.5.112"
codeSystemName="RouteOfAdministration" displayName="Inhalation, oral"/>
      <doseQuantity value="2"/>
      <administrationUnitCode code="415215001" codeSystem="2.16.840.1.113883.6.96"
displayName="Puff"/>
      <consumable>
         <manufacturedProduct>
            <templateId root="2.16.840.1.113883.10.20.1.53"/>
            <!-- Product template -->
            <manufacturedMaterial>
               <code code="307782" codeSystem="2.16.840.1.113883.6.88"
displayName="Albuterol 0.09 MG/ACTUAT inhalant solution" codeSystemName="RxNorm">
                  <originalText>Albuterol inhalant</originalText>
                  <translation code="647298" codeSystem="2.16.840.1.113883.6.88"
displayName="Albuterol 0.09 MG/ACTUAT Inhalant Solution [Pro-Air Albuterol]"
codeSystemName="RxNorm"></translation>
               </code>
               <name>Pro-Air Albuterol</name>
            </manufacturedMaterial>
         </manufacturedProduct>
      </consumable>
      <precondition typeCode="PRCN">
         <criterion>
            <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>
            <value xsi:type="CE" code="56018004" codeSystem="2.16.840.1.113883.6.96"
displayName="Wheezing"/>
         </criterion>
      </precondition>
   </substanceAdministration>
</entry>
```

2.10. Immunizations

This section defines a patient's current immunization status and pertinent immunization history. [CCD 3.11]

This section may contain the patient's entire immunization history relevant to the period being summarized. Immunizations use the same sample templates as medications.

Table 13: Immunizations Template

Immunizations Section ❐	templateId; 11369-6 (History of immunizations) immunization

substanceAdministration	See Medications
supply activity	

Immunization Example

In this example, an immunization tracking system has supplied a record of administration of flu vaccine in November 1999.

```
<author>
   <time value="20000407130000+0500"/>
   <assignedAuthor>
      <id root="IDGoesHere"/>
      <assignedAuthoringDevice>
         <softwareName>Immunization Tracking System</softwareName>
      </assignedAuthoringDevice>
      <representedOrganization>
         <id root="2.16.840.1.113883.19.5"/>
      </representedOrganization>
   </assignedAuthor>
</author>
<entry typeCode="DRIV">
   <substanceAdministration classCode="SBADM" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.1.24"/>
         <!-- Medication activity template -->
      <id root="IDGoesHere"/>
      <statusCode code="completed"/>
      <effectiveTime xsi:type="IVL_TS"><center value="199911"/></effectiveTime>
      <consumable>
         <manufacturedProduct>
            <templateId root="2.16.840.1.113883.10.20.1.53"/>
               <!-- Product template -->
            <manufacturedMaterial>
               <code code="88" codeSystem="2.16.840.1.113883.6.59"
displayName="Influenza virus vaccine">
                  <originalText>Influenza virus vaccine</originalText>
               </code>
            </manufacturedMaterial>
         </manufacturedProduct>
      </consumable>
   </substanceAdministration>
</entry>
```

2.11. Medical Equipment

> "All pertinent equipment relevant to the diagnosis, care, and treatment of a patient should be included." [CCD 3.10]

The section specifically includes durable medical equipment as well as implanted or external devices and applies to both current and historical information.

The medical equipment template uses the same data objects and constraints as medications, using the **substance administration** and the **supply** activity template.

Table 14: Medical Equipment Template

Medical Equipment	templateId; 46264-8 (History of medical device use); equipment
substanceAdministration	See Medications
supply activity	

Medical Equipment Example

This example describes a device implanted in November, 1999.

```
<entry typeCode="DRIV">
   <supply classCode="SPLY" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.1.34"/>
         <!-- Supply activity template -->
      <id root="IDGoesHere"/>
      <statusCode code="completed"/>
      <effectiveTime xsi:type="IVL_TS"><center value="199911"/></effectiveTime>
      <participant typeCode="DEV">
         <participantRole classCode="MANU">
            <templateId root="2.16.840.1.113883.10.20.1.52"/>
               <!-- Product instance template -->
            <playingDevice>
               <code code="72506001" codeSystem="2.16.840.1.113883.6.96"
displayName="Automatic implantable cardioverter/defibrillator"/>
            </playingDevice>
         </participantRole>
      </participant>
   </supply>
</entry>
```

2.12. Vital Signs

> "The section may contain all vital signs for the period of time being summarized, but at a minimum should include notable vital signs such as the most recent, maximum and/or minimum, or both, baseline, or relevant trends." [CCD 3.12]

Vital signs use one or more **organizers**, each of which contain one or more result **observations**.

Table 15: Vital Signs Section Template

Vital Signs Section	templateId; 8716-3 (Vital signs); vital signs
result **organizer**	
result **observation**	

Vital Signs Example

This example shows height recorded as 177 cm on November 14, 1999.

```
<entry typeCode="DRIV">
   <organizer classCode="CLUSTER" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.1.35"/>
         <!-- Vital signs organizer template -->
      <id root="IDGoesHere"/>
      <code code="46680005" codeSystem="2.16.840.1.113883.6.96" displayName="Vital
signs"/>
      <statusCode code="completed"/>
      <effectiveTime value="19991114"/>
      <component>
         <observation classCode="OBS" moodCode="EVN">
            <templateId root="2.16.840.1.113883.10.20.1.31"/>
               <!-- Result observation template -->
            <id root="IDGoesHere"/>
            <code code="50373000" codeSystem="2.16.840.1.113883.6.96" displayName="Body
height"/>
            <statusCode code="completed"/>
            <effectiveTime value="19991114"/>
            <value xsi:type="PQ" value="177" unit="cm"/>
         </observation>
      </component>
   </organizer>
</entry>
```

2.13. Functional Status

> "This section contains information on the "normal functioning" of the patient at the time the record is created and provides an extensive list of examples. Further, it states that deviation from normal and limitations and improvements should be included here. [CCD 3.4]

CCD describes functional status in terms of problems or results using templates defined in those sections of the specification and suggests use of **text** if neither problems nor results are appropriate[5]**.** Problem templates□ should be used for conditions, diagnoses, symptoms, and findings. Result templates□ should be used for interpretations, including assessments such as the Instrumental Activities of Daily Living (IADL) scale or the Functional Status Index (FSI). Status on **observations** (problem or result) must be reported using a status of functional status **observation** template▄.

