PS3.20

DICOM PS3.20 2018e - Imaging Reports using HL7 Clinical Document Architecture

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Foreword

This DICOM Standard was developed according to the procedures of the DICOM Standards Committee.

The DICOM Standard is structured as a multi-part document using the guidelines established in [ISO/IEC Directives, Part 2].

1 Scope and Field of Application

This part of the DICOM Standard specifies templates for the encoding of imaging reports using the HL7 Clinical Document Architecture Release 2 (CDA R2, or simply CDA) Standard. Within this scope are clinical procedure reports for specialties that use imaging for screening, diagnostic, or therapeutic purposes.

This Part constitutes an implementation guide for CDA, and is harmonized with the approach to standardized templates for CDA implementation guides developed by HL7. It also provides Business Names for data elements that link data in user terminology, e.g., collected by a report authoring application, to specific CDA encoded elements.

As an implementation guide for imaging reports, particular attention is given to the use and reference of data collected in imaging procedures as explicit evidence within reports. This data includes images, waveforms, measurements, annotations, and other analytic results managed as DICOM SOP Instances. Specifically, this Part includes a specification for transformation into CDA documents of DICOM Structured Report instances that represent imaging reports.

2 Normative and Informative References

The following standards contain provisions that, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibilities of applying the most recent editions of the standards indicated below.

[ISO/IEC Directives, Part 2] ISO/IEC. 2016/05. 7.0. *Rules for the structure and drafting of International Standards*. http://www.iec.ch/members_experts/refdocs/iec/isoiecdir-2%7Bed7.0%7Den.pdf .

ANSI/HL7 CDA®, R2-2005 HL7 Version 3 Standard: Clinical Document Architecture (CDA) Release 2, 2005 (http://www.hl7.org/implement/standards/product_brief.cfm?product_id=7)

CDA® is a registered trademark of HL7 International.

ANSI/HL7 V3 CPPV3MODELS, R1-2012 HL7 Version 3 Standard: Core Principles and Properties of Version 3 Models, Release 1 (http://www.hl7.org/implement/standards/product_brief.cfm?product_id=58)

ANSI/HL7 V3 CMET, R2-2009 Health Level Seven Version 3 Standard: Common Message Element Types, Release 2, 2009.

ANSI/HL7 V3 DT, R1-2004 HL7 Version 3 Data Types Abstract Specification, Release 1 - November 2004. [Note: this specific release version is required by CDA R2]

ANSI/HL7 V3 XMLITSDT, R1-2004 HL7 Version 3 XML Implementation Technology Specification - Data Types, Release 1 - April 2004. [Note: this specific release version is required by CDA R2]

HL7 CDA R2 DIR IG, R1-2009 Health Level Seven Implementation Guide for CDA Release 2: Imaging Integration, Basic Imaging Reports in CDA and DICOM, Diagnostic Imaging Reports (DIR) Release 1.0 - Informative, 2009 (http://www.hl7.org/implement/standards/product_brief.cfm?product_id=13)

HL7 CDAR2_IG_IHE_CONSOL HL7 Implementation Guide for CDA® Release 2: IHE Health Story Consolidation, Release 1.1 - US Realm, Draft Standard for Trial Use, July 2012 (http://www.hl7.org/implement/standards/product_brief.cfm?product_id=258)

HL7 CDAR2_IG_CCDA_CLINNOTES_R2 HL7 Implementation Guide for CDA® Release 2: Consolidated CDA Templates for Clinical Notes, Release 2 - US Realm, Draft Standard for Trial Use, November 2014 (http://www.hl7.org/implement/standards/product_brief.cfm?product_id=379)

HL7 CDAR2_IG_GREENMOD4CCD HL7 Implementation Guides for CDA® R2: greenCDA Modules for CCD®, Release 1 - Informative, April 2011(http://www.hl7.org/implement/standards/product_brief.cfm?product_id=136)

HL7 Templates HL7 Templates Standard: Specification and Use of Reusable Information Constraint Templates, Release 1 - DSTU, October 2014 (http://www.hl7.org/implement/standards/product_brief.cfm?product_id=377)

HL7 CDA Digital Signatures HL7 Implementation Guide for CDA® Release 2: Digital Signatures and Delegation of Rights, Release 1 - DSTU, October 2014 (http://www.hl7.org/implement/standards/product_brief.cfm?product_id=375)

HL7 v3-2014 HL7 Version 3 Interoperability Standards, Normative Edition 2014 (http://www.hl7.org/implement/standards/product_brief.cfm?product_id=362]

IHE Card Sup CIRC IHE Cardiology Technical Framework Supplement, Cardiac Imaging Report Content, Trial Implementation, July 2011 (http://www.ihe.net/Technical_Frameworks/#cardiology)

IHE ITI TF IHE IT Infrastructure Technical Framework, Revision 11.0, September 2014 (http://www.ihe.net/Technical_Frameworks/#IT)

IHE PCC TF IHE Patient Care Coordination Technical Framework, Revision 10.0, November 2014 (http://www.ihe.net/Technical_Frameworks/#pcc)

IHE RAD TF IHE Radiology Technical Framework, Revision 13.0, July 2014 (http://www.ihe.net/Technical_Frameworks/#radiology)

LOINC Logical Observation Identifier Names and Codes, Regenstrief Institute, Indianapolis 2013.

RFC4646 Tags for Identifying Languages, The Internet Society, 2005

SNOMED CT® Systematized Nomenclature of Medicine - Clinical Terms, International Release, International Health Terminology Standards Development Organisation (IHTSDO), January 2015

UCUM Unified Code for Units of Measure, Regenstrief Institute, Indianapolis 2013.

XML Extensible Markup Language (XML) 1.0 (Fifth Edition), World Wide Web Consortium, 2008 (http://www.w3.org/TR/REC-xml/)

XML Schema Datatypes XML Schema Part 2: Datatypes Second Edition, World Wide Web Consortium, 2004 (http://www.w3.org/TR/xmlschema-2/)

xml:id xml:id Version 1.0, World Wide Web Consortium, 2005 (http://www.w3.org/TR/xml-id)

XPath XML Path Language (XPath), Version 1.0, World Wide Web Consortium, 1999 (http://www.w3.org/TR/xpath/)

3 Definitions

For the purposes of this Standard the following definitions apply.

3.1 Codes and Controlled Terminology Definitions:

The following definitions are commonly used in this Part of the DICOM Standard:

Context Group A set of coded concepts defined by a Mapping Resource forming a set appropriate to use in a particular context.

Context ID (CID) Identifier of a Context Group.

Template A pattern that describes the Content Items, Value Types, Relationship Types and Value Sets that may be used in part of a Structured Report content tree, or in other Content Item constructs, such as Acquisition Context or Protocol Context. Analogous to a Module of an Information Object Definition.

Template ID (TID) Identifier of a Template.

Coding Schemes Dictionaries (lexicons) of concepts (terms) with assigned codes and well defined meanings.

3.2 Vocabulary Model Definitions:

The following terms used in this Part of the DICOM Standard are defined in HL7 Core Principles and Properties of Version 3 Models:

Concept Domain A named category of like concepts (a semantic type) that is specified in the vocabulary declaration of an attribute in an information model. It constrains the intent of the coded element while deferring the binding of the element to a specific set of codes until later in the specification process.

Value Set A uniquely identifiable set of valid concept identifiers. Value sets constrain the permissible content for a coded element in an information model or data type specification.

Vocabulary Binding The mechanism of identifying specific codes to be used to express the semantics of coded model elements in information models or coded data type properties. Vocabulary Binding may bind the coded element or data type property to a single fixed value code, or may bind it to a Value Set Assertion.

3.3 Template Definitions

The following term used in this Part of the DICOM Standard is defined in the HL7 Templates Standard, and applies to CDA template specifications:

Template A set of conformance statements which further constrain an existing information model.

3.4 Imaging Report Definitions

The following definitions apply to terms used in this Part of the Standard:

Business Name Identifier for a CDA Data Element, Attribute, or structure of Data Elements that corresponds to a business requirement for information exchange.

4 Symbols and Abbreviations

The following symbols and abbreviations are used in this Part of the Standard.

ANSI American National Standards Institute

CDA Clinical Document Architecture (HL7)

DICOM Digital Imaging and Communications in Medicine

HL7 Health Level 7

HMD Hierarchical Message Description (HL7)

IE Information Entity

IHE Integrating the Healthcare Enterprise

IOD Information Object Definition

ISO International Standards Organization

LOINC Logical Observation Identifiers Names and Codes

MRRT IHE Management of Radiology Report Templates Profile

NEMA National Electrical Manufacturers Association

OID Object Identifier (ISO 8824)

RSNA Radiological Society of North America

SNOMED Systematized Nomenclature of Medicine

SR Structured Reporting

UCUM Unified Code for Units of Measure

UID Unique Identifier

XML Extensible Markup Language

The following symbols and abbreviations for HL7 v3 Data Types are used in this Part of the Standard.

AD Postal Address

CE Coded With Equivalents

CD Concept Descriptor

CS Coded Simple Value

ED Encapsulated Data

EN Entity Name

II Instance Identifier

INT Integer Number

IVL<> Interval

LIST<> List

OID ISO Object Identifier

ON Organization Name

PN Person Name

PQ Physical Quantity

REAL Real Number

ST Character String

TEL Telecommunication Address

TS Point in Time

UID Unique Identifier String

URL Universal Resource Identifier

5 Conventions

5.1 Template Metadata

Each template has a set of metadata, as specified in the HL7 Templates Specification. The metadata is presented as a table, as shown in Table 5.1-1.

Table 5.1-1. Template metadata table format

Template ID	OID (see Section 5.1.1)
Name	
Effective Date	
Version Label	(see Section 5.1.1)
Status	"draft", "active", "review" or "retired"
Description	
Classification	type of the template, e.g., CDA Section Level
Relationships	relationships to other templates or model artifacts
Context	"parent node", "sibling node" (see Section 5.1.2)
Open/Closed	"open", "closed"(see Section 5.1.3)
Revision History	

5.1.1 Template IDs and Version

Template identifiers (templateId) are assigned for each document, section, and entry level template. When valued in an instance, the template identifier signals the imposition of a set of template-defined constraints. The value of this attribute (e.g., @root="2.16.840.1.113883.10.20.22.4.8") provides a unique identifier for the template in question.

A template may be further qualified by a version label. This label may be used as the extension attribute of the templateID (e.g., @extension="20150309"). All versions of a template, regardless of the version label, must be compatible; i.e., they may vary only by optional content conformance requirements. Thus the version label is typically not used as a conformance constraint.

Within this Standard, template versions are identified by the string "DICOM" and the date of adoption (represented as YYYYMMDD), separated by a hyphen (e.g., DICOM-20150523).

5.1.2 Context

As described in the HL7 Template specification section 2.9.9.4, the context identifies whether the template applies to the parent node in which the templateID is an element, or applies to its sibling nodes in the template table. These typically are applied respectively to templates with a single parent element with child element structure, and to templates with flat list of sibling elements (see Section 5.2.8).

5.1.3 Open and Closed Templates

Each template is defined as being either "open" or "closed". In "open" templates, all of the features of the CDA Specification are allowed except as constrained by the templates. By contrast, a "closed" template specifies everything that is allowed and nothing further may be included.

5.2 Template Table Structure

Each template is specified in tabular form, as shown in Table 5.2-1.

Table 5.2-1. Template table format

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
ScopingBusinessName								
ElementBusinessName								
ReferencedBusinessName								

5.2.1 Business Name

This Part uses Business Names to identify and map common data elements from clinical imaging reports into the proper context-specific CDA/XML structure.

A Business Name is assigned to each element or attribute that may have a user-specified value assigned in the production of the clinical document instance. Business Names are specified to facilitate the implementation of production logic for clinical report authoring applications. The benefit is that developers of clinical report authoring applications are not required to have an in depth knowledge of CDA, the HL7 v3 R-MIM data model, or the XML structures. The use of readable and intuitive Business Names provides a method of direct access to insert data that is specific to each clinical report instance.

Note

Business Names are also described in the HL7 greenCDAModules for CCD specification, but that specification implies the use of a specific XML structure for production logic that is not required by this Part. The specification of production logic using Business Names is outside the scope of this Part.

Business Names are not specified for elements that are expected to receive an automatically generated value, e.g., the id element for each document, section, and entry.

As a convention, Business Names are represented in CamelCase (alternating upper and lower case, no spaces, initial letter in upper case) in the Business Name column of the template tables.

Business Names are hierarchically organized, and contextually scoped by higher level Business Names.

- Data element/attribute level Business Names are shown in normal font
- Business Names that provide scoping for subsidiary Business Names are shown in bold font.
- Referenced Business Names from included templates are shown in italic (see Section 5.2.9)
- As a convention, hierarchical relationship between Business Names is shown with the : character.

Scoping Business Names scope all attributes and elements subsidiary to the element to which the name is assigned.

Examples:

- The top level scoping Business Name for an Imaging Report is "ImagingReport", and it scopes all attributes and elements in the document, i.e., including and subsidiary to the <ClinicalDocument> XML element
- The Business Name for the 9.2 Clinical Information report section is "ImagingReport:ClinicalInformation", and it scopes all attributes and elements including and subsidiary to the <section> XML element in template 1.2.840.10008.9.2
- The Business Name for the text element of the 9.2 Clinical Information report section is "ImagingReport:ClinicalInformation:Text"
- The Business Name for the text element of the 9.6 Impression section is "ImagingReport:Impression:Text"

Note that both 9.2 Clinical Information and 9.6 Impression define a Business Name "Text", but these are distinguished by their hierarchical location under the scoping Business Names of their respective sections.

5.2.1.1 Multiple Instantiations

Some templates may be invoked multiple times in a document instance; for example, the 10.5 Quantity Measurement template is instantiated for each numeric measurement in a report. Each instantiation shall have an identifying string, unique within the document, used as a discriminator between those multiple instantiations. The Business Name for each element that may have multiple instantiations has a suffix [*], indicating the use of a discriminator string. This allows Business Name based production logic for authoring applications to identify specific instances of an element.

Example 5.2.1.1-1. Example Business Name based production logic with discriminators for two measurements

```
-- "Q21a" is the discriminator for the first measurement
-- "Q21b" is the discriminator for the second measurement
ImagingReport:Findings:QuantityMeasurement[Q21a]:MeasurementName = ("112058", "DCM", "Calcium score")
ImagingReport:Findings:QuantityMeasurement[Q21a]:MeasurementValue = "8"
ImagingReport:Findings:QuantityMeasurement[Q21a]:MeasurementUnits = "[arb'U]"
ImagingReport:Findings:QuantityMeasurement[Q21b]:MeasurementName = ("408716009", "SNOMED", "Stenotic lesion length")
ImagingReport:Findings:QuantityMeasurement[Q21b]:MeasurementValue = "14"
ImagingReport:Findings:QuantityMeasurement[Q21b]:MeasurementUnits = "mm"
```

The discriminator string shall be conformant to XML Name production requirements, as used for the XML ID attribute (see Section 5.3.4 on the use of XML ID).

Some CDA elements may include an XML ID attribute. This attribute is identified by '*' (asterisk) as its Business Name, and its value shall be the discriminator string.

5.2.1.2 Implicit Element Structure For Business Name

A Business Name may be associated with an element subsidiary to another element that does not have an associated Business Name. In such a case, when the element with the Business Name is instantiated in a document, its entire parent element hierarchy must be instantiated, even if those elements are identified as optional.

Note

For example, in the 8.1 General Header template, if Recipient:Name is instantiated, the entire hierarchical structure of informationRecipient/intendedRecipient/informationRecipient/name must be instantiated to hold the name element content.

5.2.2 Nesting Level

CDA documents are encoded using the Extensible Markup Language (XML), and are marked up through hierarchically nested XML elements (tags). The Nesting Level column of the template tables identifies the hierarchical level of each element relative to the other elements in the table using the character right angle bracket '>'. Multiple levels of nesting are identified by multiple > characters.

XML elements may have attributes, encoded as "<name>=<value>" pairs within the element tag. Such attributes are identified using the character at sign '@'.

5.2.3 Element/Attribute Names and XPath Notation

The name of each XML element and attribute used in a CDA document for which specific constraints are applied is shown in the Element/Attribute column of the template tables. Optional elements whose use is not specified nor constrained are not shown.

Elements and attributes that use the default value specified in CDA Specification are not shown. For example, the Section element has default attributes classCode='DOCSECT' and moodCode='EVN'; these are not listed in the templates. In accordance with the HL7 v3 specification, attributes with default values need not be included in instances, and their absence implies the default value.

XML Path Language (XPath) notation is used to identify the XML elements and attributes within the CDA document instance to which various constraints are applied. The implicit context of these expressions is the root node of the document, and traversing the path

to the root node of the relevant template. This notation provides a mechanism that will be familiar to developers for identifying parts of an XML document.

XPath syntax selects nodes from an XML document using a path containing the context of the node(s). The path is constructed from node names and attribute names (prefixed by a '@') and concatenated with a '/' symbol.

Example 5.2.3-1 is an example of a fragment of a CDA document.

Example 5.2.3-1. XML document example

```
<author>
  <assignedAuthor>
    ...
    <code codeSystem='2.16.840.1.113883.6.96' codeSystemName='SNOMED CT'
          code='17561000' displayName='Cardiologist' />
      ...
    </assignedAuthor>
  </author>
```

Table 5.2.3-1 is an example of a fragment of a template specification table.

Table 5.2.3-1. Template element and attribute example

…	Nest Level	Element/Attribute	…
		author	
	>	assignedAuthor	
…			
	>>	code	
	>>@	@codeSystem	
	>>@	@codeSystemName	
	>>@	@code	
	>>@	@displayName	
…			

In Table 5.2.3-1, the code attribute of the code element could be selected with the XPath expressionauthor/assignedAuthor/code/@code.

5.2.4 Cardinality

Each element/attribute has a cardinality indicator that specifies the number of allowable occurrences within a template instance. The cardinality indicators are interpreted with the following format "m…n" where m represents the least and n the most:

- 0..1 zero or one
- 1..1 exactly one
- 1..* at least one
- 0..* zero or more
- 1..n at least one and not more than n
- 0..0 none [SHALL NOT]

5.2.5 Element/Attribute Conformance

Each element/attribute has a conformance verb (keyword) in addition to the cardinality constraint.

The keywords SHALL, SHOULD, MAY, SHOULD NOT, SHALL NOT, and NEED NOT in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Annex H "Verbal forms for the expression of provisions":

- SHALL: an absolute requirement
- SHALL NOT: an absolute prohibition against inclusion
- SHOULD/SHOULD NOT: a best practice or recommendation. There may be valid reasons to ignore a recommendation, but the full implications must be understood and carefully weighed before choosing to not adhere to the best practice.
- MAY/NEED NOT: truly optional; can be included or omitted at the discretion of the content creator with no conformance implications

The keyword SHALL is associated with a minimum cardinality of at least 1; other keywords have a minimum cardinality of 0. If an element is required by SHALL, but is not known (and would otherwise be omitted without the SHALL requirement), it must be represented by a nullFlavor. SHALL allows the use of nullFlavor unless the requirement is on an attribute (nullFlavor does not apply to attributes), or the use of nullFlavor is explicitly precluded (see Section 5.2.7 Value Conformance and Section 5.3.2 Null Flavor).

Within the template, the keyword COND (conditional) may be present. In this case, the specification of the condition, and the conformance verbs associated with the condition being true or false, are described below the table in a paragraph flagged with the COND keyword.

In an open template, additional elements and attributes allowed by the CDA Specification are not precluded by template constraints, unless there are applicable SHALL NOT template specifications.

5.2.6 Data Type

The data type associated with each element/attribute is specified, as described in the CDA Specification and its referenced HL7v3 Data Types Release 1. Elements that are simply tags with subsidiary content only of nested elements, e.g., RIM class clone names, have the Data Type column empty.

Many data types are non-primitive, and may include constituent component elements and/or attributes. Such subsidiary components are not specified in the templates unless specific constraints are to be applied to them.

5.2.7 Value Conformance

The template table may constrain values or vocabularies to be used with an element or attribute. Value constraints include a conformance verb (SHALL, SHOULD, MAY, etc.) as defined in Section 5.2.5, and specified in the Value Conformance column of the template tables.

Elements for which nullFlavor is forbidden are indicated with an additional constraint keyword noNull.

Additionally, constraints specifying Value Sets include a coding strength conformance CWE (Coded With Extensibility) or CNE (Coded with No Extensibility), as defined in Core Principles and Properties of HL7 Version 3 Models, Release 1.

Further, 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. By default, Value Sets have dynamic binding, unless explicitly specified with an additional constraint keyword static.

5.2.8 Value Specification

The template table may constrain values to a single fixed value, to a Value Set from which the value is to be drawn, or to a named Concept Domain. It may non-normatively reference a mapping from a DICOM SOP Instance or an HL7 message.