The specification provides special guidance on the use of standardized assessment instruments. If used, these guidelines should be followed:

- Result **organizer/code** represents the instrument using a value from LOINC or SNOMED CT. SNOMED CT includes Clinical Care Classification codes.
- Result **observation/code** represents the assessment question using a value from LOINC or SNOMED CT.
- If there are enumerated values as answers, they should be represented in **observation/value**. If **observation/value** is of datatype CE or CD, the enumerated values should use the same code set

[5] Note that CDA requires a narrative **text** for all sections, so CCD is asserting that the usual text and entries for problem and result are preferred, if appropriate, and that if neither is appropriate, a section with **text** only can be used.

as the question in **observation/code** and use a translation code to represent an equivalent in other code systems.

Table 16: Functional Status Section Template

Functional Status Section	templateId; 47420-5 (Functional status assessment); functional status
Problem **act**	
Problem **observation** **code**	FunctionalStatusTypeCode, IDF [M]
Result **organizer** **observation/code**	LOINC or SNOMED CT for assessment instrument [SD]
Result **observation** **code**	FunctionalStatusTypeCode, IDF [SD]
Status of functional status **observation**	status **observation** **value** = StatusOfFunctionalStatuscode

Functional Status Example

This example asserts "dependence on cane" since 1998.

```
<entry typeCode="DRIV">
   <act classCode="ACT" moodCode="EVN">
      <templateId root='2.16.840.1.113883.10.20.1.27'/>
         <!-- Problem act template -->
      <id root="IDGoesHere"/>
      <code nullFlavor="NA"/>
      <entryRelationship typeCode="SUBJ">
         <observation classCode="OBS" moodCode="EVN">
            <templateId root='2.16.840.1.113883.10.20.1.28'/>
               <!-- Problem observation template -->
            <id root="IDGoesHere"/>
            <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>
            <statusCode code="completed"/>
            <effectiveTime><low value="1998"/></effectiveTime>
            <value xsi:type="CD" code="105504002" codeSystem="2.16.840.1.113883.6.96"
displayName="Dependence on cane"/>
            <entryRelationship typeCode="REFR">
               <observation classCode="OBS" moodCode="EVN">
                  <templateId root='2.16.840.1.113883.10.20.1.44'/>
                     <!-- Status of functional status observation template -->
                  <code code="33999-4" codeSystem="2.16.840.1.113883.6.1"
displayName="Status"/>
                  <statusCode code="completed"/>
                  <value xsi:type="CE" code="55561003"
codeSystem="2.16.840.1.113883.6.96" displayName="Active"/>
               </observation>
            </entryRelationship>
         </observation>
      </entryRelationship>
   </act>
```

```
</entry>
```

2.14. Results

> "This section contains the results of observations generated by laboratories, imaging procedures, and other procedures." . . . "The section may contain all results for the period of time being summarized, but should include notable results such as abnormal values or relevant trends." [CCD 3.13].

The Results template contains two templates: Organizer and Observation. Each individual result is represented as an **observation**, and these observations may be grouped in an **organizer** to share a common context. An **organizer** may contain one or more child **organizer** elements.

Results may be obtained by performing a procedure on a **specimen**. The specimen may be inherent in the **organizer/Code** and if not, then should be identified in an explicit **organizer/specimen** element. The specimen **code** may specialize a specimen type inherent in the **organizer code**, but must not be in conflict with the **organizer code**. If the specimen is referenced in the Procedures section, use the same **specimenRole/id** to indicate that the results and procedure refer to the same specimen. [CDC3.13.2.1.1- Conf. 401]

The Result Organizer template also contains **components**. **Organizer/component** can target a procedure to indicate the technique used to obtain a result and is used where the procedure is not clear from **Organizer/code** or where **Organizer/code** needs to be specialized.

Effective time in a result **observation** refers to biologically relevant time, e.g., the time when the specimen was obtained from the patient.

Table 17: Results Template

Results Section	templateId; 30954-2 (Relevant diagnostic tests and/or laboratory data); result
result **organizer** **code** **specimen** [SD if not inherent] **component**	class = ORGANIZER; mood = EVN; templateId; id; statusCode LOINC [SD], SNOMED[SD], CPT-4 [M], Result TypeCode[M] **SHALL NOT** conflict with **Organizer/code** **specimenRole/id** = **Procedure/specimen/specimenRole/id** [SD] *indicates results and procedure refer to same specimen* ◎**procedure** [M]; ◎result **observation**

Results Section	templateId; 30954-2 (Relevant diagnostic tests and/or laboratory data); result
result	templateId; mood = EVN; id, statusCode; effectiveTime [SD]
observation	
code	LOINC [SD], SNOMED[SD], CPT-4 [M]
methodCode	Used if method is not inherent in code, or to specialize code; **SHALL NOT** conflict with **Observation/code**
value	If PQ**, use UCUM.**
interpretationCode	N(normal), L(low), S(susceptible), et cetera
referenceRange	contained in the observation to show normal range of values [SD]
referenceRange/ observationRange/ code	**SHALL NOT** be used; not supported by HL7 clinical statement

Result Organizer Example

The example below shows an organizer for a battery of results, in this case, a complete blood count (CBC) "without differential." The individual results in the CBC will be represented as observations nested under the organizer element.

```
<organizer classCode="BATTERY" moodCode="EVN">
   <templateId root="2.16.840.1.113883.10.20.1.32"/>
      <!-- Result organizer template -->
   <id root="someIdString"/>
   <code code="43789009" codeSystem="2.16.840.1.113883.6.96" displayName="CBC WO
DIFFERENTIAL"/>
   <statusCode code="completed"/>
   <effectiveTime value="200003231430"/>
   <component>
      <observation classCode="OBS" moodCode="EVN">
         . . .
      </observation>
   </component>
</organizer>
```

Result Observation Example

The example below illustrates a completed hemoglobin result from a specimen collected at 2:30 pm on March 23, 2000. The value of the result is 13.2 g/dl, which is normal, i.e., it falls within the indicated reference range:

```
<observation classCode="OBS" moodCode="EVN">
   <templateId root="2.16.840.1.113883.10.20.1.31"/>
      <!-- Result observation template -->
   <id root="someIdString"/>
   <code code="30313-1" codeSystem="2.16.840.1.113883.6.1" displayName="HGB"/>
   <statusCode code="completed"/>
   <effectiveTime value="200003231430"/>
   <value xsi:type="PQ" value="13.2" unit="g/dl"/>
   <interpretationCode code="N" codeSystem="2.16.840.1.113883.5.83"/>
   <methodCode code="14104" codeSystem=" 2.16.840.1.113883.5.84">
      <referenceRange>
         <observationRange>
```

```
            <text>M 13-18 g/dl; F 12-16 g/dl</text>
          </observationRange>
        </referenceRange>
      </methodCode>
    </observation>
```

2.15. Encounters

> "This section is used to list and describe any healthcare encounters pertinent to the patient's current health status or historical health history." [CCD 3.15]

The templates in the Encounters section include **encounter** activity and **encounter** location participation. The section can include patient instructions using the defined template. Indications about patient age are done through age **observation** with an **entryRelationship** whose **typeCode** value is "subject" in the HL7 ActRelationshipType value set.

Table 18: Encounters Template

Encounters Section	templateId; 46240-8 (History of encounters); encounters
Encounter activity **encounter**	class = ENC; mood = EVN; templateId; id
code [SD]	valueset = ActEncounterCode [D] [SD]
entryRelationship[M+]	◎ indication for the activity typeCode = RSON (has reason)
entryRelationship[M]	◎ age **observation** typeCode = SUBJ (subject)
performer [M] [+] patient instruction	**assignedEntity/code** defines role of practitioners involved
Encounter location participation **participant** [M+]	typeCode = LOC
participantRole	classCode = SDLOC (Service Delivery Location)
participantRoleCode [M]	value = ServiceDeliveryLocationRoleType (from RoleCode value set) [SD] [D]
participantRolePlayingEntity [M]	classCode = PLC (place)

Encounter Example

This example records a general encounter on April 7, 2000 at Good Health Clinic.

```
<entry typeCode="DRIV">
   <encounter classCode="ENC" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.1.21"/>
         <!-- Encounter activity template -->
      <id root="IDGoesHere"/>
      <code code="GENRL" codeSystem="2.16.840.1.113883.5.4" displayName="General">
         <originalText>Checkup Examination</originalText>
      </code>
      <effectiveTime value="20000407"/>
      <participant typeCode="LOC">
         <templateId root="2.16.840.1.113883.10.20.1.45"/>
            <!-- Location participation template -->
         <participantRole classCode="SDLOC">
            <id root="IDGoesHere"/>
```

```
            <playingEntity classCode="PLC">
               <name>Good Health Clinic</name>
            </playingEntity>
         </participantRole>
      </participant>
   </encounter>
</entry>
```

2.16. Plan of Care

> This section contains "All active, incomplete, or pending orders, appointments, referrals, procedures, services, or any other pending event of clinical significance to the current and ongoing care of the patient ... The plan of care section also contains information regarding goals and clinical reminders." [CCD 3.16]

A plan of care is organized around one or more plan of care activities, represented by at least one of the following: **act, encounter, observation, procedure, substance administration,** or **supply**.

Table 19: Plan of Care Section Template

Plan of Care Section	templateId; 18776-5 (Treatment Plan); plan
Plan of care activity **act**, **encounter**, **observation**, **procedure**, **substanceAdministration**, or **supply**	templateId; mood = (see the table that follows); id

The value of @moodCode varies with the type of element as follows:

Table 20: Plan of Care moodCodes

Element Type	moodCode
Act, Encounter or **Procedure**	INT, ARQ, PRMS, PRP, or RQO (not GOL)
SubstanceAdministration and **Supply**	INT, PRMS, PRP, or RQO (not ARQ or GOL)
Observation	INT, PRMS, PRP, RQO, or GOL (not ARQ)

Plan of Care Example

The following example shows a Plan of Care with an **observation** activity in request mood ordering a pulmonary function test.

```
<entry typeCode="DRIV">
   <observation classCode="OBS" moodCode="RQO">
      <templateId root="2.16.840.1.113883.10.20.1.25"/>
         <!-- Plan of Care Activity template -->
      <id root="someIdString"/>
```

```
      <code code="23426006" codeSystem="2.16.840.1.113883.6.96" displayName="Pulmonary
function test"/>
      <statusCode code="new"/>
      <effectiveTime><center value="20000421"/></effectiveTime>
   </observation>
</entry>
```

VI. Appendices

The *Guide* contains the following appendices:

- Installation Notes: How to install these files along with the CDA and CCD to activate hyperlinks.
- CCD Template Identifiers: List of all CCD-defined template identifiers
- Vocabularies and Value Sets: List of CCD value sets
- Commonly-referenced OIDs: Identifiers in common use
- Resources: This appendix lists pertinent specifications and describes how to obtain them as well as relevant articles and has links to the XML sample files supplied with this *Guide:*
    - Sample CCD (Level 2): complete CCD instance sample coded to section level (no entries or clinical statements)
    - Sample CCD (Level 3): complete CCD instance coded to entry level. Note that this sample is based on the one provided by Bob Dolin, MD with the CCD specification and has been enhanced to illustrate some further points of usage as well as compliance with HITSP C32 for medications.

1. Installation Notes

This document assumes that the implementer has downloaded all of the required reference documents and has created the following directory structure:

…*SomeDirectory***CCD_QSG**

…*SomeDirectory***CCD**

…*SomeDirectory*\ **CDA_R2_NormativeWebEdition2005**

…*SomeDirectory***CDA_QSG**

Where:

SomeDirectory is the same parent directory for all other directories listed below

CCD_QSG – the directory where this document resides.

CCD – Directory that contains the unzipped contents of the HL7 CCD IG.