The template table may contain elements without a value specification, and without a Business Name. These are typically id elements. The application creating the document instance shall fill these elements with appropriate values.

5.2.8.1 Coded Simple Value

Values of Data Type CS (Coded Simple Value) have a fixed code system defined in the CDA Specification, and are simple strings. The template tables identify only the constraint on the code value, and do not specify the fixed code system nor the code meaning (display name), which are not encoded in the CDA instance.

5.2.8.2 Concept Descriptor and Coded With Equivalents

Single values of Data Type CD (Concept Descriptor) or CE (Coded With Equivalents) are specified in the template tables with the triplet notation specified in PS3.16:

(CodeValue, Coding Scheme Designator, "Code Meaning")

The Coding Scheme Designator is a simple human readable identifier of the code system, and corresponds to the optional codeSystemName attribute of the CD or CE element. The CDA Specification requires the Code System OID to be encoded in the codeSystem attribute of the CD or CE element. The corresponding OID for each Coding Scheme Designator is provided in Annex 8 “Coding Schemes” in PS3.16. The Code Meaning is encoded in the displayName attribute of the CD or CE element.

5.2.8.3 Value Set

Elements whose value may be drawn from a Value Set will have that Value Set identified in the Value column introduced by the keyword ValueSet.

5.2.8.4 Concept Domains

Concept Domains (see definition in Section 3.2) are used to provide a named category in a structural template that can be bound to a specific value or value set by an invoking template, thus specializing the structural template for a particular use case. Concept Domain names are introduced by the keyword ConceptDomain in the Value column. For example, the 10.5 Quantity Measurement template Concept Domain "observationType" might be bound to a value set of fetal ultrasound measurements in one invoking template, or to a value set of cardiac CT measurements in another invoking template.

Concept Domain names are similar to element Business Names in that they provide a public interface that is bound to specific values later in the document specification and production process. Concept Domains do not have a Value Conformance verb; the conformance verb is specified when the Concept Domain is bound to a specific value or value set (see Section 5.2.9.1).

5.2.8.5 Mapping From DICOM SOP Instances and HL7v2 Messages

Elements whose value may be mapped from a DICOM SOP Instance or from an HL7v2 message have the source attribute name and tag identified in the Value column in italic font. Note that many of these values have their origin in IT systems outside the imaging department, and there may be alternate routes for these values to be accessed by the reporting application, e.g., from an HL7 FHIR web service.

Note

Due to differences in use of HL7v2 data elements, mappings should not be considered normative.

Data mapped from a specific Attribute in the interpreted DICOM image(s) is identified by the Attribute Name and Tag, represented in the mapping as:

Attribute Name (gggg,eeee)

Data mapped from Attributes within sequences is identified with the **>** character:

Sequence Attribute Name (ggg0,eee0) > Item Attribute Name (ggg1,eee1)

Data mapped from an HL7v2 field in the order for the study is identified by the Element Name and Segment Field identifier:

Element Name seg-n

The mapping of the value typically requires a transformation from the DICOM Value Representation or the HL7v2 Data Type representation to the CDA Data Type encoding. For example, transforming a DICOM Code Sequence attribute or an HL7v2 CWE field to a CD or CE Data Type requires a look up of the Coding Scheme OID.

5.2.9 Subsidiary Templates

A template may include subsidiary templates. Templates typically have one of two styles, a single parent element with child element structure, or a flat list of sibling elements.

The single parent element style is typical for the top level Document, Section, and Entry templates, and the parent element is of the HL7 v3 RIM act class. Inclusion of such a template therefore involves an actRelationship element; that actRelationship element is specified in the invoking template.

The sibling elements style is typical for sets of elements and attributes aggregated for editorial convenience.

Inclusion of a subsidiary template includes the name of included template and its templateID, specified in the Subsidiary Template column of the invoking template table.

For an included template of the single parent element style, the scoping business name and top level element are provided in italics in the invoking template table. This indicates this is data copied from the specification in the included template for the reader's convenience.

5.2.9.1 Vocabulary Binding and Constraints

A template inclusion may provide Concept Domain Vocabulary Binding or other vocabulary constraints, e.g., limiting an element in the included template to a specific value from its defined Value Set. These vocabulary constraints are specified in tabular form, as shown in Table 5.2.9.1-1. The table is included in the additional requirements for the template, with a reference in the Value column of the template entry invoking the subsidiary template. The Value Conformance and Value specification columns are interpreted as in the templates tables.

Table 5.2.9.1-1. Vocabulary Binding Table Format

Concept Domain or Element	Value Conf	Value
...	...	...

5.2.10 Additional Requirements

Each template may be accompanied by additional requirements and usage explanations in narrative specification language.

5.3 Encoding

A full discussion of the representation of data types and vocabulary is outside the scope of this document; for more information, see the HL7 V3 specifications on Abstract Data Types R1 and XML Data Types R1 referenced in the CDA Specification.

Note

1. Many Data Types encode their values in attributes, rather than character data. For example, the URL Data Type encodes its value in the **value**attribute within the element tag, e.g., <reference value="http://xyz.org">. Within this specification, the attribute(s) that hold the value are not identified, except where specific constraints apply.

2. The Consolidated CDA specification includes extensive examples of valid and invalid encodings, which may be useful for implementers.

3. The specification of a representation of Data Types for use in Business Name-based report production logic is outside the scope of this Standard.

5.3.1 Translation Code Element

HL7 Data Types CD (Concept Descriptor) and CE (Coded With Equivalents) allow a translation code element, which allows the encoding of the same concept in an alternate coding system. This supports the encoding of both an originally entered (local) code, and a code specified for cross-system interoperability.

This Part follows the convention used in the Consolidated CDA Implementation Guide specification, which specifies the standard interoperable code in the root, whether it is original or a translation. The HL7v3 Data Types R1 standard included by CDA formally specifies the original code (as initially entered in an information system application) to be placed in the root.

Note

This discrepancy is resolved in HL7v3 Data Types R2 to follow the convention used here, and the HL7 Structured Documents Working Group has approved the "pre-adoption" of the Data Types R2 approach in CDA implementations.

Example 5.3.1-1. Translation code example

```
<code code='206525008'
    displayName='neonatal necrotizing enterocolitis 'codeSystem='2.16.840.1.113883.6.96'
    codeSystemName='SNOMED CT'>
  <translation code='NEC-1'
    displayName='necrotizing enterocolitis'
    codeSystem='2.16.840.1.113883.19'/>
</code>
```

5.3.2 Null Flavor

Information technology solutions store and manage data, but sometimes data are not available: an item may be unknown, not relevant, or not computable or measurable. In HL7 v3, a flavor of null, or nullFlavor, describes the reason for missing data.

For example, if a patient arrives at an Emergency Department unconscious and with no identification, a null flavor is used to represent the lack of information. The patient's birth date could be represented with a null flavor of "NAV", which is the code for "temporarily unavailable". When the patient regains consciousness or a relative arrives, we expect to be able to obtain the patient's birth date.

Example 5.3.2-1. nullFlavor example

```
<birthTime nullFlavor="NAV"/> <!--coding an unknown birthdate-->
```

Use null flavors for unknown, required, or optional attributes:

NI No information. This is the most general and default null flavor.

NA Not applicable. Known to have no proper value (e.g., last menstrual period for a male).

UNK Unknown. A proper value is applicable, but is not known.

ASKU Asked, but not known. Information was sought, but not found (e.g., the patient was asked but did not know).

NAV Temporarily unavailable. The information is not available, but is expected to be available later.

NASK Not asked. The patient was not asked.

MSK Masked. There is information on this item available but it has not been provided by the sender due to security, privacy, or other reasons. There may be an alternate mechanism for gaining access to this information.

OTH Other. The actual value is not an element in the value domain of a variable. (e.g., concept not provided by required code system).

The above null flavors are commonly used in clinical documents. For the full list and descriptions, see the nullFlavor vocabulary domain in the HL7 v3 Vocabulary referenced by the CDA specification.

Any SHALL conformance requirement on an element may use nullFlavor, unless nullFlavor is explicitly disallowed (as indicated by noNull, see Section 5.2.7 Value Conformance). SHOULD and MAY conformance requirements may also use nullFlavor. nullFlavor does not apply to conformance requirements on attributes.

The encoding of nullFlavor as an attribute of the data type element is not shown in the templates, hence there is no business name associated with the attribute.

Note

Production logic based on Business Names needs to provide a mechanism for assignment of a value to the nullFlavor attribute as an alternative for a value for the element. Specification of such production logic is outside the scope of this Standard.

Example 5.3.2-2. XML example of allowed nullFlavors when element is required

```
<entry>
   <observation classCode="OBS" moodCode="EVN">
      <id nullFlavor="NI"/>
      <code nullFlavor="OTH">
         <originalText>New Grading system</originalText>
      </code>
      <statusCode code="completed"/>
      <effectiveTime nullFlavor="UNK"/>
      <value xsi:type="CD" nullFlavor="NAV">
         <originalText>Spiculated mass grade 5</originalText>
      </value>
   </observation>
</entry>
```

5.3.3 Unknown Information

If a document creator wants to state that a piece of information is unknown, the following principles apply:

1. If the creator doesn't know an attribute of an act, that attribute can be null.

Example 5.3.3-1. Unknown medication example

```
<text>patient was given a medication but I do not know what it was</text>
<entry>
   <substanceAdministration moodCode="EVN" classCode="SBADM">
      <consumable>
         <manufacturedProduct>
            <manufacturedLabeledDrug>
               <code nullFlavor="NI"/>
            </manufacturedLabeledDrug>
         </manufacturedProduct>
      </consumable>
   </substanceAdministration>
</entry>
```

2. If the creator doesn't know if an act occurred, the nullFlavor is on the act (detail could include specific allergy, drug, etc.).

Example 5.3.3-2. Unknown medication use of anticoagulant drug example

```
<text>I do not know whether or not patient received an anticoagulant drug</text>
<entry></para>
   <substanceAdministration moodCode="EVN" classCode="SBADM" nullFlavor="NI">
      <consumable>
         <manufacturedProduct>
            <manufacturedLabeledDrug>
               <code code="81839001" displayName="anticoagulant drug"
                  codeSystem="2.16.840.1.113883.6.96"
                  codeSystemName="SNOMED CT"/>
            </manufacturedLabeledDrug>
         </manufacturedProduct>
      </consumable>
   </substanceAdministration>
</entry>
```

3. If the sender wants to state 'no known', a negationInd can be used on the corresponding act (substanceAdministration, Procedure, etc.)

Example 5.3.3-3. No known medications example

```
<text>No known medications</text>
<entry>
   <substanceAdministration moodCode="EVN" classCode="SBADM" negationInd="true">
      <consumable>
         <manufacturedProduct>
            <manufacturedLabeledDrug>
               <code code="410942007" displayName="drug or medication"
                  codeSystem="2.16.840.1.113883.6.96"
                  codeSystemName="SNOMED CT"/>
            </manufacturedLabeledDrug>
         </manufacturedProduct>
      </consumable>
   </substanceAdministration>
</entry>
```

Other CDA implementation guides recommended using specific codes to assert no known content, for example SNOMED CT 160244002 "No known allergies" or 160245001 "No current problems or disability". Specific codes are still allowed; however, use of negationInd is an alternative, and the specific approach for each use will be specified in the associated template.

5.3.4 XML ID

The XML Specification allows a markup tag to have an attribute of type ID, whose value is unique within the document, that allows reference to that markup. The CDA schema defines such attributes with attribute name ID.

Note

1. Thus the attribute named ID is of XML attribute type ID. This must further be distinguished from the element named id of HL7v3 Data Type UID that is part of most RIM classes. The attribute name is always upper case, the element name is always lower case.

2. The actual CDA schema specification uses the XML Schema Datatypes definition of XML ID (xs:ID). Readers may also be familiar with the xml:id specification, which is not formally used by CDA as it was published after the CDA specification.

In the CDA R2 Specification, the XML ID attribute capability is applied to the Section and observationMedia elements, and to various types of narrative block markup, and is used to provide linkage between structured entries and the corresponding narrative text (see Section 9.1.1 Section Text).

5.4 Extension and Namespace

In accordance with CDA R2 (and HL7 v3 XML) extensibility rules, as described in CDA R2 Section 1.4, "locally-defined" XML markup may be specified where there is a need to communicate information for which there is no suitable representation in CDA R2. These extensions are described in the context of the templates where they are used. All such extensions use HL7 v3 Data Types used by CDA R2.

Note

The HL7 Structured Documents Working Group coordinates markup extensions that have been defined for implementation guides published by HL7, IHE, DICOM, and other organizations. See http://wiki.hl7.org/index.php?title=CDA_R2_Extensions

The namespace for extensions defined in this standard is "urn:dicom-org:ps3-20", which is aliased in this standard as "ps3-20". Extensions defined in this standard are:

- ps3-20:accessionNumber - The accessionNumber extension allows for the clear identification of the imaging department identifier for a service request (order). While this identifier could be conveyed as another id for the inFulfillmentOf/Order element, there is no reliable way in that context to distinguish it from the Placer Order Number. As this is a primary management identifier in departmental workflows, a distinct local markup is defined. This extension uses the II Data Type.

The namespace for extensions defined by HL7 is "urn:hl7-org:sdtc". which is aliased in this standard as "sdtc". HL7 defined extensions used in this standard are:

- sdtc:signatureText - Provides a location for a textual or multimedia depiction of the signature by which the participant endorses and accepts responsibility for his or her participation in the Act as specified in the Participation.typeCode. Details of the element content are described in the HL7 CDA Digital Signature Standard. This extension uses the ED Data Type.

5.5 Serialization Order of Elements

The CDA schema requires elements to be encoded in a specified order, which may be different than the order in which they are described in the templates. The serialization of elements shall be in accordance with the HL7 CDA Hierarchical Description. In particular, attention must be paid to the serialization order of elements defined in sibling templates (see Section 5.1.2).

Note

For example, the various header templates are siblings, specifying sets of elements at the same hierarchical level. These elements of different templates must be encoded in their appropriate serialized order in the object instance - all templateID elements from the document template and all header templates first, followed by the elements of the clinicalDocument class in their prescribed order, followed by the participations in their prescribed order, followed by act relationships in their prescribed order.

6 Conformance

The CDA specification section 1.3 provides conformance requirements for Document Originators and Document Recipients.

Note

1. Consolidated CDA Implementation Guide Section 2.8 includes recommended best practices for Document Recipients displaying CDA documents.
2. There may be other CDA-related standards to which an application may claim conformance. For example, IHE Patient Care Coordination Technical Framework specifies a Document Consumer actor with four options for conformance.

A CDA document instance in accordance with this Standard asserts its conformance to a template by inclusion of the specified templateID elements in the document, sections, and entries.

7 Document-level Templates

Document-level templates describe the purpose and rules for constructing a conforming CDA document. Document templates include constraints on the CDA header and sections by referring to templates, and constraints on the vocabulary used in those templates.

7.1 Imaging Report

Template ID	1.2.840.10008.9.1
Name	Imaging Report
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	This CDA Imaging Report document template defines the report content and technical constraints for top level elements, attributes, sections, and entries to be used in imaging report instances. This template may apply to screening, diagnostic, or therapeutic radiology, cardiology, or other imaging reports. The body of an Imaging Report may contain five main imaging report sections: • Clinical information (optionally); • Current imaging procedure description; • Comparison studies (optionally); • Findings (optionally); • Impression; • plus potentially an Addendum(s) The report templates sponsored by the RSNA Radiology Reporting Initiative (http://www.radreport.org) adhere to this general section outline. The section and subsection structure of this template is also identified by LOINC panel code 87416-4.
Classification	CDA Document Level
Relationships	
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Imaging Report		Clinical Document						
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.1	
DocType	>	code	1..1	SHALL	CD	SHALL CWE noNull	ValueSet LOINC Imaging Document Codes 1.3.6.1.4.1.12009.10.2.5	
	>		1..1	SHALL				8.1 General Header 1.2.840.10008.9.20

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
	>		1..1	SHALL				8.2 Imaging Header 1.2.840.10008.9.21
	>		0..1	MAY				8.3 Parent Document 1.2.840.10008.9.22
	>	component	1..1	SHALL				
	>>	structuredBody	1..1	SHALL				
	>>>	component	0..1	MAY				
Clinical Information	>>>>	*section*						9.2 Clinical Information 1.2.840.10008.9.2
	>>>	component	1..1	SHALL				
Procedure Description	>>>>	*section*						9.3 Imaging Procedure Description 1.2.840.10008.9.3
	>>>	component	0..1	MAY				
Comparison Study	>>>>	*section*						9.4 Comparison Study 1.2.840.10008.9.4
	>>>	component	0..1	MAY				
Findings	>>>>	*section*						9.5 Findings 2.16.840.1.113883.10.20.6.1.2
	>>>	component	1..1	SHALL				
Impression	>>>>	*section*						9.6 Impression 1.2.840.10008.9.5
	>>>	component	0..*	COND				
Addendum[*]	>>>>	*section*						9.7 Addendum 1.2.840.10008.9.6

7.1.1 clinicalDocument/code

Most of the codes in Value Set LOINC Imaging Document Codes are pre-coordinated with the imaging modality, body part examined, and/or specific imaging method. When pre-coordinated codes are used, any coded values elsewhere in the document describing the modality, body part, etc., must be consistent with the document type code. Local codes used for report types may be included as a translation element in the code.

Note

Use of Value Set LOINC Imaging Document Codes is harmonized with HL7 Consolidated CDA Templates for Clinical Notes, Release 2. DICOM CID 7001 “Diagnostic Imaging Report Headings”, used in TID 2000 “Basic Diagnostic Imaging Report”, is a subset of the LOINC Imaging Document Codes.

Example 7.1.1-1. clinicalDocument/code example with translation element for local code

```
<code code="18748-4"
      displayName="Diagnostic Imaging Report"
      codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="LOINC" >
   <translation code="XRPEDS"
      displayName="Pediatric Radiography Report"
```

```
      codeSystem="2.16.840.1.123456.78.9" />
</code>
```

7.1.2 Addendum

COND: If the header includes a relatedDocument element with typeCode RPLC, and the replaced document had a legalAuthenticator element (i.e., was signed), the component/structuredBody SHALL contain at least one 9.7 Addendum.

7.2 Imaging Addendum Report

Template ID	1.2.840.10008.9.24
Name	Imaging Addendum Report
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	Document structure for an Imaging Addendum Report, i.e., an appendage to an existing report document that contains supplemental information. The parent document content remains unaltered. The Addendum Report must be read together with its parent document for full context. Some institutions may have policies that forbid the use of Addendum Reports, and require revised reports with a complete restatement of the original documentation.
Classification	CDA Document Level
Relationships	
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Imaging Addendum		Clinical Document						
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.1	
DocType	>	code	1..1	SHALL	CD	SHALL CWE noNull	ValueSet LOINC Imaging Document Codes 1.3.6.1.4.1.12009.10.2.5	
	>		1..1	SHALL				8.1 General Header 1.2.840.10008.9.20
	>		1..1	SHALL				8.2 Imaging Header 1.2.840.10008.9.21
	>	relatedDocument	1..1	SHALL				
	>@	@typecode	1.1	SHALL	CS	SHALL	APND	
	>>	parentDocument	1..1	SHALL				
Amended DocumentID	>>>	id	1..1	SHALL	II			
	>	component	1..1	SHALL				
	>>	structuredBody	1..1	SHALL				

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
	>>>	component	1..*	SHALL				
Addendum[*]	>>>>	*section*						9.7 Addendum 1.2.840.10008.9.6

8 Header Content Templates

8.1 General Header

Template ID	1.2.840.10008.9.20
Name	General Header Elements
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	CDA Header Elements for all documents, including primary participations
Classification	CDA Header Elements
Relationships	Included in all document level templates
Context	sibling node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
		templateId	1..1	SHALL	II			
	@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.20	
Content Template		templateId	0..*	MAY	II			
		typeId	1..1	SHALL	II			
	@	@root	1..1	SHALL	UID	SHALL	2.16.840.1.113883.1.3	
	@	@extension	1..1	SHALL	ST	SHALL	POCD_HD000040	
		id	1..1	SHALL	II			
Title		title	1..1	SHALL	ST			
CreationTime		effectiveTime	1..1	SHALL	TS			
Confidentiality		confidentialityCode	1..1	SHALL	CE	SHALL CWE	ValueSet x_BasicConfidentialityKind Value Set 2.16.840.1.113883.11.16926	
Language Code		languageCode	1..1	SHALL	CS	SHALL CNE	ValueSet CID 5000 “Languages”	
SetId		setId	0..1	MAY	II			
Version Number		versionNumber	1..1	COND	INT			
Patient[*]		recordTarget	1..*	SHALL				
	>	patientRole	1..1	SHALL				
	>>	id	1..*	SHALL	II			
IDIssuer	>>@	root	1..1	SHALL	UID		*Issuer of Patient ID Qualifiers Sequence (0010,0024) > Universal Entity ID (0040,0032)* *Patient ID List PID-3.4.2*	

Business Name	Nest Level	Element/Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
ID	>>@	extension	1..1	SHALL	ST		*Patient ID (0010,0020)* *Patient ID List PID-3.1*	
Addr	>>	addr	1..*	SHALL	AD			
Tele	>>	telecom	1..*	SHALL	TEL			
	>>	patient	1..1	SHALL				
Name	>>>	name	1..1	SHALL	PN		*Patient's Name (0010,0010)* *Patient Name PID-5*	
Gender	>>>	administrative GenderCode	1..1	SHALL	CE	SHALL CNE	ValueSet AdministrativeGender Value Set 2.16.840.1.113883.11.1 *Patient's Sex (0010,0040);* [Map value "O" to nullFlavor UNK] *Administrative Sex PID-3.8*	
BirthTime	>>>	birthTime	1..1	SHALL	TS		*Patient's Birth Date (0010,0030) + Patient's Birth Time (0010,0032)* *Date/Time of Birth PID-7*	
	>>	provider Organization	0..1	MAY				
ProviderOrg Name	>>>	name	1..*	SHALL	ON		*Issuer of Patient ID (0010,0021)*	
ProviderOrg Tel	>>>	telecom	0..*	SHOULD	TEL			
ProviderOrg Addr	>>>	addr	0..*	SHOULD	AD			
		legalAuthenticator	0..1	MAY				
SigningTime	>	time	1..1	SHALL	TS			
	>	signatureCode	1..1	SHALL	CS	SHALL	S	
	>	assignedEntity	1..1	SHALL				
SignerID	>>	id	1.*	SHALL	II			
SignerAddr	>>	addr	1.*	SHALL	AD			
SignerTel	>>	telecom	1..*	SHALL	TEL			
	>>	assignedPerson	1..1	SHALL				
SignerName	>>>	name	1..1	SHALL	PN			
Signature Block	>	sdtc:signatureText	0..1	MAY	ED			
Author[*]		author	1..*	SHALL				
AuthoringTime	>	time	1..1	SHALL	TS			
	>	assignedAuthor	1..1	SHALL				
	>>	id	1.*	SHALL	II			
Addr	>>	addr	1.*	SHALL	AD			

Business Name	Nest Level	Element/Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Tel	>>	telecom	1..*	SHALL	TEL			
	>>	assignedPerson	1..1	SHALL				
Name	>>>	name	1..1	SHALL	PN			
Recipient[*]		information Recipient	0..*	MAY				
	>	intendedRecipient	1..1	SHALL				
	>@	@classCode	1..1	SHALL	CS	SHALL	ASSIGNED	
Addr	>>	addr	0.*	MAY	AD			
Tel	>>	telecom	0..*	MAY	TEL			
	>>	information Recipient	0..1	MAY				
Name	>>>	name	1..1	SHALL	PN			
	>>	received Organization	0..1	MAY				
Org	>>>	name	1..1	SHALL	ON			
		custodian	1..1	SHALL				
	>	assignedCustodian	1..1	SHALL				
	>>	represented Custodian Organization	1..1	SHALL				
CustodianOrg ID	>>>	id	1.*	SHALL	II			
CustodianOrg Name	>>>	name	1..1	SHALL	ON			
CustodianOrg Addr	>>>	addr	1..1	SHALL	AD			
CustodianOrg Tel	>>>	telecom	1..1	SHALL	TEL			

Note that there is no business name associated with this template. Rather, this template is an editorial convenience for template specification, and the Business Names for the elements of this template are logically part of the business name scope of the invoking template.

8.1.1 templateId - contentTemplate

This templateId may be used to identify the template(s) used to generate/constrain the content of the report. This element is in addition to the templateId of the document level template, and typically represents clinical sub-specialty requirements. See Section 5.1.1 on the structure and use of the templateId.

Note

The IHE MRRT profile defines a "dcterms.identifier" that may be used for this templateId.

8.1.2 title

The title may include the title of the report template used.

Note

The IHE MRRT profile defines a "dcterms.title" that may be used in this element.

8.1.3 effectiveTime

The effectiveTime signifies the document creation time, when the document first came into being. Where the CDA document is a transform from an original document in some other format, the ClinicalDocument.effectiveTime is the time the original document is created. The time when the transform occurred is not represented in CDA.

8.1.4 setID and versionNumber

The setID and versionNumber elements may be used by the document creation system to manage document revisions, in accordance with the CDA specification sections 4.2.1.7 and 4.2.1.8.

COND: If and only if the setID element is present, the versionNumber element SHALL be present.

8.1.5 recordTarget/patientRole

The recordTarget records the patient whose health information is described by the clinical document; it must contain at least one patientRole element.

Multiple recordTarget elements should be used only in the case of conjoined twins/triplets who are the subject of a single imaging procedure, or for special cases (e.g., pre-natal surgery, where a medical record has been established for the fetus).

Example 8.1.5-1. Header example

```
<typeId root="2.16.840.1.113883.1.3" extension="POCD_HD000040"/>
<!-- DICOM Imaging Report Template -->
<templateId root="1.2.840.10008.9.1"/>
<!-- General Header Template -->
<templateId root="1.2.840.10008.9.20"/>
<id extension="999021" root="2.16.840.1.113883.19"/>
<code codeSystem="2.16.840.1.113883.6.1"
   codeSystemName="LOINC" code="18748-4"
   displayName="Diagnostic Imaging Report"/>
<title>Radiology Report</title>
<effectiveTime value="20150329171504+0500"/>
<confidentialityCode code="N" codeSystem="2.16.840.1.113883.5.25"/>
<languageCode code="en-US" codeSystem="2.16.840.1.113883.6.121"/>
<setId extension="111199021" root="2.16.840.1.113883.19"/>
<versionNumber value="1"/>
```

8.1.6 legalAuthenticator

The legalAuthenticator identifies the single person legally responsible for the correctness of the content of the document and SHALL be present if the document has been legally authenticated. In the context of an imaging report, this means the radiologist, cardiologist, or other professional who signed or validated the report.

Note

Per the CDA Standard, the legal authenticator, if present, must be a person, and the authentication applies to the human-readable narrative in section/text and any renderMultiMedia referenced content. Structured entries and external images referenced through linkHtml are not attested by the legal authentication.

Based on local practice, clinical documents may be released before legal authentication. This implies that a clinical document that does not contain this element has not been legally authenticated.

The legalAuthenticator SHALL contain exactly one [1..1] time representing the time of signature.

The legalAuthenticator MAY contain zero or one [0..1] sdtc:signatureText extension element. This provides a textual or multimedia depiction of the signature by which the participant endorses and accepts responsibility for his or her participation in the Act. The element is described in the HL7 CDA Digital Signature Standard.

Example 8.1.6-1. legalAuthenticator example

```
<legalAuthenticator>
   <time value="20050329224411+0500"/>
   <signatureCode code="S"/>
   <assignedEntity>
      <id extension="KP00017" root="2.16.840.1.113883.19"/>
      <addr>
         <streetAddressLine>21 North Ave.</streetAddressLine>
         <city>Burlington</city>
         <state>MA</state>
         <postalCode>02368</postalCode>
         <country>US</country>
      </addr>
      <telecom use="WP" value="tel:(555) 555-1003"/>
      <assignedPerson>
         <name>
            <given>Henry</given>
            <family>Seven</family>
         </name>
      </assignedPerson>
   </assignedEntity>
</legalAuthenticator>
```

8.1.7 recordTarget/patientRole/Patient/birthTime

Patient birthTime SHALL be precise to year, SHOULD be precise to day.

Example 8.1.7-1. recordTarget example

```
<recordTarget>
   <patientRole>
      <id extension="12345" root="2.16.840.1.113883.19"/>
      <!-Example ID using fake assigning authority OID. ->
      <id extension="111-00-1234" root="2.16.840.1.118975.4.1"/>
      <!-Fake Social Security Number using the actual SSN OID. ->
      <addr use="HP">
         <!-HP is "primary home" from codeSystem 2.16.840.1.113883.5.1119 ->
         <streetAddressLine>17 Daws Rd.</streetAddressLine>
         <city>Blue Bell</city>
         <state>MA</state>
         <postalCode>02368</postalCode>
         <country>US</country>
         <!-US is "United States" from ISO 3166-1 Country Codes: 1.0.3166.1 ->
      </addr>
      <telecom value="tel:(781) 555-1212" use="HP"/>
      <!-HP is "primary home" from AddressUse 2.16.840.1.113883.5.1119 ->
      <patient>
         <name use="L">
            <!-L is "Legal" from EntityNameUse 2.16.840.1.113883.5.45 ->
```

```
            <prefix>Mr.</prefix>
            <given>Adam</given>
            <given qualifier="CL">Frankie</given>
            <!-CL is "Call me" from EntityNamePartQualifier 2.16.840.1.113883.5.43 ->
            <family>Everyman</family>
         </name>
         <administrativeGenderCode code="M"
            codeSystem="2.16.840.1.113883.5.1" displayName="Male"/>
         <birthTime value="19541125"/>
      </patient>
      <providerOrganization>
         <id root="2.16.840.1.113883.19"/>
         <name>Good Health Clinic</name>
         <telecom use="WP" value="tel:(781) 555-1212"/>
         <addr>
            <streetAddressLine>21 North Ave</streetAddressLine>
            <city>Burlington</city>
            <state>MA</state>
            <postalCode>02368</postalCode>
            <country>US</country>
         </addr>
      </providerOrganization>
   </patientRole>
</recordTarget>
```

8.1.8 author/assignedAuthor

The author element represents the creator of the clinical document. This template restricts the author to be a person.

Such author SHALL contain exactly one [1..1] time representing the start time of the author's participation in the creation of the content of the clinical document.

Example 8.1.8-1. Person author example

```
<author>
   <time value="20050329224411+0500"/>
   <assignedAuthor>
      <id extension="KP00017" root="2.16.840.1.113883.19.5"/>
      <addr>
         <streetAddressLine>21 North Ave.</streetAddressLine>
         <city>Burlington</city>
         <state>MA</state>
         <postalCode>02368</postalCode>
         <country>US</country>
      </addr>
      <telecom use="WP" value="tel:(555) 555-1003"/>
      <assignedPerson>
         <name>
            <given>Henry</given>
            <family>Seven</family>
         </name>
      </assignedPerson>
   </assignedAuthor>
</author>
```

8.1.9 InformationRecipient/intendedRecipient

The informationRecipient participation elements record the intended recipients of the information at the time the document is created. An intended recipient may be a person (an informationRecipient entity), with or without an organization affiliation (receivedOrganization scoping entity), or simply an organization. If an organization, the document is expected to be incorporated into an information system of that organization (e.g., the electronic medical record for the patient).

Example 8.1.9-1. informationRecipient example

```
<informationRecipient>
   <intendedRecipient classCode="ASSIGNED">
      <informationRecipient>
         <name>
            <given>Henry</given>
            <family>Seven</family>
         </name>
      </informationRecipient>
      <receivedOrganization>
         <name>Good Health Clinic</name>
      </receivedOrganization>
   </intendedRecipient>
</informationRecipient>
```

8.2 Imaging Header

Template ID	1.2.840.10008.9.21
Name	Imaging Header Elements
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	CDA Header Elements for imaging reports, including encounter, order, and study context
Classification	CDA Header Elements
Relationships	Included in 7.1 Imaging Report
Context	sibling node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
		templateId	1..1	SHALL	II			
	@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.21	
		componentOf	1..1	SHALL				
	>	encompassingEncounter	1..1	SHALL				
	>>	id	0..1	SHOULD	II			

Business Name	Nest Level	Element/Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Encounter IDIssuer	>>@	@root	1..1	SHALL	UID		*Issuer of Admission ID Sequence (0038;0014) > Universal Entity ID (0040,0032)* *Visit Number PV1-19.4.2*	
EncounterID	>>@	@extension	1..1	SHALL	ST		*Admission Id (0038,0010)* *Visit Number PV1-19.1*	
EncounterTime	>>	effectiveTime	1..1	SHALL				
	>>	location	0..1	MAY				
	>>>	healthCareFacility	1..1	SHALL				
	>>>>	location	0..1	SHOULD				
Healthcare FacilityName	>>>>>	name	1..1	SHALL	EN			
Healthcare FacilityAddress	>>>>>	addr	1..1	SHALL	AD			
	>>>>	serviceProvider Organization	0..1	SHOULD				
Healthcare Provider Organization Name	>>>>>	name	1..1	SHALL	ON			
	>>	encounterParticipant	0..*	MAY				
	>>@	@typeCode	1..1	SHALL			ATND	
	>>>	assignedEntity	1..1	SHALL				
	>>>>	assignedPerson	1..1	SHALL				
Attending PhysicianName	>>>>>	name	1..1	SHALL	EN			
		inFulfillmentOf	1..*	SHALL				
Order[*]	>	order	1..1	SHALL				
	>>	id	1..1	SHALL	II			
OrderAssigning Authority	>>@	@root	1..1	SHALL	UID		*Order Placer Identifier Sequence (0040,0026) > Universal Entity ID (0040,0032)* *Placer Order Number OBR-2.3*	
OrderPlacer Number	>>@	@extension	1..1	SHALL	ST		*Placer Order Number/Imaging Service Request (0040,2016)* *Placer Order Number OBR-2.1*	
	>>	ps3-20:accessionNumber	1..1	SHALL	II			

Business Name	Nest Level	Element/Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Accession Assigning Authority	>>@	@root	1..1	SHALL	UID		*Issuer of Accession Number Sequence (0008,0051) > Universal Entity ID (0040,0032)* *Filler Order Number OBR-2.3*	
Accession Number	>>@	@extension	1..1	SHALL	ST		*Accession Number (0008,0050)* *Filler Order Number OBR-2.1*	
Ordered ProcedureCode	>>	code	0..1	SHOULD	CE		*Requested Procedure Code Sequence (0032,1064)* *Universal Service ID OBR-4*	
OrderPriority	>>	priorityCode	0..1	SHOULD	CE		ValueSet ActPriority Value Set 2.16.840.1.113883.11.16866	
		documentationOf	1..*	SHALL				
Study[*]	>	serviceEvent	1..1	SHALL				
StudyUID	>>	id	1..1	SHALL	II		*Study Instance UID (0020,000D)* *Study Instance UID IPC-3*	
ProcedureCode	>>	code	1..1	SHALL	CE		*Procedure Code Sequence (0008,1032)*	
Modality	>>>	translation	1..*	SHALL	CD	SHALL CNE	*Modality (0008,0060)*	
Anatomic RegionCode	>>>	translation	0..1	SHOULD	CD		ConceptDomain AnatomicRegion	
	>>	effectiveTime	1..1	SHALL	IVL <TS>			
StudyTime	>>>	low	1..1	SHALL	TS		*Study Date (0008,0020) + Study Time (0008,0030) + Timezone Offset From UTC (0008,0201)* *Observation Date/Time OBR-7*	
Performer[*]	>>	performer	0..*	MAY				
Type	>>@	@typeCode	1..1	SHALL	CS	SHALL	ValueSet x_serviceEventPerformer Value Set 2.16.840.1.113883.11.19601	
	>>>	assignedEntity	1..1	SHALL				
ID	>>>>	id	1..1	SHALL	II			
	>>>>	assignedPerson	1..1	SHALL				
Name	>>>>>	name	1..1	SHALL	PN			
		participant	1..1	SHALL				
	@	@typeCode	1..1	SHALL	CS	SHALL	REF	
	>	associatedEntity	1..1	SHALL				

Business Name	Nest Level	Element/Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
	>@	@classCode	1..1	SHALL	CS	SHALL	PROV	
ReferrerID	>>	id	0..1	SHOULD	II		*Ordering Provider ORC-12.1 + ORC-12.9.2*	
ReferrerAddr	>>	addr	0.*	SHOULD	AD		*Ordering Provider Address ORC-24*	
ReferrerTel	>>	telecom	0..*	SHOULD	TEL		*Call Back Phone Number ORC-14*	
	>>	associatedPerson	1..1	SHALL				
ReferrerName	>>>	name	1..1	SHALL	PN		*Referring Physician's Name (0008,0090)* *Ordering Provider ORC-12*	
		dataEnterer	0..1	MAY				
	@	@typeCode	1..1	SHALL	CS	SHALL	ENT	
	>	assignedEntity	1..1	SHALL				
Transcriptionist ID	>>	id	0..1	SHOULD	II		*Transcriptionist OBR-35.1.1*	
	>>	assignedPerson	0..1	SHOULD				
Transcriptionist Name	>>>	name	1..1	SHALL	PN		*Transcriptionist OBR-35.1*	

Note that there is no business name associated with this template. Rather, this template is an editorial convenience for template specification, and the Business Names for the elements of this template are logically part of the Business Name scope of the invoking template.

8.2.1 componentOf/encompassingEncounter

The id element of the encompassingEncounter represents the identifier for the encounter. When the diagnostic imaging procedure is performed in the context of a hospital stay or an outpatient visit for which there is an Encounter Number, Visit Number, or Admission ID, equivalent to DICOM attribute (0038,0010), that number should be present as the ID of the encompassingEncounter.

The effectiveTime of the encompassingEncounter represents the time interval or point in time in which the encounter took place. The encompassing encounter might be that of the hospital or office visit in which the imaging procedure was performed. If the effective time is unknown, a nullFlavor attribute can be used.

Example 8.2.1-1. componentOf example

```
<componentOf>
  <encompassingEncounter>
    <id extension="9937012" root="1.3.6.4.1.4.1.2835.12"/>
    <effectiveTime value="20060828170821"/>
    <encounterParticipant typeCode="ATND">
      <assignedEntity>
        <id extension="4" root="2.16.840.1.113883.19"/>
        <code code="208M00000X"
          codeSystem="2.16.840.1.113883.6.101"
          codeSystemName="NUCC"
          displayName="Hospitalist"/>
        <addr nullFlavor="NI"/>
        <telecom nullFlavor="NI"/>
        <assignedPerson>
```

```
            <name>
               <prefix>Dr.</prefix>
               <given>Fay </given>
               <family>Family</family>
            </name>
         </assignedPerson>
      </assignedEntity>
   </encounterParticipant>
</encompassingEncounter>
</componentOf>
```

8.2.2 Physician of Record Participant

This encounterParticipant with typeCode="ATND" (Attender) is the attending physician and is usually different from the Physician Reading Study Performer defined in documentationOf/serviceEvent.

Example 8.2.2-1. Physician of record participant example

```
<encounterParticipant typeCode="ATND">
   <assignedEntity>
      <id extension="44444444" root="2.16.840.1.113883.4.6"/>
      <code code="208M00000X"
         codeSystem="2.16.840.1.113883.6.101"
         codeSystemName="NUCC"
         displayName="Hospitalist"/>
      <addr nullFlavor="NI"/>
      <telecom nullFlavor="NI"/>
      <assignedPerson>
         <name>
            <prefix>Dr.</prefix>
            <given>Fay</given>
            <family>Family</family>
         </name>
      </assignedPerson>
   </assignedEntity>
</encounterParticipant>
```

8.2.3 inFulfillmentOf/Order and @ID

An inFulfillmentOf element represents the Placer Order. There may be more than one inFulfillmentOf element in the case where a single report is fulfilling multiple orders. There SHALL be one inFulfillmentOf/order for each distinct Order associated with the report.

In each inFulfillmentOf/order there SHALL be one order/id for the Placer Order Number (0040,2016). There SHALL be one order/ps3-20:accessionNumber for the DICOM Accession Number (0008,0050) associated with the order. The ps3-20:accessionNumber SHALL be Data Type II; it SHALL have a UID root attribute identifying its assigning authority, and the DICOM Accession Number SHALL be in the extension attribute.

Example 8.2.3-1. inFulfillmentOf example

```
<xs:schema ...
   xmlns:ps3-20="urn:dicom-org:ps3-20"
   ...
```

```
</xs:schema>
<inFulfillmentOf>
   <order>
      <id extension="089-927851" root="2.16.840.1.113883.19.4.33"/>
      <!-- {extension} =
        Placer Order Number/Imaging Service Request (0040,2016) {root} =
        Order Placer Identifier Sequence (0040,0026) > Universal Entity ID (0040,0032) -->
      <ps3-20:accessionNumber extension="10523475" root="2.16.840.1.113883.19.4.27" />
      <!-- {extension}=
        Accession Number (0008,0050) {root} =
        Issuer of Accession Number Sequence (0008,0051) > Universal Entity ID (0040,0032) -->
      <code code="RPID24"
          displayName="CT HEAD WITH IV CONTRAST"
          codeSystem="2.16.840.1.113883.6.256"
          codeSystemName="RadLex Playbook">
      <!-- Ordered Procedure Code is
        Requested Procedure Code Sequence (0032,1064) -->
   </order>
</inFulfillmentOf>
```

8.2.4 documentationOf/serviceEvent

Each documentationOf/serviceEvent indicates an imaging procedure that the provider describes and interprets in the content of the report. The main activity being described by this document is both the performance of the imaging procedure and the interpretation of the imaging procedure.