CDA_R2_NormativeWebEdition2005 – unzipped contents of the CDA_R2 specification

CDA_QSG – unzipped contents of the *CDA Quick Start Guide*

NOTE: See Resources for information on how to obtain these documents and files.

Other links in this document may point directly to other public online resources.

The **CCD_QSG** Directory should contain the following files after installation:

- **ccdqsg.pdf** – this guide
- **sample1evel2.xml** – an example of an XML instance that contains Level 2 coding.
- **samplelevel3.xml** – an example of an XML instance that contains Level 3 coding.
- **ccd.xsl** – a style sheet for viewing the sample files in an appropriate viewer/browser.

VII.CCD Template Identifiers

This table lists CCD-defined template identifiers and the SDTC root for templates. The identifier populates the root of templateId and no extension is used. References in the third column are to pertinent sections within CCD. Links in the Description column are to pertinent sections within this *Guide*.

Template Identifier	Description	Reference (CCD)
2.16.840.1.113883.10	HL7 Registered Templates Root	
2.16.840.1.113883.10.20	HL7 SDTC Registered Templates Root	
2.16.840.1.113883.10.20.1	CCD v1.0 Templates Root	***1.4 Asserting conformance to this Implementation Guide; 2.3 Version***
Section Templates		
2.16.840.1.113883.10.20.1.1	Advance directives section	***3.2 Advance Directives***
2.16.840.1.113883.10.20.1.2	Alerts section	***3.8 Alerts***
2.16.840.1.113883.10.20.1.3	Encounters section	***3.15 Encounters***
2.16.840.1.113883.10.20.1.4	Family history section	***3.6 Family History***
2.16.840.1.113883.10.20.1.5	Functional status section	***3.4 Functional Status***
2.16.840.1.113883.10.20.1.6	Immunizations section	***3.11 Immunizations***
2.16.840.1.113883.10.20.1.7	Medical equipment section	***3.10 Medical Equipment***
2.16.840.1.113883.10.20.1.8	Medications section	***3.9 Medications***
2.16.840.1.113883.10.20.1.9	Payers section	***3.1 Payers***
2.16.840.1.113883.10.20.1.10	Plan of care section	***3.16 Plan of Care***
2.16.840.1.113883.10.20.1.11	Problem section	***3.5 Problems***
2.16.840.1.113883.10.20.1.12	Procedures section	***3.14 Procedures***
2.16.840.1.113883.10.20.1.13	Purpose section	***2.8 Purpose***
2.16.840.1.113883.10.20.1.14	Results section	***3.13 Results***
2.16.840.1.113883.10.20.1.15	Social history section	***3.7 Social History***
2.16.840.1.113883.10.20.1.16	Vital signs section	***3.12 Vital Signs***
Clinical Statement Templates		
2.16.840.1.113883.10.20.1.17	Advance directive observation	***3.2 Advance Directives***
2.16.840.1.113883.10.20.1.18	Alert observation	***3.8 Alerts***
2.16.840.1.113883.10.20.1.19	Authorization activity	***3.1 Payers***
2.16.840.1.113883.10.20.1.20	Coverage activity	***3.1 Payers***
2.16.840.1.113883.10.20.1.21	Encounter activity	***3.15 Encounters***
2.16.840.1.113883.10.20.1.22	Family history observation	***3.6 Family History***
2.16.840.1.113883.10.20.1.23	Family history organizer	***3.6 Family History***
2.16.840.1.113883.10.20.1.24	Medication activity	***3.9 Medications***

Template Identifier	Description	Reference (CCD)
2.16.840.1.113883.10.20.1.25	Plan of care activity	*3.16 Plan of Care*
2.16.840.1.113883.10.20.1.26	Policy activity	*3.1 Payers*
2.16.840.1.113883.10.20.1.27	Problem act	*3.5 Problems*
2.16.840.1.113883.10.20.1.28	Problem observation	*3.5 Problems*
2.16.840.1.113883.10.20.1.29	Procedure activity	*3.14 Procedures*
2.16.840.1.113883.10.20.1.30	Purpose activity	*2.8 Purpose*
2.16.840.1.113883.10.20.1.31	Result observation	*3.13 Results*
2.16.840.1.113883.10.20.1.32	Result organizer	*3.13 Results*
2.16.840.1.113883.10.20.1.33	Social history observation	*3.7 Social History*
2.16.840.1.113883.10.20.1.34	Supply activity	*3.9 Medications*
2.16.840.1.113883.10.20.1.35	Vital signs organizer	*3.12 Vital Signs*
Supporting Templates (used within a clinical statement)		
2.16.840.1.113883.10.20.1.36	Advance directive reference	*3.2 Advance Directives*
2.16.840.1.113883.10.20.1.37	Advance directive status observation	*3.2 Advance Directives*
2.16.840.1.113883.10.20.1.38	Age observation	*3.6.2.4 Representation of age*
2.16.840.1.113883.10.20.1.39	Alert status observation	*3.8 Alerts*
2.16.840.1.113883.10.20.1.40	Comment	*4.3 Comments*
2.16.840.1.113883.10.20.1.41	Episode observation	*3.5.2.3 Episode observations*
2.16.840.1.113883.10.20.1.42	Family history cause of death observation	*3.6 Family History*
2.16.840.1.113883.10.20.1.43	Fulfillment instruction	*3.9.2.2 Medication related information*
2.16.840.1.113883.10.20.1.45	Location participation	*3.15.2.2 Encounter location*
2.16.840.1.113883.10.20.1.46	Medication series number observation	*3.9.2.2 Medication related information*
2.16.840.1.113883.10.20.1.47	Medication status observation	*3.9 Medications*
2.16.840.1.113883.10.20.1.48	Patient awareness	*3.5.2.4 Patient awareness of a problem*
2.16.840.1.113883.10.20.1.49	Patient instruction	*3.9.2.2 Medication related information*
2.16.840.1.113883.10.20.1.51	Problem healthstatus observation	*3.5 Problems*
2.16.840.1.113883.10.20.1.50	Problem status observation	*3.5 Problems*
2.16.840.1.113883.10.20.1.53	Product	*3.9.2.4 Representation of a product*
2.16.840.1.113883.10.20.1.52	Product instance	*3.14.2.2 Procedure related products*
2.16.840.1.113883.10.20.1.54	Reaction observation	*3.9.2.2 Medication related information*
2.16.840.1.113883.10.20.1.55	Severity observation	*3.9.2.2 Medication related information*
2.16.840.1.113883.10.20.1.56	Social history status observation	*3.7 Social History*
2.16.840.1.113883.10.20.1.57	Status observation	*5.1 “Type” and “Status” values*

Template Identifier	Description	Reference (CCD)
2.16.840.1.113883.10.20.1.44	Status of functional status observation	***3.4 Functional Status***
2.16.840.1.113883.10.20.1.58	Verification of an advance directive observation	***3.2 Advance Directives***

VIII.Vocabularies and Value Sets

The following table summarizes the CCD value sets described in CCD. As in CCD, single-code bindings are not included.