There may be more than one documentationOf/serviceEvent element if the report is interpreting multiple DICOM Studies. There may also be multiple reports for a single DICOM Study.

The serviceEvent/id element contains the DICOM Study Instance UID.

The date and time of the imaging procedure is indicated in the serviceEvent/effectiveTime element; the date and time of the interpretation is in the clinicalDocument/effectiveTime.

Note

The serviceEvent/effectiveTime uses the IVL_TS data type with the low element required, for harmonization with Consolidated CDA release 1.1.

8.2.4.1 code and translation

Within each documentationOf element, there is one serviceEvent element. The type of imaging procedure may be further described in the serviceEvent/code element. This guide makes no specific recommendations about the primary vocabulary to use for describing this event, identified as Procedure Code.

The serviceEvent/code/translation elements include codes representing the primary image acquisition modality using DICOM (DCM) terminology, and target anatomic region (for which SNOMED terminology is recommended).

Note

1. These codes may be used as health information exchange search metadata in accordance with the IHE Radiology Technical Framework Cross-Enterprise Document Sharing for Imaging (XDS-I) Profile.

2. Binding of the Concept Domains ProcedureCode and AnatomicRegion to specific Value Sets may be done in a further profiling of the use of this Template.

Example 8.2.4.1-1. documentationOf example

```
<documentationOf>
   <serviceEvent classCode="ACT" moodCode="EVN">
      <!-- study instance UID (0020,000D) -->
      <id root="1.2.840.113619.2.62.994044785528.114289542805"/>
      <!-- code is DICOM (Performed) Procedure Code Seq (0008,1032) -->
      <code code="71020"
         displayName="Radiologic examination, chest, two views, frontal and lateral"
         codeSystem="2.16.840.1.113883.6.12"
         codeSystemName="CPT4">
         <translation code="XR"
            displayName="XR"
            codeSystem="1.2.840.10008.2.16.4"
            codeSystemName="DCM"/>
      </code>
      <!-- translation code is Modality (0008,0060) -->
      <effectiveTime value="20060823222400+0800"/>
   </serviceEvent>
</documentationOf>
```

8.2.4.2 Performer

The documentationOf/serviceEvent may include as a participant the physician reading the study, equivalent to DICOM attribute (0008,1060), and other healthcare professional participants in the procedure (e.g., the surgical performer in an interventional procedure).

Note

In simple procedures, the physician reading the study is identified in the Author or LegalAuthenticator participation on the ClinicalDocument, and does not need to be re-identified in this element. The technologist performing the imaging may be identified in this element as a secondary performer, since the interpreting physician is the principal performer responsible for the service event.

Example 8.2.4.2-1. Physician reading study performer example

```
<performer typeCode="PRF">
   <assignedEntity>
      <id extension="111111111" root="2.16.840.1.113883.4.6"/>
      <code code="2085R0202X"
         codeSystem="2.16.840.1.113883.6.101"
         codeSystemName="NUCC"
         displayName="Diagnostic Radiology"/>
      <addr nullFlavor="NI"/>
      <telecom nullFlavor="NI"/>
      <assignedPerson>
         <name><given>Christine</given><family>Cure</family><suffix>MD</suffix></name>
      </assignedPerson>
   </assignedEntity>
</performer>
```

Example 8.2.4.2-2. participant example

```
<participant typeCode="REF">
   <associatedEntity classCode="PROV">
      <id nullFlavor="NI"/>
      <addr nullFlavor="NI"/>
      <telecom nullFlavor="NI"/>
      <associatedPerson>
         <name><given>Amanda</given><family>Assigned</family><suffix>MD</suffix></name>
      </associatedPerson>
   </associatedEntity>
</participant>
```

Example 8.2.4.2-3. dataEnterer example

```
<dataEnterer>
   <assignedEntity typeCode="ENT">
      <id root="2.16.840.1.113883.19.5" extension="43252"/>
      <addr>
         <streetAddressLine>21 North Ave.</streetAddressLine>
         <city>Burlington</city>
         <state>MA</state>
         <postalCode>02368</postalCode>
         <country>US</country>
      </addr>
      <telecom use="WP" value="tel:(555) 555-1003"/>
      <assignedPerson>
         <name><given>Henry</given><family>Seven</family></name>
      </assignedPerson>
   </assignedEntity>
</dataEnterer>
```

8.3 Parent Document

Template ID	1.2.840.10008.9.22
Name	Parent Document Header Elements
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	CDA Header Elements describing relationship to prior/parent documents
Classification	CDA Header Elements
Relationships	Included in all document level templates
Context	sibling node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
		relatedDocument	0..1	MAY				
	@	@typecode	1.1	SHALL	CS	SHALL	RPLC	
	>	parentDocument	1..1	SHALL				
ReplacedDocument ID	>>	id	1..1	SHALL	II			
ReplacedDocument SetID	>>	setId	0..1	MAY	II			
ReplacedDocument Version	>>	versionNumber	1..1	COND	INT			
		relatedDocument	0..1	MAY				
	@	@typecode	1.1	SHALL	CS	SHALL	XFRM	
	>	parentDocument	1..1	SHALL				
Transformed DocumentID	>>	id	1..1	SHALL	II			

8.3.1 relatedDocument

A document may have two types of parent document:

- A superseded version that the present document wholly replaces (typeCode =RPLC). Documents may go through stages of revision prior to being legally authenticated. Such early stages may be drafts from transcription, those created by residents, or other preliminary versions. Policies not covered by this specification may govern requirements for retention of such earlier versions. Except for forensic purposes, the latest version in a chain of revisions represents the complete and current report.
- A source document from which the present document is transformed (typeCode = XFRM). A document may be created by transformation from a DICOM Structured Report (SR) document (see Annex C).

The CDA document management vocabulary includes a typeCode APND (append) relationship to a parent document. This relationship type is not supported in this specification; rather, append is effected by creating a replacement document with an 9.7 Addendum.

8.3.2 parentDocument/setId and versionNumber

COND: If and only if the setID element is present, the versionNumber element SHALL be present.

Example 8.3.2-1. relatedDocument example

```
<!-- transformation of a DICOM SR -->
<relatedDocument typeCode="XFRM">
   <parentDocument>
      <id root="1.2.840.113619.2.62.994044785528.20060823.200608232232322.9"/>
      <!-- SOP Instance UID (0008,0018) of SR sample document -->
   </parentDocument>
</relatedDocument>
```

9 Section-level Templates

9.1 General Requirements For Sections

9.1.1 Section Text

Template ID	1.2.840.10008.9.19
Name	Section Text
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	This template specifies the common set of narrative block markup that may be included in a CDA imaging report section.
Classification	CDA Element Set
Relationships	Included in all sections
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Text		text	1..1	COND	ED			
Content[*]	>	content	0..*	MAY	ST			
*	>@	@ID	1..1	SHALL	XML ID		[See 5.3.4 XML ID]	
Style	>@	@styleCode	0..1	MAY	XML NMTOKENS			
IntRef[*]	>	linkHtml	0..*	MAY	ST			
	>@	@href	1..1	SHALL	ST (URL - XML IDREF)			
GraphicRef[*]	>	renderMultiMedia	0..*	MAY				
	>@	@referencedObject	1..1	SHALL	XML IDREF			
Caption	>>	caption	0..1	MAY	ST			
ExtRef[*]	>	linkHtml	0..*	MAY	ST			
URL	>@	@href	1..1	SHALL	ST (URL)			
Paragraph(*)	>	paragraph	0..*	MAY	ST			
Caption	>>	caption	0..1	MAY	ST			
List(*)	>	list	0..*	MAY	ST			
*	>@	@ID	1..1	SHALL	XML ID		[See 5.3.4 XML ID]	
Ordered	>@	@listType	0..1	MAY	XML NMTOKENS	SHALL	ordered	
Caption	>>	caption	0..1	MAY	ST			
Item(*)	>>	item	1..*	SHALL	ST			

*	>>@	@ID	1..1	SHALL	XML ID		[See 5.3.4 XML ID]	
Table(*)	>	table	1..1	SHALL				
*	>@	@ID	1..1	SHALL	XML ID		[See 5.3.4 XML ID]	
Caption	>>	caption	0..1	MAY	ST			
	>>	Tr	1..1	SHALL				
	>>@	@styleCode	1..1	SHALL	CS	SHALL	Bold	
ColumnHead(*)	>>>	Th	1..*	SHALL	ST			
Row[*]	>>	Tr	1..*	SHALL				
*	>>@	@ID	1..1	SHALL	XML ID			
Cell(*)	>>>	Td	1..1	SHALL	ST			

The text element within the section stores the narrative to be rendered, as described in the CDA R2 specification, and is referred to as the CDA narrative block.

COND: The text element SHALL be present if the section content is not completely represented by subsections.

As noted in the CDA R2 specification, the document originator is responsible for ensuring that the narrative block contains the complete, human readable, attested content of the section. Structured entries support computer processing and computation, and are not a replacement for the attestable, human-readable content of the CDA narrative block.

Additional specification information for the CDA narrative block can be found in the CDA R2 specification in sections 1.2.1, 1.2.3, 1.3, 1.3.1, 1.3.2, 4.3.4.2, and 6.

The narrative block allows a variety of markup. The markup that implements various types of internal and external linkage is shown in the table, and is included in the conformance specifications for each section narrative block that invokes this template. The markup elements may occur in any order and at any point within the narrative block text as allowed by the CDA R2 specification.

9.1.1.1 <content> Markup and Links From Entries

The CDA narrative block may contain the <content> markup element to wrap a block of text so that it can be explicitly identified using its XML ID attribute, and referenced from elsewhere in the document. Specifically, structured entries may link to their equivalent narrative rendering in a content block using the XML ID (see CDA R2 Specification, section 4.3.5.1).

Additionally, a content block may include a styleCode attribute to suggest rendering (see CDA R2 Specification, section 4.3.5.11). For example, Bold could also be used to highlight actionable findings in the text of the 9.5 Findings and/or 9.6 Impression sections.

9.1.1.2 <linkHtml> Markup and Internal References

The CDA narrative block MAY contain the <linkHtml> markup to provide a link between narrative text in one section and a content block in another section (see CDA R2 specification section 4.3.5.2). The XML ID of the target content block is used in the linkHtml href attribute, with a prefixed '#' to indicate the reference is in the current document.

For example, a linkHtml reference could be used to link an actionable finding in the 9.6 Impression section to the specific, detailed measurement evidencing a problem that was identified in the text of the 9.5 Findings section.

9.1.1.3 <renderMultiMedia> Markup and Graphical Content

The CDA narrative block MAY contain the <renderMultiMedia> markup element to include graphical content, e.g., a coronary tree diagram or myocardial wall motion "bulls-eye chart". The renderMultiMedia element SHALL link to an observationMedia structured entry using the XML ID of that entry (see CDA R2 Specification, section 4.3.5.6).

9.1.1.4 <linkHtml> Markup and External References

The CDA narrative block MAY contain the <linkHtml> markup to provide a link between narrative text and an external (non-attested) resource (see CDA R2 specification section 4.3.5.2).

Note

For radiology reports, this capability may be used to tag concepts in the narrative block to concepts defined in the RadLex terminology (http://www.radlex.org), developed by the Radiological Society of North America. The RadLex coded vocabulary is a useful tool for indexing report content for data mining purposes. It is not intended to be a complete grammar for expression of clinical statements, but rather a lexicon for tagging concepts of interest.

Within the report section narrative blocks, RadLex codes may be included using the <linkHtml> element and a URI pointing to the RadLex resource. <linkHtml> elements may be embedded in the text at the location of the concept (within the scope of a content tag), or may be provided in a list at the end of the narrative block.

Example 9.1.1.4-1. Example - linkHtml references at point of use for RadLex

```
<section>
   ...
   <text>
      ...
      <content ID="find1">There is focal opacity
         <linkHtml href="http://www.radlex.org/RID/RID28530"/>
         at the right lung
         <linkHtml href="http://www.radlex.org/RID/RID1302"/>
         base most likely representing right lower lobe atelectasis
         <linkHtml href="http://www.radlex.org/RID/RID28493"/>.
      </content>
      <content ID="find2">The mediastinum ...</content>
   </text>
   ...
</section>
```

Example 9.1.1.4-2. Example- linkHtml references at end of narrative block for RadLex

```
<section>
   <title>Findings</title>
   <text>
      <content ID="find1">Pleura normal... </content>
      <linkHtml href="http://www.radlex.org/RID/RID1362"/>
   </text>
</section>
```

9.1.1.5 <linkHtml> Markup and Image References

The text elements (and their children) MAY contain Web Access to DICOM Persistent Object (WADO) references to DICOM objects by including a linkHtml element where @href is a valid WADO URL. The text content of linkHtml MAY be either the visible text of the hyperlink, or a descriptor or identifier of the image.

The linkHtml may be associated with a <renderMultiMedia> markup element to specify a (limited resolution) copy of the image to be rendered in the narrative (e.g., a thumbnail); the renderMultiMedia element SHALL link to an observationMedia structured entry using the XML ID of that entry. As CDA does not allow use of an image as the linkHtml displayable hyper-linked content, the linkHtml should immediately follow the renderMultiMedia for the thumbnail.

Example 9.1.1.5-1. Example linkHtml reference for WADO image access

```
<text>
   ...
   <paragraph>
      <caption>Source of Measurement</caption>
      <renderMultiMedia referencedObject="#thumb1"/>
      <linkHtml href="http://www.example.org/wado?requestType=WADO
         &amp;studyUID=1.2.840.113619.2.62.994044785528.114289542805
         &amp;seriesUID=1.2.840.113619.2.62.994044785528.20060823223142485051
         &amp;objectUID=1.2.840.113619.2.62.994044785528.20060823.200608232232322.3
         &amp;contentType=application/dicom">Chest_PA</linkHtml>
   </paragraph>
   ...
</text>
```

9.1.1.6 list

This template specifies a structure and Business Names for list markup in the narrative text, as described in the CDA Specification section 4.3.5.8. Inclusion of the listType="ordered" attribute specifies a numbered list of items.

Each list is identified by an XML ID attribute, and each list item also is identified by an XML ID attribute.

The list items contain human readable displayable text using any of the narrative text structures permitted in section/text, including internal, external, or image references, or graphics. Processable structured data may be encoded in 10.1 Coded Observation or 10.5 Quantity Measurement entries in the *section*. Such observation entries SHOULD be linked to the corresponding item through the ID attribute of the item (see Section 10.1.2 and Section 10.5.1).

9.1.1.7 table

This template specifies a structure and Business Names for table markup in the narrative text, as described in the CDA Specification section 4.3.5.9, typically used for a table of measurements. The table may be of arbitrary size.

Note

See Travis, A., et al., "Preferences for Structured Reporting of Measurement Data", *JAcadRadiology* 21:6 DOI:10.1016/j.acra.2014.02.008

Each table is identified by an XML ID attribute, and each table row also is identified by an XML ID attribute.

The table cells contain human readable displayable text using any of the narrative text structures permitted in section/text, including internal, external, or image references, or graphics. Processable structured data may be encoded in 10.1 Coded Observation or 10.5 Quantity Measurement entries in the *section*. Such observation entries SHOULD be linked to the corresponding row through the ID attribute of the row (see Section 10.1.2 and Section 10.5.1).

Example 9.1.1.7-1. Measurements Table Example 1

As displayed

Table . Cardiac Measurements

Measurement name	Value	Flag
Left ventricular ejection fraction	40 %	**LOW**
Left ventricle end diastolic volume	120 ml	

Measurement name	Value	Flag
Left ventricle end systolic volume	72 ml	

As encoded in CDA instance

```
<text>
 <table ID="T-C">
  <caption>Cardiac Measurements</caption>
  <tr styleCode="Bold">
   <th>Measurement name</th>
   <th>Value</th>
   <th>Flag</th>
  </tr>
  <tr ID="Q1">
   <td>Left ventricular ejection fraction</td>
   <td>40 %</td>
   <td styleCode="Bold">LOW</td>
  </tr>
  <tr ID="Q2">
   <td>Left ventricle end diastolic volume</td>
   <td>120 ml</td>
  </tr>
  <tr ID="Q3">
   <td>Left ventricle end systolic volume</td>
   <td>72 ml</td>
  </tr>
 </table>
</text>
<entry>
 <observation classCode="OBS" moodCode="EVN">
  <templateId root="2.16.840.1.113883.10.20.6.2.14"/>
  <id root="1.2.840.10213.2.62.7044234.11652014"/>
  <code code="10230-1" codeSystem="2.16.840.1.113883.6.1"
     codeSystemName="LOINC" displayName="LVEF" />
  <text><reference value="#Q1"/></text>
  <statusCode code="completed"/>
  <effectiveTime value="20140913223912"/>
  <value xsi:type="PQ" unit="%" value="40" />
  <interpretationCode code="L" codeSystem="2.16.840.1.113883.6.83"
     codeSystemName="ObservationInterpretation" displayName="Low" />
 </observation>
</entry>
<entry>
 <observation classCode="OBS" moodCode="EVN">
  <templateId root="2.16.840.1.113883.10.20.6.2.14"/>
  <id root="1.2.840.10213.2.62.7044234.11652014"/>
  <code code="8821-1" codeSystem="2.16.840.1.113883.6.1"
     codeSystemName="LOINC" displayName="LVEDV" />
  <text><reference value="#Q2"/></text>
  <statusCode code="completed"/>
  <effectiveTime value="20140913223912"/>
  <value xsi:type="PQ" unit="ml" value="120" />
 </observation>
</entry>
<entry>
 <observation classCode="OBS" moodCode="EVN">
  <templateId root="2.16.840.1.113883.10.20.6.2.14"/>
  <id root="1.2.840.10213.2.62.7044234.11652014"/>
```

```
  <code code="8823-7" codeSystem="2.16.840.1.113883.6.1"
     codeSystemName="LOINC" displayName="LVESV" />
  <text><reference value="#Q3"/></text>
  <statusCode code="completed"/>
  <effectiveTime value="20140913223912"/>
  <value xsi:type="PQ" unit="ml" value="72" />
 </observation>
</entry>
```

Example 9.1.1.7-2. Measurements Table Example 2

As displayed

Table . Current Lesion Sizes with Comparison to Exam on 2014/11/16

Ref	Measurement name	Current Value	Prior Value	Image Reference
L1	Left periaortic lymph node size (mm)	12 x 8	15 x 10	Ser:3, Img:67
L2	Segment 2 left lobe lesion size (mm)	6 x 8	10 x 9	Ser:3, Img:79
L3	Left common iliac lymph node size (mm)	12 x 3	16 x 5	Ser:3, Img:139

As encoded in CDA instance

```
<text>
 <table ID="Table2">
  <caption>Current Lesion Sizes with Comparison to Exam on 2014/11/16</caption>
  <tr styleCode="Bold">
   <td>Ref</td>
   <td>Measurement name</td>
   <td>Current Value</td>
   <td>Prior Value</td>
   <td>Image Reference</td>
  </tr>
  <tr ID="lesRow1">
   <td>L1</td>
   <td>Left periaortic lymph node size (mm) </td>
   <td>12 x 8</td>
   <td>15 x 10</td>
   <td><linkHtml href="http://wado.pacs.guh.org/..." >Ser:3, Img:67</linkHtml></td>
  </tr>
  ...
 </table>
</text>
```

9.1.2 General Section Entries

Template ID	1.2.840.10008.9.23
Name	General Section Entries
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active

Description	This template specifies the common set of structured entries that may be included in a CDA imaging report section, and an author participation for the section.
Classification	CDA Element Set
Relationships	Included in 9.5 Findings section and its sub-sections, 9.2 Clinical Information and other sections
Context	sibling node
Open/Closed	open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
ContentTemplate		templateId	0..1	MAY	II			
		author	0..*	MAY				
AuthoringTime	>	time	1..1	SHALL	TS			
	>	assignedAuthor	1..1	SHALL				
AuthorID	>>	id	1.*	SHALL	II			
	>>	assignedPerson	1..1	COND				
AuthorName	>>>	name	1..1	SHALL	PN			
	>>	assignedAuthoring Device	1..1	COND				
AuthorDevice Model	>>>	manufacturerModel Name	0..1	SHOULD	ST			
AuthorSoftware	>>>	softwareName	0..1	SHOULD	ST			
	>>	represented Organization	0..1	MAY				
AuthorOrganization	>>>	name	0..1	SHOULD	ON			
		entry	0..*	MAY				
Coded Observation[*]	>	*observation*	1..1	SHALL				10.1 Coded Observation 2.16.840.1.113883.10.20.6.2.13
		entry	0..*	MAY				
Quantity Measurement[*]	>	*observation*	1..1	SHALL				10.5 Quantity Measurement 2.16.840.1.113883.10.20.6.2.14
		entry	0..*	MAY				
Graphic[*]	>	*observationMedia*	1..1	SHALL				10.3 observationMedia 1.3.6.1.4.1.19376.1.4.1.4.7
		entry	0..*	MAY				
SOPInstance[*]	>	*observation*	1..1	SHALL				10.8 SOP Instance Observation 1.2.840.10008.9.18
		entry	0..*	MAY				
	>	regionOfInterest	0..0	SHALL NOT				

Note that there is no business name associated with this template. Rather, this template is an editorial convenience for template specification, and the Business Names for the elements of this template are logically part of the Business Name scope of the invoking template.

Also, the ID of this template is not represented in a templateID element. Rather, the templateID of the invoking template implicitly includes the elements specified by this template.

9.1.2.1 templateId

This templateId may be used to identify the template(s) used to generate/constrain the content of the section. This is in addition to the templateId of the section level template, and typically represents clinical sub-specialty requirements. See Section 5.1.1 on the structure and use of the templateId.

9.1.2.2 author

The author participation allows the recording of an author for a section, equivalent to the TID 1002 “Observer Context”. Either a person or a device may be identified as the author for a section or subsection.

COND: Either the assignedPerson or assignedAuthoringDevice element SHALL be present.

Example 9.1.2.2-1. Author example

```
<author>
   <assignedAuthor>
      <id extension="121008" root="2.16.840.1.113883.19.5"/>
      <assignedPerson>
         <name>
            <given>John</given>
            <family>Blitz</family>
            <suffix>MD</suffix>
         </name>
      </assignedPerson>
   </assignedAuthor>
</author>
```

9.1.2.3 section/entry

A section may contain CDA entries that represent clinical statements in coded form (using the 10.1 Coded Observation template), numeric measurements (using the 10.5 Quantity Measurement template), images to be displayed in the narrative block (using the 10.3 observationMedia template, and invoked from a renderMultiMedia element), or references to external images or annotated images (using the 10.8 SOP Instance Observation template).

These entries may appear in any order.

9.1.2.4 regionOfInterest

Section templates defined in this Implementation guide SHALL NOT use the CDA Region of Interest Overlay entry (classCode="ROIOVL"). If it is desired to show images with graphical annotations, the annotations SHOULD be encoded in DICOM Presentation State objects that reference the image. Report applications that display referenced images and annotation may retrieve a rendered image using a WADO reference in accordance with PS3.18, including the image and Presentation State, or other DICOM retrieval and rendering methods. This approach avoids the risks of errors in registering a CDA region of interest annotation with DICOM images, and places all image rendering within the scope of the DICOM Standard, including the full range of 2D and 3D presentations defined in DICOM.

9.2 Clinical Information

Template ID	1.2.840.10008.9.2
Name	Clinical Information
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	Clinical details about the case such as presenting signs and symptoms, past clinical history, the overall condition of the patient, etc.
Classification	CDA Section Level
Relationships	Included in 7.1 Imaging Report
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Clinical Information		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.2	
	>	id	1..1	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(55752-0, LOINC, "Clinical Information")	
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	COND	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>	component	0..1	MAY				
Request	>>	*section*	1..1	SHALL				9.8.1 Request 1.2.840.10008.9.7
	>	component	0..1	MAY				
Procedure Indications	>>	*section*	1..1	SHALL				9.8.2 Procedure Indications 1.2.840.10008.9.22
	>	component	0..1	MAY				
History	>>	*section*	1..1	SHALL				9.8.3 Medical (General) History 2.16.840.1.113883.10.20.22.2.39
	>		0..1	MAY				9.1.2 General Section Entries 1.2.840.10008.9.23

Example 9.2-1. Clinical Information section example

```
<section classCode="DOCSECT" moodCode="EVN">
   <templateId root="1.2.840.10008.9.2"/>
   <id root="1.2.840.10213.2.62.994044785528.114289542805"/>
   <code code="55752-0" codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="LOINC" displayName="Clinical Information"/>
   <title>Clinical Information</title>
   <text>The patient was referred for evaluation of suspected pulmonary embolism.</text>
   <!---see examples for other sections/entries -->
</section>
```

9.3 Imaging Procedure Description

Template ID	1.2.840.10008.9.3
Name	Imaging Procedure Description
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	The Imaging Procedure Description section records the technical details of the procedure and may include information about protocol, imaging device, contrast, radiation dose, medications administered (sedation, stress agents), etc.
Classification	CDA Section Level
Relationships	Included in 7.1 Imaging Report
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Procedure Description		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.3	
	>	id	1..1	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(55111-9, LOINC, "Current Imaging Procedure Description")	
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	COND	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>	entry	1..1	SHALL				
Procedure Technique	>>	*procedure*	1..1	SHALL				10.4 Procedure Technique 1.2.840.10008.9.14
	>	entry	0..*	MAY				

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Procedural Medication[*]	>>	*substance Administration*	1..1	SHALL				10.2 Procedural Medication 1.2.840.10008.9.13
	>	component	0..1	MAY				
Complications	>>	*section*	1..1	SHALL				9.8.4 Complications 2.16.840.1.113883.10.20.22.2.37
	>	component	0..1	COND				
Radiation Exposure	>>	*section*	1..1	SHALL				9.8.5 Radiation Exposure and Protection Information 1.2.840.10008.9.8
	>	component	1..1	SHALL				
DICOMObject Catalog	>>	*section*	1..1	SHALL				9.8.7 DICOM Object Catalog 2.16.840.1.113883.10.20.6.1.1
	>	entry	0..1	MAY				
ImageQuality	>>	*observation*	1..1	SHALL				10.9 Image Quality 1.2.840.10008.9.15

Example 9.3-1. Current Imaging Procedure description section example

```
<section classCode="DOCSECT" moodCode="EVN">
   <templateId root="1.2.840.10008.9.3"/>
   <id root="1.2.840.10213.2.62.9940434234785528.11428954534542805"/>
   <code code="55111-9" codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="LOINC" displayName="Current Imaging Procedure Description"/>
   <title>Imaging Procedure Description</title>
   <text>A CT study was acquired with 2.5 mm images of the abdomen and pelvis with 140 ml of... </text>
   <!-- See Procedure Technique template example - required here -->
   <!-- See DICOM Imaging Catalog template example - required here -->
   <!---see examples for other sections/entries -->
</section>
```

9.3.1 component/section Radiation Exposure and Protection Information

COND: If the documented service utilizes ionizing radiation, a 9.8.5 Radiation Exposure and Protection Information section MAY be present.

9.4 Comparison Study

TemplateID	1.2.840.10008.9.4
Name	Comparison Study
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active

Description	Documentation of a prior Imaging Procedure to which the current images were compared
Classification	CDA Section Level
Relationships	Included in 7.1 Imaging Report
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Comparison Study		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.4	
	>	id	1..*	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(18834-2, LOINC, "Radiology Comparison study")	
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	COND	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>	entry	0..*	MAY				
Procedure Technique	>>	*procedure*	1..1	SHALL				10.4 Procedure Technique 1.2.840.10008.9.14
	>	entry	0..*	MAY				
Study[*]	>>	*act*	1..1	SHALL				10.6 Study Act 1.2.840.10008.9.16
	>		0..1	MAY				9.1.2 General Section Entries 1.2.840.10008.9.23

Example 9.4-1. Comparison study section example

```
<section classCode="DOCSECT" moodCode="EVN">
   <templateId root="1.2.840.10008.9.4"/>
   <id root="1.2.840.10213.2.62.994056444785528.1142893564536542805"/>
   <code code="18834-2" codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="LOINC" displayName="Radiology Comparison Study"/>
   <title>Comparison Study</title>
   <text>A prior CT with contrast performed on May 7, 2012, showed that ...</text>
   <! ---see examples for other sections/entries />
</section>
```

9.5 Findings

Template ID	2.16.840.1.113883.10.20.6.1.2

Name	Findings
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	Records clinically significant observations confirmed or discovered during the procedure.
Classification	CDA Section Level
Relationships	Included in 7.1 Imaging Report
Context	parent node
Open/Closed	Open
Revision History	From Consolidated CDA r1.1 DICOM-20150324: Added optional subsections and entries

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Findings		section						
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	2.16.840.1.113883.10.20.6.1.2	
	>	id	1..*	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(59776-5, LOINC, "Procedure Findings")	
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	COND	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>	component	0..*	MAY				
Fetus Findings[*]	>>	*section*	1..1	SHALL				9.8.8 Fetus Findings 1.2.840.10008.9.9
	>	component	0..*	MAY				
Subsection[*]	>>	*section*	1..1	SHALL				9.8.9 Labeled Subsection 1.2.840.10008.9.10
	>		0..1	MAY				9.1.2 General Section Entries 1.2.840.10008.9.23

9.5.1 text

If entries are present, the section/text SHALL represent faithfully all such statements and MAY contain additional text.

The narrative text associated with an actionable finding SHOULD be highlighted using styleCode Bold. See Section 9.1.1.1.

Actionable findings that require a specific follow-up action or procedure SHOULD be referenced from a recommendation in the 9.8.11 Recommendation section.

Communication of actionable findings SHOULD be documented in the 9.8.10 Communication of Actionable Findings section.

Example 9.5.1-1. Findings section example

```
<section classCode="DOCSECT" moodCode="EVN">
   <templateId root="2.16.840.1.113883.10.20.6.1.2"/>
   <id root="1.2.840.10213.2.62.941494044785528.114289542452452805"/>
   <code code="59776-5" codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="LOINC" displayName="Procedure Findings"/>
   <title>Findings</title>
   <text>
      <paragraph>
         <caption>Finding</caption>
         <content ID="Fndng2">The cardiomediastinum is... </content>
      </paragraph>
      <paragraph>
         <caption>Diameter</caption>
         <content ID="Diam2">45mm</content>
      </paragraph>
      ...
   </text>
   <entry>
      <templateId root="2.16.840.1.113883.10.20.6.2.12"/>
      ...
   </entry>
   <!-- see examples for other sections/entries -->
</section>
```

9.6 Impression

Template ID	1.2.840.10008.9.5
Name	Impression
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	The most important diagnoses or other clinical conclusions that can be made from the imaging observations and other clinical information are recorded here. This section may include recommendations for additional imaging tests or other actions, as well as global assessments, such as BI-RADS Categories or the equivalent.
Classification	CDA Section Level
Relationships	Included in 7.1 Imaging Report
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Impression		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.5	
	>	id	1..*	SHALL	II			

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
	>	code	1..1	SHALL	CD	SHALL	(19005-8, LOINC, "Impressions")	
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	COND	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>	component	0..1	MAY				
CommunicationOf Actionable Findings	>>	*section*	1..1	SHALL				9.8.10 Communication of Actionable Findings 1.2.840.10008.9.11
	>	component	0..1	MAY				
KeyImages	>>	*section*	1..1	SHALL				9.8.6 Key Images 1.3.6.1.4.1.19376. 1.4.1.2.14
	>	component	0..*	MAY				
Recommendation	>>	*section*	1..1	SHALL				9.8.11 Recommendation 1.2.840.10008.9.12
	>	entry	0..*	MAY				
Coded Observation	>>	*observation*	1..1	SHALL	CD			10.1 Coded Observation 2.16.840.1.113883. 10.20.6.2.13

Example 9.6-1. Impression section example

```
<section classCode="DOCSECT" moodCode="EVN">
   <templateId root="2.16.840.1.113883.10.20.22.2.27"/>
   <id root="1.2.840.10213.2.62.994948294044785528.11422458954285205"/>
   <code code="19005-8"
      codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="LOINC"
      displayName="Impressions"/>
   <title>Impression</title>
   <text>This exam identified ...</text>
   <!-- other sections and entries here -->
</section>
```

9.7 Addendum

Template ID	1.2.840.10008.9.6
Name	Addendum
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	Addendum section for imaging report includes supplemental information added to the original document contents..

Classification	CDA Section Level
Relationships	Included in 7.1 Imaging Report
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Addendum[*]		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.6	
	>	id	1..*	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(55107-7, LOINC, "Addendum")	
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	COND	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>	author	1..1	SHALL				
Time	>>	time	1..1	SHALL	TS			
	>>	assignedAuthor	1..1	SHALL				
AuthorID	>>>	id	1..*	SHALL	II			
	>>>>	assignedPerson	1..1	SHALL				
AuthorName	>>>>>	name	1..1	SHALL	PN			
	>	component	0..1	MAY				
Communication OfActionable Findings	>>	*section*	1..1	SHALL				9.8.10 Communication of Actionable Findings 1.2.840.10008.9.11
	>		0..1	MAY				9.1.2 General Section Entries 1.2.840.10008.9.23

9.7.1 author

Note that the Author identified in the document header is the author of the original report, as that participation sets the default authoring context for the report. The Author participation in this section shall be present, and identifies the author of the addendum, even if the same as the author of the original report.

9.7.2 component/section - Communication of Actionable Findings

It is possible for an imaging report to be legally signed (authenticated) prior to the Actionable Findings being properly communicated. In this event, an addendum to the imaging report is often created to document the communication of the actionable findings. This can be included in the section/text of the 9.7 Addendum, or using the 9.8.10 Communication of Actionable Findings subsection.

Example 9.7.2-1. Addendum section example

```
<section classCode="DOCSECT" moodCode="EVN" ID="Adndm">
   <templateId root="1.2.840.10008.9.6"/>
   <id root="1.2.840.10213.2.62.7906994044785528.1142895428068506"/>
```

```
  <code code="55107-7" codeSystem="2.16.840.1.113883.6.1"
    codeSystemName="LOINC" displayName=" Addendum"/>
  <title>Addendum</title>
  <text>The supplemental information added to the original document...</text>
  <author>
    <time value="20140605143000+0500"/>
    <assignedAuthor>
      <id extension="23454345" root="2.16.840.1.113883.19.5"/>
      <assignedPerson>
      <name><given>Henry</given> <family>Radiologist</family></name>
      </assignedPerson>
    </assignedAuthor>
  </author>
</section>
```

9.8 Sub-sections

9.8.1 Request

Template ID	1.2.840.10008.9.7
Name	Request
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	Information about the requested imaging studies and associated tests. It may include information on the reason for the request, and on any validation of the request by clinical decision support against relevant appropriateness criteria.
Classification	CDA Section Level
Relationships	Included in 9.2 Clinical Information
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Request		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.7	
	>	id	1..*	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(55115-0, LOINC, "Request")	
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	COND	ED			9.1.1 Section Text 1.2.840.10008.9.19
CDSRecord Text[*]	>>	content	0..*	MAY	ST			
*	>>@	@ID	1..1	SHALL	XML ID			

	>		0..1	MAY				9.1.2 General Section Entries 1.2.840.10008.9.23

9.8.1.1 text/content and @ID – CDS Record

The Request section narrative text block MAY include content blocks recording clinical decision support assessments of the request with respect to the indications, patient characteristics, and relevant guidelines. Each such text/content SHALL include an XML ID attribute that serves as the business name discriminator associated with an instantiation of the element. Even if only one content block is instantiated, the ID attribute shall be present.

Example 9.8.1.1-1. Request section example

```
<section classCode="DOCSECT" moodCode="EVN">
   <templateId root="1.2.840.10008.9.7" />
   <id root="1.2.840.10213.2.62.7906994785528.114289506"/>
   <code code="55115-0"
      codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="LOINC"
      displayName="Request" />
   <title>Request</title>
   <text>PTA (Iliac Angioplasty) for treatment of symptomatic
      atherosclerotic disease in both iliac arteries.
      <content ID="CDS001">Procedure ordered by Pat Smith, MD, NPI:8740944987.
      Classified APPROPRIATE by RadCDS based on ACR Select criteria
      at 2015-07-21 10:52:31 CDT</content>
   </text>
</section>
```

9.8.2 Procedure Indications

Template ID	2.16.840.1.113883.10.20.22.2.29
Name	Procedure Indications
Effective Date	2012-07
Version Label	DICOM-20150324
Status	Active
Description	Records details about the reason for the procedure. This section may include the pre-procedure diagnosis or diagnoses as well as one or more symptoms that contribute to the reason the procedure is being performed.
Classification	CDA Section Level
Relationships	Included in 9.2 Clinical Information
Context	parent node
Open/Closed	Open
Revision History	From Consolidated CDA r1.1 DICOM-20150324: adapted to use optional Coded Observation entry rather than optional Indication entry

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template

Procedure Indications		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	2.16.840.1.113883.10.20.22.2.29	
	>	id	1..*	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(59768-2, LOINC, "Procedure Indications")	
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	COND	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>	entry	0..*	MAY				
Coded Observation[*]	>>	*observation*	1..1	SHALL			See 9.8.2.1 entry/observation	10.1 Coded Observation 2.16.840.1.113883.10.20.6.2.13

9.8.2.1 entry/observation

The binding to the Coded Observation concept domains is:

Concept Domain or Element	Value Conf	Value
ObservationType	SHOULD	(432678004, SNOMED, "Indication for procedure")
Other concept domains		unspecified

Note

In Consolidated CDA r1.1 the binding to the observationType is to Value Set Problem Type (2.16.840.1.113883.3.88.12.3221.7.2) with conformance SHOULD. Values from that Value Set are acceptable here as well.

Example 9.8.2.1-1. Procedure indications section example

```
<section classCode="DOCSECT" moodCode="EVN">
   <templateId root="2.16.840.1.113883.10.20.22.2.29"/>
   <id root="1.2.840.10213.2.62.044785528.1142895426"/>
   <code code="59768-2"
      codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="LOINC"
      displayName="Procedure Indications"/>
   <title>Procedure Indications</title>
   <text>The procedure is performed as a follow-up for abnormal screening result.</text>
</section>
```

9.8.3 Medical (General) History

Template ID	2.16.840.1.113883.10.20.22.2.39
Name	Medical (General) History
Effective Date	2012-07
Version Label	DICOM-20150324

Status	Active
Description	History general describes all aspects of medical history of the patient even if not pertinent to the current procedure, and may include chief complaint, past medical history, social history, family history, surgical or procedure history, medication history, and other history information. The history may be limited to information pertinent to the current procedure or may be more comprehensive. It may also be reported as a collection of random clinical statements or it may be reported categorically. Categorical report formats may be divided into multiple subsections, including Past Medical History and Social History.
Classification	CDA Section Level
Relationships	Included in 9.2 Clinical Information
Context	parent node
Open/Closed	Open
Revision History	From Consolidated CDA r1.1 DICOM-20150324: Addition of optional entries; C-CDA templateID retained

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
History		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	2.16.840.1.113883.10.20.22.2.39	
	>	id	1..*	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(11329-0, LOINC, "History General")	
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	COND	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>		0..1	MAY				9.1.2 General Section Entries 1.2.840.10008.9.23

9.8.3.1 section/text

In the context of an Imaging Report, the section/text should document any contraindications to contrast administration or other procedure techniques that affected the selection or performance of the protocol.