valueSetOID (localValueSetName)	**code**	**displayName**	**codeSystem**	**Code System Name**
2.16.840.1.113883.1.11.20 (HL7 SDTC Value Set OID Root)				
2.16.840.1.113883.1.11.19832 (ActCoverageType)	Any subtype of ActCoverageType		2.16.840.1.113883.5.4	ActCode
2.16.840.1.113883.1.11.20.1 (AdvanceDirectiveStatusCode)	425392003	Current and Verified	2.16.840.1.113883.6.96	SNOMED CT
	425394002	Supported By Healthcare Will	2.16.840.1.113883.6.96	SNOMED CT
	425393008	Supported By Durable Power of Attorney for Healthcare	2.16.840.1.113883.6.96	SNOMED CT
	425396000	Verified With Family Only	2.16.840.1.113883.6.96	SNOMED CT
	310305009	Verified By Medical Record Only	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.20.2 (AdvanceDirectiveTypeCode)	304251008	Resuscitation	2.16.840.1.113883.6.96	SNOMED CT
	52765003	Intubation	2.16.840.1.113883.6.96	SNOMED CT
	225204009	IV Fluid and Support	2.16.840.1.113883.6.96	SNOMED CT
	89666000	CPR	2.16.840.1.113883.6.96	SNOMED CT
	281789004	Antibiotics	2.16.840.1.113883.6.96	SNOMED CT
	78823007	Life Support	2.16.840.1.113883.6.96	SNOMED CT
	61420007	Tube Feedings	2.16.840.1.113883.6.96	SNOMED CT
	71388002	Other Directive	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.20.3 (AlertStatusCode)	55561003	Active	2.16.840.1.113883.6.96	SNOMED CT
	392521001	Prior History	2.16.840.1.113883.6.96	SNOMED CT
	73425007	No Longer Active	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.20.4 (AlertTypeCode)	106190000	Allergy	2.16.840.1.113883.6.96	SNOMED CT
	281647001	Adverse Reaction	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.13955 (EncounterCode)	Any subtype of ActEncounterCode		2.16.840.1.113883.5.4	ActCode

valueSetOID (localValueSetName)	code	displayName	codeSystem	Code System Name
2.16.840.1.113883.1.11.20.21 (FamilyHistoryPersonCode)	Any subtype of 303071001 "Person in the family"		2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.19579 (FamilyHistoryRelated SubjectCode)	Any subtype of FAMMEMB		2.16.840.1.113883.5.111	RoleCode
2.16.840.1.113883.1.11.20.6 (FunctionalStatusTypeCode)	282097004	Ambulatory Status	2.16.840.1.113883.6.96	SNOMED CT
	363871006	Mental Status	2.16.840.1.113883.6.96	SNOMED CT
	129025006	Activities of Daily Living	2.16.840.1.113883.6.96	SNOMED CT
	4683004	Home/Living Situation	2.16.840.1.113883.6.96	SNOMED CT
	284773001	Ability to Care for Self	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.20.7 (MedicationStatusCode)	55561003	Active	2.16.840.1.113883.6.96	SNOMED CT
	421139008	On Hold	2.16.840.1.113883.6.96	SNOMED CT
	392521001	Prior History	2.16.840.1.113883.6.96	SNOMED CT
	73425007	No Longer Active	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.20.8 (MedicationTypeCode)	373873005	Medication	2.16.840.1.113883.6.96	SNOMED CT
	354078009	IV Fluid	2.16.840.1.113883.6.96	SNOMED CT
	327838005	Parenteral Nutrition	2.16.840.1.113883.6.96	SNOMED CT
	108961000	Supplemental Nutrition	2.16.840.1.113883.6.96	SNOMED CT
	350326008	Immunization	2.16.840.1.113883.6.96	SNOMED CT
	425398004	Supplies	2.16.840.1.113883.6.96	SNOMED CT
	49062001	Device	2.16.840.1.113883.6.96	SNOMED CT
	40388003	Implantable Device	2.16.840.1.113883.6.96	SNOMED CT
	425399007	Durable Medical Equipment	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.20.9 (OrderRequestTypeCode)	71388002	Order	2.16.840.1.113883.6.96	SNOMED CT
	308335008	Encounter	2.16.840.1.113883.6.96	SNOMED CT
	71388002	Procedure	2.16.840.1.113883.6.96	SNOMED CT
	127777001	Service	2.16.840.1.113883.6.96	SNOMED CT

valueSetOID (localValueSetName)	code	displayName	codeSystem	Code System Name
	260787004	Product	2.16.840.1.113883.6.96	SNOMED CT
	127785005	Immunization	2.16.840.1.113883.6.96	SNOMED CT
	416118004	Medication	2.16.840.1.113883.6.96	SNOMED CT
	386336002	Authorization	2.16.840.1.113883.6.96	SNOMED CT
	3457005	Referral	2.16.840.1.113883.6.96	SNOMED CT
	11429006	Consultation	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.20.10 (PlanOfCareStatusCode)	new	Ordered	2.16.840.1.113883.5.14	ActStatus
	new	Requested	2.16.840.1.113883.5.14	ActStatus
	active	Pending	2.16.840.1.113883.5.14	ActStatus
	active	In Process	2.16.840.1.113883.5.14	ActStatus
	held	On Hold	2.16.840.1.113883.5.14	ActStatus
	cancelled	Cancelled	2.16.840.1.113883.5.14	ActStatus
	-any-	Repeat	2.16.840.1.113883.5.14	ActStatus
	Aborted	No Show	2.16.840.1.113883.5.14	ActStatus
2.16.840.1.113883.1.11.20.11 (PlanOfCareTypeCode)	223452003	Reminder	2.16.840.1.113883.6.96	SNOMED CT
	71388002	Order	2.16.840.1.113883.6.96	SNOMED CT
	416118004	Prescription	2.16.840.1.113883.6.96	SNOMED CT
	386336002	Request For Authorization	2.16.840.1.113883.6.96	SNOMED CT
	386336002	Authorization	2.16.840.1.113883.6.96	SNOMED CT
	3457005	Referral	2.16.840.1.113883.6.96	SNOMED CT
	11429006	Request For Consultation	2.16.840.1.113883.6.96	SNOMED CT