Example 9.8.3.1-1. Medical (General) History section example

```
<section classCode="DOCSECT" moodCode="EVN">
   <templateId root="2.16.840.1.113883.10.20.22.2.39"/>
   <id root="1.2.840.10213.2.62.7044785528.114289875"/>
   <code code="11329-0"
      codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="LOINC"
      displayName="History General"/>
   <title>Relevant Medical History</title>
   <text>
      <list>
         <item>Patient reported adverse reaction to iodine.</item>
         <item>Patient is smoker (1 pack daily).</item>
```

```
      </list>
   </text>
</section>
```

9.8.4 Complications

Template ID	2.16.840.1.113883.10.20.22.2.37
Name	Complications
Effective Date	2012-07
Version Label	DICOM-20150324
Status	Active
Description	The Complications section records problems that occurred during the procedure or other activity. The complications may have been known risks or unanticipated problems.
Classification	CDA Section Level
Relationships	Included in 9.3 Imaging Procedure Description
Context	parent node
Open/Closed	Open
Revision History	From Consolidated CDA r1.1 DICOM-20150324: Addition of optional entries

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Complications		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	2.16.840.1.113883.10.20.22.2.37	
	>	id	1..*	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(55109-3, LOINC, "Complications")	
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	COND	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>	entry	0..*	MAY				
Coded Observation[*]	>>	*observation*						10.1 Coded Observation 2.16.840.1.113883.10.20.6.2.13

Example 9.8.4-1. Complications section example

```
<section classCode="DOCSECT" moodCode="EVN">
   <templateId root="2.16.840.1.113883.10.20.22.2.37"/>
   <id root="1.2.840.10213.2.62.70444786655528.11428987524546666"/>
   <code code="55109-3"
      codeSystem="2.16.840.1.113883.6.1"
```

```
      codeSystemName="LOINC"
      displayName="Complications"/>
   <title>Complications</title>
   <text>Immediately following IV contrast injection, the patient reporting itching "all over".
      Dr. Smith examined the patient and found multiple urticaria. The patient denied difficulty
      breathing or swallowing. The patient was given Benadryl 50 mg PO and was followed for
      30 minutes, during which time the symptoms subsided.</text>
   <entry>
      <observation classCode="OBS" moodCode="EVN">
         <templateId root="2.16.840.1.113883.10.20.6.2.13"/>
         <!-- Coded Observation -->
         ...
      </observation>
   </entry>
</section>
```

9.8.5 Radiation Exposure and Protection Information

Template ID	1.2.840.10008.9.8
Name	Radiation Exposure and Protection Information
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	Contains information related to the radiation exposure and protection of the patient, as may be required by national or local legal requirements or standards.
Classification	CDA Section and Entry Level
Relationships	Included in 9.3 Imaging Procedure Description
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Radiation Exposure		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.8	
	>	code	1..1	SHALL	CD	SHALL	(73569-6, LOINC, "Radiation exposure and protection information")	
	>	id	1..1	SHALL	II			
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	SHALL	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>	entry	0..1	COND				
	>>	procedure	1..1	SHALL				
	>>@	@classCode	1..1	SHALL	CS	SHALL	PROC	
	>>@	@moodCode	1..1	SHALL	CS	SHALL	EVN	

	>>>	code	1..1	SHALL	CD	SHALL	(121290, DCM, "Patient exposure to ionizing radiation")	
	>>>	participant	1..1	SHALL				
	>>@	@typeCode	1..1	SHALL	CS	SHALL	RESP	
	>>>	participantRole	1..1	SHALL				
Irradiation AuthorizingID	>>>>	id	1..1	SHALL	II			
	>>>>	functionCode	1..1	SHALL	CE	SHALL	(113850, DCM, "Irradiation Authorizing")	
	>>>>	playingEntity	1..1	SHALL				
Irradiation Authorizing Name	>>>>>	name	1..1	SHALL	PN			
	>	entry	0..*	MAY				
SOPInstance[*]	>>	*observation*	1..1	SHALL				10.8 SOP Instance Observation 1.2.840.10008.9.18
	>	entry	1..1	COND				
Coded Observation [pregnancy]	>>	*observation*	1..1	SHALL			[See 9.8.5.4 entry/observation Pregnancy]	10.1 Coded Observation 2.16.840.1.113883.10.20.6.2.13
	>	entry	0..1	MAY				
Coded Observation [indication]	>>	*observation*	1..1	SHALL			[See 9.8.5.5 entry/observation Indication]	10.1 Coded Observation 2.16.840.1.113883.10.20.6.2.13
	>	entry	0..*	MAY				
Quantity Measurement[*]	>>	*observation*	1..1				[See 9.8.5.6 entry/observation Dose Measurements]	10.5 Quantity Measurement 2.16.840.1.113883.10.20.6.2.14
	>	entry	0..1	MAY				
	>>	substance Administration						
	>>@	@classCode	1..1	SHALL		SHALL	SBADM	
	>>@	@moodCode	1..1	SHALL		SHALL	EVN	
	>>>	code	1..1			SHALL	(440252007, SNOMED, "Administration of radiopharmaceutical")	
Radioactivity Dose	>>>	doseQuantity	0..1	SHOULD	PQ			
	>>>	consumable	1..1	SHALL				
	>>>>	manufactured Product	1..1	SHALL				
	>>>>>	material	1..1	SHALL				

Radio pharmaceutical	>>>>>>	code	1..1	SHALL	CE	SHOULD CWE	ValueSet CID 25 “Radiopharmaceuticals”, or CID 4021 “PET Radiopharmaceutical”	
FreeTextRadio pharmaceutical	>>>>>>>	original Text	0..1	SHOULD	ED			

9.8.5.1 text

The section text SHALL contain information related to the radiation exposure and protection of the patient, as is required by state/national legal requirements or standards, for example:

- information on the indications for the procedure
- the name of the "Irradiation Authorizing" person who is the clinician responsible for determining that the irradiating procedure was appropriate for the indications.
- summary information on radiation exposure if ionizing is applied in the context of the current procedure (detailed specification of exposure is out of the scope of this textual summary).
- information on the radioactive substance administered if radioactive substance is administered in the context of the current procedure.

Note

Compare to TID 2008 “Radiation Exposure and Protection Information”.

9.8.5.2 entry/procedure Patient Exposure

COND: If modality is CT, MG, NM, PT, XR, XA, or XF, the section SHOULD contain a procedure entry for the exposure of the patient to ionizing radiation.

This entry SHALL have a participant, the irradiation authorizing person who is the clinician responsible for determining that the irradiating procedure was appropriate for the indications.

Note

This may be the same person as the performing physician identified in the header.

9.8.5.3 entry/observation SOP Instance

The section may include reference to one or more DICOM Dose Report SOP Instances that provides a detailed record of exposure.

9.8.5.4 entry/observation Pregnancy

COND: A coded observation entry SHALL be present if the patient is female and child-bearing age.

The binding to the Coded Observation concept domains is:

Concept Domain or Element	Value Conf	Value
ObservationType	SHALL	(364320009, SNOMED, "Pregnancy observable")
ObservationValue	SHALL CNE	ValueSet CID 6096 Pregnancy Status
Other concept domains		unspecified

9.8.5.5 entry/observation Indication

An indication for procedure recorded in this section should be consistent with any indications identified in the 9.2 Clinical Information and/or 9.8.2 Procedure Indications section. It is included here for conformance with regulatory requirements in some jurisdictions for the indications to be specified in the context of the radiation exposure information.

The binding to the Coded Observation concept domains is:

Concept Domain or Element	Value Conf	Value
ObservationType	SHALL	(432678004, SNOMED, "Indication for procedure")
Other concept domains		unspecified

9.8.5.6 entry/observation Dose Measurements

The section may include multiple dose measurements. The binding to the Quantity Measurement concept domains is:

Concept Domain or Element	Value Conf	Value
ObservationType	SHALL CWE	ValueSet CID 10050 “Summary Radiation Exposure Quantities”
Other concept domains		unspecified

Example 9.8.5.6-1. Radiation Exposure and Protection section example

```
<section classCode="DOCSECT" moodCode="EVN">
 <templateId root="1.2.840.10008.9.8" />
 <id root="1.2.840.10213.2.62.704478559484.11428372623"/>
 <code code="73569-6"
  codeSystem="2.16.840.1.113883.6.1"
  codeSystemName="LOINC"
  displayName="Radiation Exposure And Protection Information"/>
 <title> Radiation Exposure and Protection Information</title>
 <text>A dosage of... </text>
 <entry>
  <procedure classCode="PROC" moodCode="EVN">
   <code code="121290"
      codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="DCM"
      displayName="Patient exposure to ionizing radiation"/>
   <participant typeCode="RESP">
    <participantRole>
     <id root="2.16.840.1.113883.4.6" extension="980003719"/>
     <code code="113850"
        codeSystem="2.16.840.1.113883.6.1"
        codeSystemName="DCM"
        displayName="Irradiation Authorizing"/>
     <playingEntity>
      <name>
       <given>Martha</given>
       <family>Radiologist</family>
      </name>
     </playingEntity>
    </participantRole>
   </participant>
  </procedure>
 </entry>
 <entry>
  <observation classCode="OBS" moodCode="EVN" ID="pregnancy">
   <templateId root="2.16.840.1.113883.10.20.6.2.13"/>
   <id root="1.2.840.10213.2.62.7044779.114265201"/>
   <code code="364320009"
      codeSystem="2.16.840.1.113883.6.96"
```

```
      codeSystemName="SNOMED CT"
      displayName="Pregnancy observable"/>
    <statusCode code="completed"/>
    <value xsi:type="CD" code="60001007"
      codeSystem="2.16.840.1.113883.6.96"
      codeSystemName="SNOMED CT"
      displayName="not pregnant"/>
    <effectiveTime value="20140914171504+0500"/>
   </observation>
  </entry>
</section>
```

9.8.6 Key Images

ID	1.3.6.1.4.1.19376.1.4.1.2.14
Name	Key Images
Effective Date	2011-07
Version Label	DICOM-20150324
Status	Active
Description	The Key Images section contains narrative description of and references to DICOM Image Information Objects that illustrate the findings of the procedure reported.
Classification	CDA Section Level
Relationships	Included in 9.6 Impression
Context	parent node
Open/Closed	Open
Revision History	From IHE Cardiac Imaging Report Content DICOM-20150324: Addition of optional inline image (observationMedia)

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
KeyImages		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.3.6.1.4.1.19376.1.4.1.2.14	
	>	id	1..*	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(55113-5, LOINC, "Key Images")	
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	COND	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>	entry	0..*	SHOULD				
SOPInstance[*]	>>	*observation*	1..1	SHALL				
	>	entry	0..*	MAY				
Graphic[*]	>>	*observation Media*	1..1	SHALL				10.3 observationMedia 1.3.6.1.4.1.19376.1.4.1.4.7

9.8.6.1 Section/text

The Key Images section text SHALL contain image references using linkHtml elements, where @href is a valid Web Access to DICOM Persistent Object (WADO) URL. See Section 9.1.1.5. The text content of linkHtml should be either visible text of the hyperlink, or a descriptor or identifier of the image; it may be associated with a (limited resolution) copy of the image (see Section 9.8.6.3).

9.8.6.2 SOP Instance Observation

The Key Images section SHOULD include 10.8 SOP Instance Observation entries equivalent to the linkHtml image references.

9.8.6.3 observationMedia

The Key Images section MAY include observationMedia entries with in-line encoded copies of the referenced images, linked into the narrative block using the renderMultiMedia markup. See Section 9.1.1.3. These in-line encoded images may have limited resolution and lossy compression as appropriate for inclusion in a report.

Example 9.8.6-1. Key Images section example

```
<section classCode="DOCSECT" moodCode="EVN">>
 <templateId root="1.3.6.1.4.1.19376.1.4.1.2.14" />
 <id root="1.2.840.10213.2.62.704478559484.11428372623" />
 <code code="55113-5"
  codeSystem="2.16.840.1.113883.6.1"
  codeSystemName="LOINC"
  displayName="Key Images"/>
 <title>Key Images</title>
 <text>Maximum extent of tumor is shown in
  <linkHtml href="http://www.example.org/wado?requestType=WADO&amp;amp;...">image 1</linkHtml>
  <renderMultiMedia referencedObject="refimag1"/>
 </text>
 <entry>
  <!-- SOP Instance reference -->
  <observation classCode=DGIMG moodCode=EVN ID="SOP1-2"/>
 </entry>
 <entry>
  <!-- inline rendered image -->
  <observationMedia ID="refimag1">
   <value representation=B64 mediaType="image/jpeg">
    Bgd3fsET4g...
   </value>
  </observationMedia>
 </entry>
</section>
```

9.8.7 DICOM Object Catalog

Template ID	2.16.840.1.113883.10.20.6.1.1
Name	DICOM Object Catalog Section
Effective Date	2012-07
Version Label	CCDA-1.1
Status	Active

Description	DICOM Object Catalog lists all referenced objects and their parent Series and Studies, plus other DICOM attributes required for retrieving the objects. The DICOM Object Catalog section is not intended for viewing and may contain empty section text.
Classification	CDA Section Level
Relationships	Included in 9.3 Imaging Procedure Description
Context	parent node
Open/Closed	Open
Revision History	From Consolidated CDA r1.1

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
DICOMCatalog		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	2.16.840.1.113883.10.20.6.1.1	
	>	id	1..*	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(121181, DCM, "Dicom Object Catalog")	
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	SHALL	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>	entry	0..*	SHOULD				
Study[*]	>>	*act*	1..1	SHALL				10.6 Study Act 2.16.840.1.113883.10.20.6.2.6

Example 9.8.7-1. DICOM object catalog section example

```
<section classCode="DOCSECT" moodCode="EVN">
 <templateId root="2.16.840.1.113883.10.20.6.1.1"/>
 <id root="1.2.840.10213.2.62.70447834679.11429737"/>
 <code code="121181"
  codeSystem="1.2.840.10008.2.16.4"
  codeSystemName="DCM"
  displayName="DICOM Object Catalog"/>
 <entry>
       <!-- **** Study Act **** -->
       <act classCode="ACT" moodCode="EVN">
  <templateId root="2.16.840.1.113883.10.20.6.2.6"/>
  <id root="1.2.840.113619.2.62.994044785528.114289542805"/>
  <code code="113014" codeSystem="1.2.840.10008.2.16.4"
   codeSystemName="DCM" displayName="Study"/>
  <!-- **** Series Act ****-->
  <entryRelationship typeCode="COMP">
   <act classCode="ACT" moodCode="EVN">
    <id root="1.2.840.113619.2.62.994044785528.20060823223142485051"/>
    <code code="113015" codeSystem="1.2.840.10008.2.16.4"
     codeSystemName="DCM" displayName="Series">
      ...
```

```
    </code>
    <!-- **** SOP Instance UID *** -->
    <!-- 2 References -->
    <entryRelationship typeCode="COMP">
     <observation classCode="DGIMG" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.6.2.8"/>
      ...
     </observation>
    </entryRelationship>
    <entryRelationship typeCode="COMP">
     <observation classCode="DGIMG" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.6.2.8"/>
      ...
     </observation>
    </entryRelationship>
   </act>
  </entryRelationship>
      </act>
</entry>
```

9.8.8 Fetus Findings

Template ID	1.2.840.10008.9.9
Name	Fetus Findings
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	Records observations related to a fetus confirmed or discovered during an imaging procedure.
Classification	CDA Section Level
Relationships	Included in 9.5 Findings
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Fetus Findings[*]		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.9	
	>	id	1..*	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(76514-9, LOINC, "Fetal Study observation")	
Title	>	title	1..1	SHALL	ST			
Text	>	*text*	1..1	COND	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>	subject	1..1	SHALL				

	>>	relatedSubject	1..1	SHALL				
	>>>	code	1..1	SHALL	CE	SHALL	(121026, DCM, "Fetus")	
	>>>	subject	1..1	SHALL				
FetusID	>>>>	name	1..1	SHALL	PN			
	>	component	0..*	MAY				
Subsection[*]	>>	*section*	1..1	SHALL				9.8.9 Labeled Subsection 1.2.840.10008.9.10
	>		0.1	MAY				9.1.2 General Section Entries 1.2.840.10008.9.23

For reports on mothers and their fetus(es), information on a mother is mapped to recordTarget/PatientRole/Patient in the CDA header. Information on the fetus is mapped to subject/relatedSubject/SubjectPerson at the CDA section level. Both context information on the mother and fetus must be included in the document if observations on fetus(es) are contained in the document.

9.8.8.1 name - FetusID

The subject/relatedSubject/subject/name element is used to store the fetus ID, typically a pseudonym such as "fetus A". This shall be present even if only one fetus is identified in the document.

Example 9.8.8-1. Fetus Findings section example

```
<section classCode="DOCSECT" moodCode="EVN">
   <templateId root="2.16.840.1.113883.10.20.22.2.27" />
   <id root="1.2.840.10213.2.62.70447834679.11429737"/>
   <code code="76514-9" codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="LOINC" displayName="Fetal Study observation" />
   <title>Fetus #1</title>
   <text>Estimated gestational age of 27 weeks... </text>
   <relatedSubject>
      <code code="121026" codeSystem="1.2.840.10008.2.16.4" displayName="Fetus"/>
      <subject>
         <name>Fetus 1</name>
      </subject>
   </relatedSubject>
</section>
```

9.8.9 Labeled Subsection

Template ID	1.2.840.10008.9.10
Name	Labeled Subsection
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	Narrative or coded subsection that allows organization of content for a labeled topic (a particular organ or anatomic feature, a lesion, a tumor, etc.). The section.code shall be absent, but the section.title shall be present.
Classification	CDA Section Level

Relationships	Included in 9.5 Findings
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Subsection[*]		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.10	
	>	id	1..*	SHALL	II			
	>	code	0..0	SHALL NOT				
Title	>	title	1..1	SHALL noNull	ST		[See 9.8.9.1 title]	
Text	>	*text*	1..1	COND	ED			9.1.1 Section Text 1.2.840.10008.9.19
	>	component	0..*	MAY				
Subsection[*]	>>	*section*	1..1	SHALL				9.8.9 Labeled Subsection 1.2.840.10008.9.10
	>		0..1	MAY				9.1.2 General Section Entries 1.2.840.10008.9.23

9.8.9.1 title

The title element is used to identify the topic (specific organ or anatomic feature, abnormality, lesion, etc.) as the subject of the sub-section findings in the human readable document. As there is no section.code, this is the required mechanism to represent the section purpose as free text.

9.8.9.2 component/section Labeled Subsection

This template invokes itself recursively to allow arbitrarily deep nested subsections.

Example 9.8.9.2-1. Labeled sub-section example

```
<section classCode="DOCSECT" moodCode="EVN">
   <templateId root="1.2.840.10008.9.10" />
   <id root="1.2.840.10213.2.62.7044794679.114296787"/>
   <title>Liver</title>
   <text>No evidence of cirrhosis, nodular regeneration, or ... </text>
</section>
```

9.8.10 Communication of Actionable Findings

Template ID	1.2.840.10008.9.11
Name	Communication of Actionable Findings
Effective Date	2015/03/24

Version Label	DICOM-20150324
Status	Active
Description	A section that documents the notification of an actionable finding to a provider or other person responsible for patient care. The documentation in narrative text, and optionally in a coded entry, includes by whom, to whom, and at what date/time. Specific findings, including actionable (aka. critical) findings documented in text or as coded entries, are typically found in the 9.5 Findings. The actionable findings may be duplicated in the 9.6 Impression in either text or as coded entries. The actionable findings may be new (critical) or a change to a previous report/diagnosis (discrepant).
Classification	CDA Section and Entry Level
Relationships	Included in 9.6 Impression and 9.7 Addendum
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Actionable Findings		section	1..1	SHALL				
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.11	
	>	id	1..*	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(73568-8, LOINC, "Communication of Critical Results")	
Title	>	title	1..1	SHALL	ST			
	>	text	1..1	SHALL	ED			
Content[*]	>>	content	0..*	SHALL	ST		[See 9.8.10.1 section/text/content - narrative]	
*	>>@	@ID	1..1	SHALL	XML ID			
FindingRef	>>>	linkHtml	0..*	MAY	ST			
FindingURI	>>>@	@href	1..1	SHALL	URL (XML IDREF)		*#findingRef*	
	>	entry	0..*	SHOULD				
Communication[*]	>>	act	1..1	SHALL		SHALL		
	>>@	@classCode	1..1	SHALL	CS	SHALL	ACT	
	>>@	@moodCode	1..1	SHALL	CS	SHALL	EVN	
*	>>@	@ID	1..1	SHALL	XML ID			
	>>>	code	1..1	SHALL	CD	SHALL	(121291, DCM, "Results communicated")	
CommTime	>>>	effectiveTime	1..1	SHALL	TS			
	>>>	text	1..1	SHALL	ED			
Ref	>>>>	reference	1..1	SHALL	URL (XML IDREF)		*# contentRef*	
	>>>	performer	1..1	SHALL				

	>>>>	assignedEntity	1..1	SHALL				
	>>>>>	assignedPerson	1..1	SHALL				
ReportingPhysicianName	>>>>>>	name	1..1	SHALL	PN			
	>>>	participant	1..1	SHALL				
	>>>@	@typeCode	1..1	SHALL	CS	SHALL	NOT	
	>>>>	participantRole	1..1	SHALL				
NotificationContactTelecom	>>>>>	telecom	1..1	SHALL	TEL			
	>>>>>	playingEntity	1..1	SHALL				
NotificationContactName	>>>>>>	name	1..1	SHALL	PN			

9.8.10.1 section/text/content - narrative

Each documented act of communication of actionable findings SHALL be included as narrative in a section/text/content element, labeled with an XML ID (see Section 9.1.1.1).

Note

The following text content for such a block is specified in the RSNA Radiology Reporting Templates, Template 297: Communication of Actionable Finding (http://radreport.org/txt-mrrt/0000297):

method [discussed directly | discussed by telephone | described in message]

by [person]

to [person]

on [<date>] at [<time>]

The documentation may also provide a linkHtml reference to the actionable finding narrative elsewhere in the report, e.g., in the 9.5 Findings or 9.8.4 Complications section (see Section 9.1.1.2).

9.8.10.2 entry/act

A structured entry representation of the act of communication MAY be included in the section. This entry does not necessarily represent the entirety of the act as described in the narrative text, e.g., the communication method and actual content of the communication is not represented, nor whether the receiver acknowledged the communication ("read-back"). The act/text/reference element SHALL include an XML IDREF value pointing to the associated narrative content block.

9.8.10.3 entry/act/effectiveTime

The entry/act/effectiveTime element represents the date and time that actionable findings were communicated. The time that the findings were first observed is recorded in the effectiveTime element of the original observation, as linked through the section/text/content/linkHtml element.

9.8.10.4 entry/act/participant

The entry/act/participant element represents the notified party (@typecode = "NOT"). This could be the patient.

Example 9.8.10-1. Communication of Actionable Results section example

```
<section classCode="DOCSECT" moodCode="EVN">
   <templateId root="1.2.840.10008.9.11"/>
   <id root="1.2.840.10213.2.62.7044794679.114296787"/>
   <code code="73568-8"
      codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="LOINC"
      displayName="Communication of Critical Results"/>
   <title>Communication of Actionable Results</title>
   <text>
      <content ID=CR1>Dr. Smith was phoned at 262-966-0120 at 3:14pm on
      Wednesday, June 4, 2014, and the 4mm lung nodule was discussed directly
      with Dr. Smith to explain the follow-up recommendation of ...</content>
   </text>
   <entry>
      <act classCode="ACT" moodCode="EVN">
         <code code="121291"
            codeSystem="1.2.840.10008.2.16.4"
            codeSystemName="DCM"
            displayName="Results Communicated"/>
         <text>
            <reference value="#CR1"/>
         </text>
         <effectiveTime value="20140604221400-0700"/>
         <performer>
            <assignedEntity>
               <id root="1.2.840.10213.2.62.7044794679.114298686"/>
               <assignedPerson>
                  <name>Jane Doctor</name>
               </assignedPerson>
            </assignedEntity>
         </performer>
         <participant typeCode="NOT">
            <participantRole>
               <telecom value="tel:262-966-0120"/>
               <playingEntity>
                  <name>Dr. Smith</name>
               </playingEntity>
            </participantRole>
         </participant>
      </act>
   </entry>
</section>
```

9.8.11 Recommendation

Template ID	1.2.840.10008.9.12
Name	Recommendation
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	This section provides a separate section to describe the study interpreter's recommendations for follow-up studies or procedures.

Classification	CDA Section Level
Relationships	Included in 9.6 Impression
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Recommendation		section						
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.12	
	>	id	1..*	SHALL	II			
	>	code	1..1	SHALL	CD	SHALL	(18783-1, LOINC, "Study recommendation")	
Title	>	title	0..1	MAY	ST			
Text	>	text	0..1	SHALL	ED			
Content[*]	>>	content	0..*	SHALL	ST		[See 9.8.11.1 text/content]	
*	>>@	@ID	1..1	SHALL	XML ID			
GuidelineRef	>>>	linkHtml	0..1	MAY	ST			
GuidelineURI	>>>@	@href	1..1	SHALL	URI			
	>	entry	0..*	SHOULD				
Followup Procedure[*]	>>	procedure	1..1	SHALL				
	>>@	@classCode	1..1	SHALL	CS	SHALL	PROC	
	>>@	@moodCode	1..1	SHALL	CS	SHALL	PRP	
ProcedureCode	>>>	code	1..1	SHALL	CD		ConceptDomain Recommended Follow-up	
When	>>>	effectiveTime	1..1	SHOULD	IVL <TS>			
	>>>	text	1..1	SHALL	ED			
Ref	>>>>	reference	1..1	SHALL	URL (XML IDREF)		*# contentRef*	

9.8.11.1 text/content

Each documented recommendation SHALL be included as narrative in a content element, labeled with an XML ID (see Section 9.1.1.1 <content> Markup and Links From Entries). The content element NEED NOT be top level markup within the section/text element; it MAY be wrapped in another allowed narrative block markup, such as paragraph, list/item, or table/row/cell.

If the recommendation is based on a clinical guideline, a reference to that guideline MAY be included in a linkHtml element.

Each recommendation SHOULD have a corresponding structured entry.

9.8.11.2 entry/procedure

The Recommendation section SHOULD include entries for recommended follow-up actions or procedures.

Note

While this entry may be a trigger for a tracking system for ensuring follow up on recommendations, the imaging study report only conveys the interpreting physician's recommendations.

9.8.11.3 entry/procedure/code

Vocabulary binding for Concept Domain Recommended Follow-up may be further profiled in sub-specialty guidelines.

Note

An example would be Value Set CID 6028 “Mammography Recommended Follow-up”, incorporating concepts from ACR BI-RADS ®.

9.8.11.4 entry/procedure/effectiveTime

The HL7v3 IVL <TS> Data Type used for effectiveTime requires the specification of absolute dates, rather than a date relative to the date of the report.

Note

Thus the concept "follow-up within one year" needs to be encoded as a IVL <TS> with an effectiveTime/high element value one year after the date of the report.

9.8.11.5 entry/procedure/text/reference

The procedure entry SHALL include a text/reference element, whose value attribute SHALL begin with a '#' and SHALL point to its corresponding narrative content block. See Section 9.1.1.1.

Example 9.8.11-1. Radiology recommendation section example

```
<section classCode="DOCSECT" moodCode="EVN">
   <templateId root="1.2.840.10008.9.12" />
   <id root="1.2.840.10213.2.62.7044779.114265201"/>
   <code code="18783-1" codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="LOINC" displayName="Study Recommendation"/>
   <title>Radiology Recommendation</title>
   <text>
      <content ID="rec01">Biopsy should be considered. Follow-up at 3 month interval.
      </content>
      <linkHtml href="http://pubs.rsna.org/doi/abs/10.1148/radiol.2372041887"/>
   </text>
   <entry>
      <procedure ID="RadRec1" classCode="PROC" moodCode="PRP"/>
      <!-- local coding scheme -->
      <code code="9191919" codeSystem="2.16.840.1.56789.6.1"
         codeSystemName="My Hospital Coding System"
         displayName="3 month follow-up"/>
      <text><reference value="#rec01"/></text>
      <effectiveTime value="20141213"/>
   </entry>
</section>
```

10 Entry-level Templates

10.1 Coded Observation

Template ID	2.16.840.1.113883.10.20.6.2.13
Name	Coded Observation
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	Qualitative or categorical observation using a value of type CD.
Classification	CDA Entry Level
Relationships	Included in all sections
Context	parent node
Open/Closed	open
Revision History	From Consolidated CDA r1.1 DICOM-20150324: Added optional negationInd, interpretationCode, targetSiteCode, and methodCode with Business Names; added optional subject Coded Observation

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Coded Observation[*]		observation						
	@	@classCode	1..1	SHALL	CS	SHALL	OBS	
	@	@moodCode	1..1	SHALL		SHALL	EVN	
Not	@	@negationInd	0..1	MAY	BL	SHALL	true	
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	2.16.840.1.113883. 10.20.6.2.13	
	>	id	1..1	SHALL	II			
ObsName	>	code	1..1	SHALL	CD		ConceptDomain ObservationType	
	>	text	0..1	SHOULD	ED			
Ref	>>	reference	1..1	SHALL	URL (XML IDREF)		*# contentRef*	
	>	statusCode	1..1	SHALL	CS	SHALL	COMPLETED	
Time	>	effectiveTime	0..1	SHOULD	TS			
ObsValue	>	value	1..1	SHALL	CD		ConceptDomain ObservationValue	
	>@	@xsi:type	1..1	SHALL	ST	SHALL	CD	
Interpretation Code	>	interpretation Code	0..1	MAY	CE	SHALL CNE	ValueSet ObservationInterpretation Value Set 2.16.840.1.113883.11.78	

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Actionable Priority	>>	translation	0..1	MAY	CD	MAY CWE	ValueSet CID 7035 “Actionable Finding Classification” [See 10.1.3 interpretationCode and translation For Actionable Findings]	
TargetSite	>	targetSiteCode	1..1	COND	CD		ConceptDomain ObservationSite	
	>>	qualifier	0..1	COND				
	>>>	name	1..1	SHALL	CD	SHALL	(272741003, SNOMED CT, "laterality")	
Laterality	>>>	value	1..1	SHALL	CD	SHALL CNE	ValueSet CID 244 “Laterality”	
	>>	qualifier	0..1	COND				
	>>>	name	1..1	SHALL	CD	SHALL	(106233006, SNOMED CT, "topographical modifier")	
TopoModifier	>>>	value	1..1	SHALL	CD	SHALL CNE	ValueSet CID 2 “Anatomic Modifier”	
Method	>	methodCode	0..1	MAY	CD		ConceptDomain ObservationMethod	
	>	entry Relationship	0..*	MAY				
	>@	@typeCode	1..1	SHALL	CS	SHALL	SPRT	
SOPInstance[*]	>>	*observation*	1..1	SHALL				10.8 SOP Instance Observation 1.2.840.10008.9.18
	>	entry Relationship	0..*	MAY				
	>@	@typeCode	1..1	SHALL	CS	SHALL	SPRT	
Quantity Measurement[*]	>	*observation*	1..1	SHALL				10.5 Quantity Measurement 2.16.840.1.113883.10.20.6.2.14
	>	entry Relationship	0..*	MAY				
	>@	@typeCode	1..1	SHALL	CS	SHALL	SUBJ	
Coded Observation[*]	>	*observation*	1..1	SHALL				10.1 Coded Observation 2.16.840.1.113883.10.20.6.2.13

10.1.1 code and @negationInd

The Observation code element has an associated Concept Domain ObservationType. A representative binding for this Concept Domain is to the value (ASSERTION, actcode[2.16.840.1.113883.5.4], "Assertion"), providing an assertion of a finding concept in the value element.

The Observation may have @negationInd attribute "true", which together with the code "ASSERTION" indicates that the finding was not observed, e.g., to represent "No finding of stroke".

Note

This is the pattern used in Consolidated CDA for negative findings.

10.1.2 text/reference and Related Narrative Block Markup

The Observation entry SHOULD include a text/reference element, whose value attribute (not to be confused with the value element of the Observation class) SHALL begin with a '#' and SHALL point to its corresponding narrative in the parent section (using the approach defined in CDA Release 2, section 4.3.5.1). See Section 9.1.1.1.

10.1.3 interpretationCode and translation For Actionable Findings

When an observation is unexpected or "actionable" (one type of which is denoted a "critical finding"), it may be flagged using the interpretationCode. For very abnormal findings the interpretationCode element SHALL be set to (AA, ObservationInterpretation, "abnormal alert"). Unexpected normal findings, e.g., no findings of disease when patient treatment had been planned on the presumption of disease, may also be flagged using interpretationCode (N, ObservationInterpretation, "normal").

The translation element of the interpretationCode may be used to provide a further classification as defined in a regionally- or professionally-specified value set. This template identifies an optional value set for the ACR Actionable Finding categories 1, 2, and 3, as defined by: Larson PA, et al. J Am Coll Radiol 2014; published online. DOI 10.1016/j.jacr.2013.12.016.

The narrative text associated with the actionable finding SHOULD be highlighted using styleCode Bold. See Section 9.5.1 and Section 9.1.1.1.

Actionable findings that require a specific follow-up action or procedure SHOULD be referenced from a recommendation in the 9.8.11 Recommendation section.

Communication of actionable findings SHOULD be documented in the 9.8.10 Communication of Actionable Findings section.

10.1.4 targetSiteCode

Each observation needs to fully specify its site/location.

COND: If the observation site is not pre-coordinated in the observation/code or observation/value, it SHALL be specified in the observation/targetSiteCode.

COND: The qualifier element for laterality SHALL be present if the targetSiteCode represents a paired body part and laterality is not pre-coordinated in the targetSiteCode.

Note that inclusion in a labeled subsection (see Section 9.8.9) does not imply a finding site for the observation from the title. The title is not semantically part of the post-coordination.

10.1.5 entryRelationship/@typeCode=SUBJ/observation - Coded

The Coded Observation entry MAY include an actRelationship of type SUBJ (has subject) to a subsidiary Coded Observation (recursively invoking this same template). This allows the constructions of complex clinical statements.

Example 10.1-1. Coded observation example

```
<text>
   ...
   <content ID="fnd-1"> ...finding of a right hilar mass (abnormal - class 1) ...</content>
</text>
...
<entry>
   <observation classCode="OBS" moodCode="EVN">
```

```
    <templateId root="2.16.840.1.113883.10.20.6.2.13"/>
    <id root="1.2.840.10213.2.62.7044779.114265201"/>
    <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"
       codeSystemName="actCode"
       displayName="Assertion"/>
    <text><reference value="#fnd-1"/></text>
    <statusCode code="completed"/>
    <effectiveTime value="20140914171504+0500"/>
    <value xsi:type="CD" code="309530007"
       codeSystem="2.16.840.1.113883.6.96"
       codeSystemName="SNOMED CT"
       displayName="Hilar mass"/>
    <interpretationCode code = "AA" codeSystem="2.16.840.1.113883.5.83"
          codeSystemName="ObservationInterpretation"
          displayName="Abnormal Alert">
       <translation code="RID49480" codeSystem="2.16.840.1.113883.6.256"
          codeSystemName="RADLEX"
          displayName="ACR Category 1 Actionable Finding"/>
    </interpretationCode>
    <!-- although "hilar mass" is by definition in the lung, the observation.value
        does not describe right or left lung, so targetSite is required -->
    <targetSiteCode code="3341006"
       codeSystem="2.16.840.1.113883.6.96" codeSystemName="SNOMED CT"
       displayName="right lung">
    </targetSiteCode>
    <!-- entryRelationship elements referring to SOP Instance Observations
        or Quantity Measurement Observations may appear here -->
  </observation>
</entry>
```

10.2 Procedural Medication

Template ID	1.2.840.10008.9.13
Name	Procedural Medication
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	Procedural medication describes a substance administration that has actually occurred prior to or during a procedure (e.g., imaging contrast/agents, anti-histamines, anti-anxiety, beta blockers to control heart rate during procedure, etc.).
Classification	CDA Entry Level
Relationships	Included in 9.3 Imaging Procedure Description
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Procedural Medication[*] or **Contrast[*]**		substance Administration	1..1	SHALL				

Business Name	Nest Level	Element/Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
	@	@classCode	1..1	SHALL	CS	SHALL	SBADM	
	@	@moodCode	1..1	SHALL	CS	SHALL	EVN	
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.13	
	>	id	1..1	SHALL	II			
	>	text	0..1	SHOULD	ED			
Ref	>>	reference	0..1	SHOULD	URL (XML IDREF)		*#contentRef*	
	>	statusCode	1..1	SHALL	CS	SHALL	COMPLETED	
Route	>	routeCode	0..1	MAY	CE	SHOULD CWE	ValueSet CID 11 “Route of Administration”	
Dose	>	doseQuantity	0..1	SHOULD	PQ			
DoseUnit	>@	@unit	0..1	SHOULD		SHALL CNE	ValueSet CID 82 “Units of Measurement”	
Rate	>	rateQuantity	0..1	MAY	PQ			
RateUnit	>@	@unit	1..1	SHALL	CS	SHALL CNE	ValueSet CID 82 “Units of Measurement”	
	>	consumable	1..1	SHALL				
	>>	manufactured Product	1..1	SHALL				
	>>@	@classCode	1..1	SHALL	CS	SHALL	MANU	
	>>>	manufactured Material	1..1	SHALL				
CodedProduct Name	>>>>	code	1..1	SHALL	CE		ConceptDomain MedContrastName	
FreeText ProductName	>>>>>	original Text	0..1	SHOULD	ED			

10.2.1 Business Name Alias

This template defines a primary scoping business name "ProceduralMedication" and an alias "Contrast". This allows production logic to use either term, although the structure is identical.

10.2.2 text/reference and Related Narrative Block Markup

The substanceAdministration entry SHOULD include a text/reference element, whose value attribute SHALL begin with a '#' and SHALL point to its corresponding narrative in the parent section (using the approach defined in CDA Release 2, section 4.3.5.1). See Section 9.1.1.1.

10.2.3 doseQuantity

- Pre-coordinated consumable: If the consumable code is a pre-coordinated unit dose (e.g., "metoprolol 25mg tablet") then doseQuantity is a unitless number that indicates the number of products given per administration (e.g., "2", meaning 2 x "metoprolol 25mg tablet").

- Not pre-coordinated consumable: If the consumable code is not pre-coordinated (e.g., is simply "metoprolol"), then doseQuantity must represent a physical quantity with @unit, e.g., "25" and "mg", specifying the amount of product given per administration.

Example 10.2-1. Procedural Medication activity example

```
<substanceAdministration classCode="SBADM" moodCode="EVN">
   <templateId root="1.2.840.10008.9.13"/>
   <id root="cdbd33f0-6cde-11db-9fe1-0800200c9a66"/>
   <text>
      <reference value="#med1"/>
   </text>
   <statusCode code="completed"/>
   <routeCode code="47625008" codeSystem="2.16.840.1.113883.6.96"
      codeSystemName="SNOMED CT" displayName="intravenous route"/>
   <doseQuantity value="100" unit="ml"/>
   <consumable>
      <manufacturedProduct classCode="MANU">
         <templateId root="2.16.840.1.113883.10.20.22.4.23"/>
         <id/>
         <manufacturedMaterial>
            <code code="412372002"
                  codeSystem="2.16.840.1.113883.6.96"
                  codeSystemName="SNOMED CT"
                  displayName="Meglumine Diatrizoate">
               <originalText>
                  <reference value="#manmat1"/>
               </originalText>
               <translation code="3320"
                  codeSystem="2.16.840.1.113883.6.88" codeSystemName="RxNorm"
                  displayName="Diatrizoate Meglumine"/>
            </code>
         </manufacturedMaterial>
      </manufacturedProduct>
   </consumable>
</substanceAdministration>
```

10.3 observationMedia

Template ID	1.3.6.1.4.1.19376.1.4.1.4.7
Name	observationMedia Entry
Effective Date	2011-07
Version Label	IHECIRC-TI
Status	Active
Description	The observationMedia Entry provides an in-line graphic depiction of the section findings. It is referenced by a <renderMultiMedia> element in the section text. Typical uses are for graphic representation of findings (e.g., arterial tree diagrams) or in-line representations of key images.
Classification	CDA Entry Level
Relationships	
Context	parent node
Open/Closed	Open

Revision History	From IHE Cardiac Imaging Report Content Profile Supplement for Trial Implementation

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Graphic[*]		observation Media	1..1	SHALL				
	@	classCode	1..1	SHALL	CS	OBS		
	@	moodCode	1..1	SHALL	CS	EVN		
*	@	@ID	1..1	SHALL	XML ID		[See 5.3.4 XML ID]	
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.3.6.1.4.1.19376.1.4.1.4.7	
	>	id	1..1	SHALL	II			
Image	>	value	1..1	SHALL	ED			
	>@	@representation	1..1	SHALL	CS	SHALL	B64	
MediaType	>@	@mediaType	1..1	SHALL	CS	SHALL CNE STATIC	ValueSet ImageMediaType Value Set 2.16.840.1.113883.11.14839	
ImageURI	>>	reference	0..1	MAY	TEL			

10.3.1 observationMedia/@ID and Related Narrative Block Markup

The ObservationMedia entry SHALL include an XML ID attribute (not to be confused with the id element of the act class) used as a target of a<renderMultiMedia> element in the section/text narrative block of the parent section. See Section 9.1.1.3.

10.3.2 value and Reference

The value of type ED SHALL contain an in-line encoding of a graphic using base64. The <reference> element, if present, SHALL reference a URI for the same image as included in-line.

Example 10.3-1. Observation Media activity example

```
<observationMedia classCode="SBADM" moodCode="EVN" ID="obsMedia-1">
   <templateId root="1.3.6.1.4.1.19376.1.4.1.4.7"/>
   <id root="1.2.840.19432234.2342342.23232232"/>
   <value representation="B64" mediaType="image/jpeg">
      Bgd3fsET4g...
   </value>
</observationMedia>
```

10.4 Procedure Technique

Template ID	1.2.840.10008.9.14
Name	Procedure Technique
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active

Description	The Procedure Technique entry allows the encoding of various parameters of the image acquisition. Other details may be found in other entries (e.g., procedural medication).
Classification	CDA Entry Level
Relationships	Included in 9.3 Imaging Procedure Description and 9.4 Comparison Study
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial version

Business Name	Nest Level	Element/Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Procedure Technique		procedure	1..1	SHALL				
	@	@classCode	1..1	SHALL	CS	SHALL	PROC	
	@	@moodCode	1..1	SHALL	CS	SHALL	EVN	
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID		1.2.840.10008.9.14	
	>	id	1..1	SHALL	II			
Procedure Code	>	code	1..1	SHALL	CD		ConceptDomain ProcedureCode	
	>	text	0..1	SHOULD	ED			
Ref	>>	reference	1..1	SHALL	URL (XML IDREF)		*# contentRef*	
EffectiveTime	>	effectiveTime	0..1	SHOULD	IVL <TS>			
Modality	>	methodCode	1..*	SHALL	CD	SHALL CNE	ValueSet CID 29 “Acquisition Modality”	
MethodCode	>	methodCode	0..*	MAY	CD		ConceptDomain ImagingTechnique	
TargetSite	>	targetSiteCode	0..*	SHOULD	CD		ConceptDomain TargetSite	
	>>	qualifier	0..1	COND				
	>>>	name	1..1	SHALL	CD	SHALL	(272741003, SNOMED CT, "laterality")	
Laterality	>>>	value	1..1	SHALL	CD	SHALL CNE	ValueSet CID 244 “Laterality”	
	>	participation	0..1	COND				
	>@	@typecode	1..1	SHALL	CS	SHALL	LOC	
	>>	participantRole	1..1	SHALL				
	>>@	classCode	1..1	SHALL	CS	SHALL	SDLOC	
	>>>	scopingEntity	1..1	SHALL				
Provider Organization	>>>>	desc	1..1	SHALL	ST			

10.4.1 id

procedure/id does not correspond to any DICOM UID, but is an arbitrary identifier for this entry.