	391157003	Treatment Recommendation	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.19809 (PolicyOrProgramCoverageRoleType)	Any subtype of PolicyOrProgramCoverage RoleType		2.16.840.1.113883.5.111	RoleCode
2.16.840.1.113883.1.11.20.12 (ProblemHealthStatusCode)	81323004	Alive and well	2.16.840.1.113883.6.96	SNOMED CT
	313386006	In remission	2.16.840.1.113883.6.96	SNOMED CT
	162467007	Symptom free	2.16.840.1.113883.6.96	SNOMED CT
	161901003	Chronically ill	2.16.840.1.113883.6.96	SNOMED CT

valueSetOID (localValueSetName)	code	displayName	codeSystem	Code System Name
	271593001	Severely ill	2.16.840.1.113883.6.96	SNOMED CT
	21134002	Disabled	2.16.840.1.113883.6.96	SNOMED CT
	161045001	Severely disabled	2.16.840.1.113883.6.96	SNOMED CT
	419099009	Deceased	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.20.13 (ProblemStatusCode)	55561003	Active	2.16.840.1.113883.6.96	SNOMED CT
	73425007	Inactive	2.16.840.1.113883.6.96	SNOMED CT
	90734009	Chronic	2.16.840.1.113883.6.96	SNOMED CT
	7087005	Intermittent	2.16.840.1.113883.6.96	SNOMED CT
	255227004	Recurrent	2.16.840.1.113883.6.96	SNOMED CT
	415684004	Rule out	2.16.840.1.113883.6.96	SNOMED CT
	410516002	Ruled out	2.16.840.1.113883.6.96	SNOMED CT
	413322009	Resolved	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.20.14 (ProblemTypeCode)	64572001	Condition	2.16.840.1.113883.6.96	SNOMED CT
	418799008	Symptom	2.16.840.1.113883.6.96	SNOMED CT
	404684003	Finding	2.16.840.1.113883.6.96	SNOMED CT
	409586006	Complaint	2.16.840.1.113883.6.96	SNOMED CT
	248536006	Functional limitation	2.16.840.1.113883.6.96	SNOMED CT
	55607006	Problem	2.16.840.1.113883.6.96	SNOMED CT
	282291009	Diagnosis	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.20.15 (ProcedureStatusCode)	cancelled	Cancelled	2.16.840.1.113883.5.14	ActStatus
	Held	On Hold	2.16.840.1.113883.5.14	ActStatus
	Active	In Progress	2.16.840.1.113883.5.14	ActStatus
	Aborted	Not Completed	2.16.840.1.113883.5.14	ActStatus
	completed	Completed	2.16.840.1.113883.5.14	ActStatus
2.16.840.1.113883.1.11.20.16 (ResultTypeCode)	252275004	Hematology	2.16.840.1.113883.6.96	SNOMED CT
	275711006	Chemistry	2.16.840.1.113883.6.96	SNOMED CT
	68793005	Serology	2.16.840.1.113883.6.96	SNOMED CT
	395124008	Virology	2.16.840.1.113883.6.96	SNOMED CT

valueSetOID (localValueSetName)	code	displayName	codeSystem	Code System Name
	69200006	Toxicology	2.16.840.1.113883.6.96	SNOMED CT
	19851009	Microbiology	2.16.840.1.113883.6.96	SNOMED CT
	363679005	Imaging	2.16.840.1.113883.6.96	SNOMED CT
	363680008	X-ray	2.16.840.1.113883.6.96	SNOMED CT
	16310003	Ultrasound	2.16.840.1.113883.6.96	SNOMED CT
	77477000	CT	2.16.840.1.113883.6.96	SNOMED CT
	113091000	MRI	2.16.840.1.113883.6.96	SNOMED CT
	77343006	Angiography	2.16.840.1.113883.6.96	SNOMED CT
	40701008	Cardiac Echo	2.16.840.1.113883.6.96	SNOMED CT
	371572003	Nuclear Medicine	2.16.840.1.113883.6.96	SNOMED CT
	108257001	Pathology	2.16.840.1.113883.6.96	SNOMED CT
	71388002	Procedure	2.16.840.1.113883.6.96	SNOMED CT
	46680005	Vital Sign	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.14581 (RouteOfAdministration)	Any subtype of RouteOfAdministration		2.16.840.1.113883.5.112	RouteOf Administration
2.16.840.1.113883.1.11.17660 (ServiceDeliveryLocationRoleType)	Any subtype of ServiceDeliveryLocation RoleType		2.16.840.1.113883.5.111	RoleCode
2.16.840.1.113883.1.11.20.17 (SocialHistoryStatusCode)	55561003	Active	2.16.840.1.113883.6.96	SNOMED CT
	392521001	Prior History	2.16.840.1.113883.6.96	SNOMED CT
	73425007	No Longer Active	2.16.840.1.113883.6.96	SNOMED CT
	261665006	Unknown	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.20.18 (SocialHistoryTypeCode)	125680007	Marital Status	2.16.840.1.113883.6.96	SNOMED CT
	160538000	Religion	2.16.840.1.113883.6.96	SNOMED CT
	364699009	Ethnicity	2.16.840.1.113883.6.96	SNOMED CT
	103579009	Race	2.16.840.1.113883.6.96	SNOMED CT
	61909002	Language	2.16.840.1.113883.6.96	SNOMED CT
	229819007	Smoking	2.16.840.1.113883.6.96	SNOMED CT
	256235009	Exercise	2.16.840.1.113883.6.96	SNOMED CT

valueSetOID (localValueSetName)	code	displayName	codeSystem	Code System Name
	364393001	Diet	2.16.840.1.113883.6.96	SNOMED CT
	364703007	Employment	2.16.840.1.113883.6.96	SNOMED CT
	425400000	Toxic Exposure	2.16.840.1.113883.6.96	SNOMED CT
	160573003	ETOH Use	2.16.840.1.113883.6.96	SNOMED CT
	363908000	Drug Use	2.16.840.1.113883.6.96	SNOMED CT
	228272008	Other Social History	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.20.5 (StatusOfFunctionalStatus Code)	55561003	Active	2.16.840.1.113883.6.96	SNOMED CT
	90734009	Chronic	2.16.840.1.113883.6.96	SNOMED CT
	14803004	Temporary	2.16.840.1.113883.6.96	SNOMED CT
	370996005	Resolved	2.16.840.1.113883.6.96	SNOMED CT
2.16.840.1.113883.1.11.20.19 (TestStatusCode)	active	Pending	2.16.840.1.113883.5.14	ActStatus
	active	In Process	2.16.840.1.113883.5.14	ActStatus
	active	Preliminary Results	2.16.840.1.113883.5.14	ActStatus
	completed	Final Results	2.16.840.1.113883.5.14	ActStatus
	completed	Corrected Results	2.16.840.1.113883.5.14	ActStatus
2.16.840.1.113883.1.11.20.20 (TestTypeCode)	71388002	Observation	2.16.840.1.113883.6.96	SNOMED CT
	404684003	Result	2.16.840.1.113883.6.96	SNOMED CT

4. Commonly-referenced OIDs

The following tables list some commonly referenced object identifiers (OIDs). For a more complete list, please refer to the HL7 OID registry at http://www.hl7.org/oid/index.cfm. (Descriptions below are abbreviated from those in the HL7 OID registry.)

4.1. Identifiers

OID	HL7 Symbolic Name	Description
2.16.840.1.113883.4.1		United States Social Security Number (SSN). Assigned by the U.S. Social Security Administration. Note: IRS assigned ITINs are often used as drop-ins for social security numbers.

2.16.840.1.113883.4.2		United States Individual Taxpayer Identification Number (ITIN). Assigned by the U.S. Internal Revenue Service (IRS) to alien taxpayers not eligible to a social security number. ITIN are used as drop-ins for Social Security Numbers.
2.16.840.1.113883.4.4	EIN	U.S. IRS Assigned Employer Identification Number EIN. An EIN is a nine-digit number (for example, “12-3456789”) assigned to sole proprietors, corporations, partnerships, estates, trusts, withholding agents, and other entities for tax filing and reporting purposes. An EIN can not be used in place of a social security number (SSN).
2.16.840.1.113883.4.5	PTIN	U.S. IRS Assigned Preparer Tax Identification Number PTIN. Section 3710 of the Internal Revenue Service Restructuring and Reform Act of 1998 defines the PTIN. The PTIN has the form of an SSN. It is used as an alias SSN to identify paid preparers of tax returns.

4.2. Coding Systems

OID	HL7 Symbolic Name	Description
2.16.840.1.113883.6.1	LN	Logical Observation Identifier Names and Codes (LOINC)
2.16.840.1.113883.6.2	ICD9CM	The International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM), Volumes I, II (diagnoses) and III (procedures) describes the classification of morbidity and mortality information for statistical purposes and for the indexing of healthcare records by diseases and procedures. The ICD-9-CM codes can be used as the value of the Act.cd attribute. **Note that this has been retired** in favor of an explicit split between the diagnosis codes and the procedures codes as per the Vocablary TC decision on Wednesday Q4, January 21, 2004. Replaced by **2.16.840.113883.6.103** and **2.16.840.113883.6.104** as voted by committee. -T. Klein

2.16.840.1.113883.6.103	ICD-9CM (diagnosis codes)	The International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM), Volumes I, II (diagnoses) and III (procedures) describes the classification of morbidity and mortality information for statistical purposes and for the indexing of healthcare records by diseases and procedures. The ICD-9-CM codes can be used as the value of the Act.cd attribute.
2.16.840.1.113883.6.104	ICD-9CM (procedure codes)	The International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM), Volumes I, II (diagnoses) and III (procedures) describes the classification of morbidity and mortality information for statistical purposes and for the indexing of healthcare records by diseases and procedures. The ICD-9-CM codes can be used as the value of the Act.cd attribute.
2.16.840.1.113883.6.3	ICD10	International Classification of Diseases revision 10 (ICD 10) Note this does NOT have the CM changes, and is specifically for international use.
2.16.840.1.113883.6.4	ICD10PCS	The International Classification of Diseases, 10th Revision, Procedure Coding System (ICD-10-PCS), describes the classification of inpatient procedures for statistical purposes and for the indexing of healthcare records by procedures. The ICD-10-PCS codes can be used as the value of the Act.cd attribute
2.16.840.1.113883.6.90	ICD10CM	The International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM), describes the classification of morbidity and mortality information for statistical purposes and for the indexing of healthcare records by diseases. The ICD-10-CM codes can be used as the value of the Act.cd attribute.
2.16.840.1.113883.6.94	ICD10-Ca	ICD10 with Canadian modifications
2.16.840.1.113883.6.12	C4	American Medical Association’s Current Procedure Terminology 4 (CPT-4) codes.

2.16.840.1.113883.6.26	MEDCIN	MEDCIN contains more than 175,000 clinical data elements arranged in a hierarchy, with each item having weighted links to relevant diagnoses. The clinical data elements are organized into six basic termtypes designed to accommodate information relevant to a clinical encounter.
2.16.840.1.113883.6.42	I9	ICD9
2.16.840.1.113883.6.69	NDC	National drug codes
2.16.1	ISO3166-1	ISO 3166-1 2 Country codes. Note that ISO 3166-1 has numeric. 2-character, and 3-characters codes (synonyms), but HL7 has agreed that only the 2-character form is to be used (In v3 this will be done using value set machinery).
2.16.2	ISO3166-2	ISO 3166-2 Country subdivision codes.
2.16.840.1.113883.6.86	UMLS	UMLS codes as CUIs making up the values in a coding system
2.16.840.1.113883.6.88	RxNorm	RxNorm provides standard names for clinical drugs (active ingredient + strength + dose form) and for dose forms as administered to a patient. It provides links from clinical drugs, both branded and generic, to their active ingredients, drug components (active ingredient + strength), and related brand names. NDCs (National Drug Codes) for specific drug products (where there are often many NDC codes for a single product) are linked to that product in RxNorm.
2.16.840.1.113883.6.96	SNOMED-CT	SNOMED CT is a concept-based, scientifically validated terminology that provides a unique and permanent concept identifier that can be included in multiple HL7 data types including CD and CE. SNOMED CT's concepts are interrelated hierarchically and using description logic.
2.16.840.1.113883.6.99	ISO639-1	Codes for the Representation of Names of Languages Part 1: Alpha-2 Code. Used as part of the IETF 3066 specification for languages throughout the HL7 specification.
2.16.840.1.113883.6.100	ISO639-2	Codes for the Representation of Names of Languages Part 2: Alpha-3 Code. Used as part of the IETF 3066 specification for languages throughout the HL7 specification.

2.16.840.1.113883.6.101	NUCC Provider Codes	Codes from the National Uniform Claim Committee for Provider Types (Provider Taxonomy)
2.16.840.1.113883.6.164.1	MDREA	Medical Dictionary for Regulatory Activities Terminology (MedDRA), American English Equivalents with expanded abbreviations, Version 7.0. Bethesda, MD: National Library of Medicine, March 1, 2004.
2.16.840.1.113883.6.209	NDFRT	National Drug File - Reference Terminology, 2004_01. Washington, DC: U.S. Department of Veterans Affairs, Veterans Health Administration, January 2004.

5. Resources

This appendix lists specifications, articles, and web resources for the CCD implementer. It also links to the two sample XML files supplied with this *Guide*.

5.1. Specifications and Profiles

The two pertinent specifications are CCD and CDA, listed below. Copies of the specifications are available without charge to members of HL7 and for a fee of $50 for nonmembers through the HL7 online bookstore.

Dolin RH, Alschuler L, Beebe C, Boone KW, Geimer R, Giannone G, et al, (Editors). HL7 Implementation Guide: CDA Release 2 - Continuity of Care Document (CCD). April 2007. Ann Arbor, Mich.: Health Level Seven, Inc. Available at: http://www.hl7.org/library/General/HL7_CCD_final.zip.

Dolin RH, Alschuler L, Boyer S, Beebe C, Behlen FM, Biron PV, Shabo A, (Editors). HL7 Clinical Document Architecture, Release 2.0. ANSI-approved HL7 Standard; May 2005. Ann Arbor, Mich.: Health Level Seven, Inc. Available at: http://www.hl7.org/documentcenter/private/standards/cda/r2/cda_r2_normativewebedition.zip.

HL7 CDA4CDT Project Wiki Page lists latest CDA4CDT Guides: http://informatics.mayo.edu/wiki/index.php/CDA_for_Common_Document_Types_%28CDA4CDT%29

IHE Patient Care Coordination (PCC) Technical Framework: http://wiki.ihe.net/index.php?title=Patient_Care_Coordination_Technical_Framework

HITSP C32: http://publicaa.ansi.org/sites/apdl/Documents/Standards%20Activities/Healthcare%20Informatics%20Technology%20Standards%20Panel/Interoperability%20Specification/IS03%20-%20Consumer%20Empowerment%20V2.0/HITSP_v2.0_2007_C32%20-%20Registration%20and%20Medication%20History%20Document.pdf

5.2. Articles and Reference Guides

Following are citations for peer-reviewed articles on CCD and CDA. In addition, Alschuler Associates, LLC, maintains a library of trade press articles on CDA and CCD use and adoption.

Dolin RH, Giannone G, Schadow G; Enabling Joint Commission Medication Reconciliation Objectives with the HL7 / ASTM Continuity of Care Document Standard; AMIA 2007 Fall Symposium Proceedings.

Dolin RH, Alschuler L, Boyer S, Beebe C, Behlen FM, Biron PV, Shabo A., HL7 Clinical Document Architecture, Release 2. J Am Med Inform Assoc. 2006;13:3039. Available at: http://www.jamia.org/cgi/reprint/13/1/30

Kush R, Alschuler L, Ruggerri R, Cassells S, Gupta N, Bain L, Claise K, Shah M, Nahm M; The STARBRITE Proof-of-Concept Study; J Am Med Inform Assoc. 2007;14:662-673. DOI 10.1197/jamia.M2157.

The Clinical Document Architecture Quick Start Guide (CDA QSG) Alschuler Associates, LLC. Available at: http://www.alschulerassociates.com/cda/?topic=quick-start-guides

5.3. Web Resources

Following are some of the most useful sites for CCD implementers:

- CCD wiki: HL7 uses a Wiki site maintained by the Mayo Clinic. The CCD page contains the most recent set of validating rules, style sheets and other information. See http://informatics.mayo.edu/wiki/index.php/Continuity_of_Care_Document_%28CCD%29 and enter userid "wiki," password "wikiwiki."
- Alschuler Associates, LLC, maintains a CDA Validator at http://www.alschulerassociates.com/validator/, which reads an uploaded file and produces a validation report. The Validator uses the latest CCD validation rules and also validates other types of CDA documents, including the CDA4CDT H&P, Consult Note and the CDC Healthcare Associated Infection Report.
- Structured Documents Technical Committee (SDTC) page: access from www.hl7.org, navigate to "Technical Committees" and look for SDTC. Note that the HL7 website is undergoing revision. This page holds SDTC mission, minutes, co-chair contact information, and links to the listserv and documents and presentations used for CDA and CCD development and the development of related document specifications.
- XML: the source is www.w3.org.
- Schematron: For more information on Schematron and related applications, see http://xml.ascc.net/schematron/.

- See the EHRVA "Tools" page for the Interoperability Roadmap, additional Quick Start Guides and other implementation aids. Available at: http://himssehrva.org/ASP/tools.asp.