10.4.2 code

When invoked from the (current) 9.3 Imaging Procedure Description, procedure/code SHALL be identical to documentationOf/serviceEvent/code in the CDA header.

10.4.3 text/reference and Related Narrative Block Markup

The Procedure entry SHOULD include a text/reference element, whose value attribute SHALL begin with a '#' and SHALL point to its corresponding narrative in the parent section (using the approach defined in CDA Release 2, section 4.3.5.1). See Section 9.1.1.1.

10.4.4 methodCode - Modality

When invoked from the (current) 9.3 Imaging Procedure Description, procedure/methodCode used for modality SHALL be identical to documentationOf/serviceEvent/code/translation used for modality in the CDA header (see Section 8.2.4.1).

10.4.5 methodCode - Other Parameters

methodCode may be used to encode study type, contrast use, challenge, views, positioning (CID 91 “Functional Condition Present During Acquisition”, CID 92 “Joint Position During Acquisition”, CID 93 “Joint Positioning Method”, CID 94 “Physical Force Applied During Acquisition”), etc.

10.4.6 targetSiteCode and Laterality

procedure/targetSiteCode may be used to encode the specific anatomic focus, and is not necessarily identical to documentationOf/serviceEvent/code/translation used for anatomic region in the CDA header. This may be derived from *Body Part Examined (0018,0015)*, as mapped to SNOMED codes in Annex L “Correspondence of Anatomic Region Codes and Body Part Examined Defined Terms” in PS3.16, or from *Anatomic Region Sequence (0008,2218)*.

COND: The qualifier element for laterality SHALL be present if the targetSiteCode represents a paired body part and laterality is not pre-coordinated in the targetSiteCode.

10.4.7 participation - Location

COND: If this template is invoked from the Comparison Study section, procedure/participation MAY be used to identify the location (provider organization) at which the Comparison Study was performed.

Example 10.4-1. Procedure Technique template example

```
<procedure moodCode="EVN" classCode="PROC">
   <templateId root="1.2.840.10008.9.14"/>
   <id root="1.2.840.6544.33.9100653988998717.99752758234560017O"/>
   <code code="RPID465"
      displayName="MR NECK ANGIOGRAPHY"
      codeSystem="2.16.840.1.113883.6.256"
      codeSystemName="RadLex"/>
   <text><reference value="#proc"/></text>
   <effectiveTime value="20140913222400"/>
   <methodCode code="MR"
      displayName="Magnetic Resonance"
      codeSystem="1.2.840.10008.2.16.4" codeSystemName="DCM"/>
   <targetSiteCode code="45048000"
      codeSystem="2.16.840.1.113883.6.96" codeSystemName="SNOMED CT"
      displayName="Neck (structure)">
   </targetSiteCode>
</procedure>
```

10.5 Quantity Measurement

Template ID	2.16.840.1.113883.10.20.6.2.14
Name	Quantity Measurement
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	A Quantity Measurement records quantitative measurements such as linear, area, volume, and numeric measurements. If based on image data, a reference to the image may be present.
Classification	CDA Entry Level
Relationships	
Context	parent node
Open/Closed	open
Revision History	DICOM-20150324: Initial publication, derived from template originally published in DIR r1-2009, revised in Consolidated CDA r1-2011 as 2.16.840.1.113883.10.20.6.2.14. This derivation includes Units of Measure specified with DICOM value set for UCUM (CID 82 “Units of Measurement”), equivalent to C-CDA specified value set (UCUM Units of Measure (case sensitive) 2.16.840.1.113883.11.12839); addition of optional interpretationCode and actionable priority

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Quantity Measurement[*]		observation	1..1	SHALL				
	@	@classCode	1..1	SHALL	CS	SHALL	OBS	
	@	@moodCode	1..1	SHALL	CS	SHALL	EVN	
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	2.16.840.1.113883. 10.20.6.2.14	
	>	id	1..1	SHALL	II			
Measurement Name	>	code	1..1	SHALL	CD		ConceptDomain ObservationType	
	>	text	0..1	SHOULD				
Ref	>>	reference	1..1	SHALL	URL (XML IDREF)		*# contentRef*	
	>	statusCode	1..1	SHALL	CS	SHALL	COMPLETED	
Time	>	effectiveTime	0..1	SHOULD	TS			
	>	value	1..1	SHALL				
	>@	@xsi:type	1..1	SHALL	ST	SHALL	PQ	
Measurement Value	>@	@value	1..1	SHALL	REAL			
Measurement Units	>@	@unit	1..1	SHALL	CS	SHALL CNE	ValueSet CID 82 “Units of Measurement”	

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Interpretation Code	>	interpretation Code	0..1	MAY	CE	SHALL CNE	ValueSet ObservationInterpretation Value Set 2.16.840.1.113883.11.78	
ActionablePriority	>>	translation	1..1	MAY	CD	MAY CWE	ValueSet CID 7035 “Actionable Finding Classification” [See 10.1.3 interpretationCode and translation For Actionable Findings]	
TargetSite	>	targetSite Code	1..1	COND	CD		ConceptDomain ObservationSite	
	>>	qualifier	0..1	COND				
	>>>	name	1..1	SHALL	CD	SHALL	(272741003, SNOMED CT, "laterality")	
Laterality	>>>	value	1..1	SHALL	CD	SHALL CNE	ValueSet CID 244 “Laterality”	
	>>	qualifier	0..1	COND				
	>>>	name	1..1	SHALL	CD	SHALL	(106233006, SNOMED CT, "Topographical modifier")	
TopoModifier	>>>	value	1..1	SHALL	CD	SHALL CNE	ValueSet CID 2 “Anatomic Modifier”	
Method	>	methodCode	0..1	MAY	CD		ConceptDomain ObservationMethod	
	>	entry Relationship	0..*	MAY				
	>@	@typeCode	1..1	SHALL	CS	SHALL	SPRT	
SOPInstance[*]	>>	*observation*	1..1	SHALL				10.8 SOP Instance Observation 1.2.840.10008.9.18
	>	*entry Relationship*	0..*	MAY				
	>@	*@typeCode*	1..1	SHALL	CS	SHALL	SPRT	
Quantity Measurement[*]	>	*observation*	1..1	SHALL				10.5 Quantity Measurement 2.16.840.1.113883.10.20.6.2.14

10.5.1 text/reference and Related Narrative Block Markup

The Observation entry SHOULD include a text/reference element, whose **value** attribute (not to be confused with the **value** element of the Observation class) SHALL begin with a '#' and SHALL point to its corresponding narrative in the parent section (using the approach defined in CDA Release 2, section 4.3.5.1). See Section 9.1.1.1.

10.5.2 interpretationCode and Translation For Actionable Findings

When a measurement is out of normal range, it may be flagged using the interpretationCode. Very abnormal values, often denoted as exceeding "panic limits", or as "actionable" or "critical findings", may have values such as (LL, ObservationInterpretation, "low alert"), (HH, ObservationInterpretation, "high alert"), or (AA, ObservationInterpretation, "abnormal alert").

The translation element of the interpretationCode may be used to provide a further classification as defined in a regionally- or professionally-specified value set. This template identifies an optional value set for the ACR Actionable Finding categories 1, 2, and 3, as defined by: Larson PA, et al. J Am Coll Radiol 2014; published online. DOI 10.1016/j.jacr.2013.12.016.

The narrative text associated with the actionable finding SHOULD be highlighted using styleCode Bold. See Section 9.1.1.1.

Actionable findings that require a specific follow-up action or procedure SHOULD be referenced from a recommendation in the 9.8.11 Recommendation Section.

Communication of actionable findings SHOULD be documented in the 9.8.10 Communication of Actionable Findings Section.

10.5.3 targetSiteCode

Each observation needs to fully specify its site/location.

COND: If the observation site is not pre-coordinated in the observation/code, it SHALL be specified in the observation/targetSiteCode.

COND: The qualifier element for laterality SHALL be present if the targetSiteCode represents a paired body part and laterality is not pre-coordinated in the targetSiteCode.

COND: The qualifier element for topographical modifier SHALL be present if the targetSiteCode does not fully specify the observation location in sufficient detail.

Note

Inclusion of a site name in a labeled subsection title (see Section 9.8.9) does not imply a finding site for observations within that subsection. The title is not semantically part of the post-coordination, and target sites must be explicitly identified.

See Example 10.5-2 “Quantity measurement observation example 2”, an example of a measurement using a topographical modifier qualifier.

Example 10.5-1. Quantity measurement observation example 1

```
<text> ...
   <content ID="Q21" styleCode="Bold">Calcium score (Agatston) : 817 [HIGH - ACR Cat3]</content>
   ...
</text>
<entry>
   <observation classCode="OBS" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.6.2.14"/>
      <id root="1.2.840.10213.2.62.7044234.11652014"/>
      <code code="112058" codeSystem="1.2.840.10008.2.16.4"
         codeSystemName="DCM" displayName="Calcium score" />
      <text><reference value="#Q21"/></text>
      <statusCode code="COMPLETED"/>
      <effectiveTime value="20140913223912"/>
      <value xsi:type="PQ" unit="[arb'U]" value="817" />
      <interpretationCode code="HH" codeSystem="2.16.840.1.113883.5.83"
            codeSystemName="ObservationInterpretation" displayName="High alert">
         <translation code="RID49482" codeSystem="2.16.840.1.113883.6.256"
            codeSystemName="RADLEX" displayName="ACR Category 3 Actionable Finding" />
      </interpretationCode>
      <methodCode code="112055" codeSystem="1.2.840.10008.2.16.4"
```

```
        codeSystemName="DCM" displayName="Agatston" />
      <!-- entryRelationships to SOP Instance Observations may go here -->
    </observation>
</entry>
```

Example 10.5-2. Quantity measurement observation example 2

```
<section>
   <title>Left femoral artery</title>
   <text>
      ...
      <content ID="M10">Distal lumen stenosis: 75%</content>
      ...
   </text>
   <entry>
      <observation classCode="OBS" moodCode="EVN">
         <templateId root="2.16.840.1.113883.10.20.6.2.14"/>
         <id root="1.2.840.10213.2.62.7044234.988810005"/>
         <code code="408714007" codeSystem="2.16.840.1.113883.6.96"
            codeSystemName=" SNOMED CT"
            displayName="Vessel lumen diameter reduction" />
         <text><reference value="#M10"/></text>
         <statusCode code="COMPLETED"/>
         <effectiveTime value="20140913223912"/>
         <value xsi:type="PQ" unit="%" value="75" />
         <targetSiteCode code="113270003"
               codeSystem="2.16.840.1.113883.6.96" codeSystemName="SNOMED CT"
               displayName="Left femoral artery">
            <qualifier>
               <name code="106233006" codeSystem="2.16.840.1.113883.6.96"
                  codeSystemName="SNOMED CT" displayName="Topographical modifier" />
               <value code="46053002" codeSystem="2.16.840.1.113883.6.96"
                  codeSystemName="SNOMED CT" displayName="Distal" />
            </qualifier>
         </targetSiteCode>
      </observation>
   </entry>
</section>
```

10.6 Study Act

Template ID	1.2.840.10008.9.16
Name	Study Act
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active

Description	A Study Act contains the DICOM study information that defines the characteristics of an imaging study performed on a patient. An imaging study is a collection of one or more series of medical images, presentation states, SR documents, overlays, and/or curves that are logically related for the purpose of diagnosing a patient. Each study is associated with exactly one patient. A study may include composite instances that are created by a single modality, multiple modalities, or by multiple devices of the same modality. The study information is modality-independent.
Classification	CDA Entry Level
Relationships	Included in 9.8.7 DICOM Object Catalog and 9.4 Comparison Study
Context	parent node
Open/Closed	Open
Revision History	DICOM-20150324: Initial publication, derived from template originally published in DIR r1-2009, revised in Consolidated CDA r1-2011 as 2.16.840.1.113883.10.20.6.2.6. This derivation makes Series conditional (required for Object Catalog) to support use in Comparison Study reference, and uses DICOM-20150324 Series Act subsidiary template.

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Study[*]		act	1..1	SHALL				
	@	@classCode	1..1	SHALL	CS	SHALL	ACT	
	@	@moodCode	1..1	SHALL	CS	SHALL	EVN	
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.16	
	>	id	1..1	SHALL	II			
StudyUID	>@	@root	1..1	SHALL	UID		*Study Instance UID (0020,000D)*	
	>@	@extension	0..0	SHALL NOT				
	>	code	1..1	SHALL	CD	SHALL	(113014, DCM, "Study")	
Description	>	text	0..1	MAY	ED			
Time	>	effectiveTime	0..1	SHOULD	TS		*Study Date (0008,0020)* + *Study Time (0008,0030)* + *Timezone Offset From UTC (0008,0201)*	
	>	entryRelationship	1..*	COND				
	>@	@typeCode	1..1	SHALL	CS	SHALL	COMP	
Series[*]	>>	*act*						10.7 Series Act 1.2.840.10008.9.17

10.6.1 entryRelationship/act - Series

COND: If this template is invoked by the 9.8.7 DICOM Object Catalog, the entryRelationship to the Series act SHALL be present, otherwise it MAY be present.

Example 10.6-1. Study act example

```
<act classCode="ACT" moodCode="EVN">
   <templateId root="2.16.840.1.113883.10.20.6.2.6"/>
   <id root="1.2.840.113619.2.62.994044785528.114289542805"/>
   <code code="113014" codeSystem="1.2.840.10008.2.16.4"
      codeSystemName="DCM" displayName="Study"/>
   <effectiveTime value="20060823223232"/>
   <!-- **** Series ****-->
   <entryRelationship typeCode="COMP">
      <act classCode="ACT" moodCode="EVN">
         ...
      </act>
   </entryRelationship>
</act>
```

10.7 Series Act

Template ID	1.2.840.10008.9.17
Name	Series Act
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	A Series Act contains the DICOM series information for referenced DICOM composite objects. The series information defines the attributes that are used to group composite instances into distinct logical sets. Each series is associated with exactly one study. Series Act clinical statements are only instantiated in the 9.8.7 DICOM Object Catalog section inside a 10.6 Study Act.
Classification	CDA Entry Level
Relationships	Included in 10.6 Study Act
Context	parent node
Open/Closed	open
Revision History	DICOM-20150324: Initial publication, derived from template originally published in DIR r1-2009, revised in Consolidated CDA r1-2011 as 2.16.840.1.113883.10.20.22.4.63. This derivation uses DICOM-20150324 SOP Instance subsidiary template.

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Series[*]		act	1..1	SHALL				
	@	@classCode	1..1	SHALL	CS	SHALL	ACT	
	@	@moodCode	1..1	SHALL	CS	SHALL	EVN	
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.17	
	>	id	1..1	SHALL				
SeriesUID	>@	@root	1..1	SHALL	UID		*Series Instance UID (0020,000E)*	
	>@	@extension	0..0	SHALL NOT				

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
	>	code	1..1	SHALL	CD	SHALL	(113015, DCM, "Series")	
	>>	qualifier	1..1	SHALL				
	>>>	name	1..1	SHALL	CD	SHALL	(121139, DCM, "Modality")	
Modality	>>>	value	1..1	SHALL	CD		*Modality (0008,0060)*	
Description	>	text	0..1	MAY	ED			
Time	>	effectiveTime	0..1	SHOULD	TS		*Series Date (0008,0021)* + *Series Time (0008,0031)* + *Timezone Offset From UTC (0008,0201)*	
	>	entry Relationship	1..*	SHALL				
	>@	@typeCode	1..1	SHALL	CS	SHALL	COMP	
SOPInstance[*]	>>	*observation*	1..1					10.8 SOP Instance Observation 1.2.840.10008.9.18

Example 10.7-1. Series act example

```
<act classCode="ACT" moodCode="EVN">
   <templateId root="1.2.840.10008.9.17"/>
   <id root="1.2.840.113619.2.62.994044785528.20060823223142485051"/>
   <code code="113015" codeSystem="1.2.840.10008.2.16.4"
         codeSystemName="DCM" displayName="Series">
      <qualifier>
         <name code="121139" codeSystem="1.2.840.10008.2.16.4"
            codeSystemName="DCM"
            displayName="Modality"/>
         <value code="CR" codeSystem="1.2.840.10008.2.16.4"
            codeSystemName="DCM"
            displayName="Computed Radiography"/>
      </qualifier>
   </code>
   <!-- **** SOP Instance UID *** -->
   <entryRelationship typeCode="COMP">
      <observation classCode="DGIMG" moodCode="EVN">
         <templateId root="2.16.840.1.113883.10.20.6.2.8"/>
         ...
      </observation>
   </entryRelationship>
</act>
```

10.8 SOP Instance Observation

Template ID	1.2.840.10008.9.18

Name	SOP Instance Observation
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active
Description	A SOP Instance Observation contains the DICOM Service Object Pair (SOP) Instance information for referenced DICOM composite objects. The SOP Instance act class is used to reference both image and non-image DICOM instances. The text attribute contains the DICOM WADO reference.
Classification	CDA Entry Level
Relationships	
Context	parent node
Open/Closed	open
Revision History	DICOM-20150324: Initial publication, derived from template originally published in DIR r1-2009, revised in Consolidated CDA r1-2011 as 2.16.840.1.113883.10.20.6.2.8 This derivation includes Purpose of Reference value set specified with DICOM CID 7003; directly incorporates descendant templates Purpose of Reference Observation, Referenced Frames, and Boundary Observation

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
SOPInstance[*]		observation	1..1	SHALL				
	@	@classCode	1..1	SHALL	CS	SHALL	DGIMG	
	@	@moodCode	1..1	SHALL	CS	SHALL	EVN	
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.18	
SOPInstanceUID	>	id	1..*	SHALL	II		*SOP Instance UID (0008,0018)*	
	>	code	1..1	SHALL	CD			
SOPClassUID	>@	@code	1..1	SHALL	ST		*SOP Class UID (0008,0016)*	
	>@	@codeSystem	1..1	SHALL	UID	SHALL	1.2.840.10008.2.6.1	
	>	text	0..1	SHOULD	ED			
	>@	@mediaType	1..1	SHALL	ST	SHALL	application/dicom	
WADOReference	>>	reference	1..1	SHALL	URL			
	>	effectiveTime	0..1	SHOULD	TS		*Instance Creation Date (0008,0012) + Instance Creation Time (0008,0013) + Timezone Offset From UTC (0008,0201)*	
	>	entry Relationship	0..*	COND				
	>@	@typeCode	1..1	SHALL	CS	SHALL	SUBJ	
SOPInstance[*]	>>	*observation*	1..1	SHALL				10.8 SOP Instance Observation 1.2.840.10008.9.18
	>	entry Relationship	0..1	COND				

Business Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
	>@	@typeCode	1..1	SHALL	CS	SHALL	RSON	
	>>	observation	1..1	SHALL				
	>>@	@classCode	1..1	SHALL	CS	SHALL	OBS	
	>>@	@moodCode	1..1	SHALL	CS	SHALL	EVN	
	>>>	code	1..1	SHALL	CD	SHALL	(ASSERTION, ActCode [2.16.840.1.113883.5.4], "Assertion")	
PurposeOf Reference	>>>	value	1..1	SHALL	CD	SHALL CWE DYNAMIC	ValueSet CID 7003 “Diagnostic Imaging Report Purposes of Reference”	
	>	entry Relationship	0..1	COND				
	>@	@typeCode	1..1	SHALL	CS	SHALL	COMP	
	>>	observation	1..1	SHALL				
	>>@	@classCode	1..1	SHALL	CS	SHALL	ROIBND	
	>>@	@moodCode	1..1	SHALL	CS	SHALL	EVN	
	>>	code	1..1	SHALL	CD	SHALL	(121190, DCM, "Referenced Frames")	
	>>	entry Relationship	1..1	SHALL				
	>>@	@typeCode	1..1	SHALL	CS	SHALL	COMP	
	>>>	observation	1..1	SHALL				
	>>>@	@classCode	1..1	SHALL	CS	SHALL	OBS	
	>>>@	@moodCode	1..1	SHALL	CS	SHALL	EVN	
	>>>	code	1..1	SHALL	CD	SHALL	(113036, DCM, "Frames for Display")	
Referenced Frames	>>>	value	1..1	SHALL	LIST <INT>			

10.8.1 entryRelationship

COND: entryRelationship SHALL NOT be present in a 10.8 SOP Instance Observation included within a 9.8.7 DICOM Object Catalog section, and MAY be present otherwise.

10.8.1.1 entryRelationship/@typeCode=SUBJ (SOP Instance)

This template recursively invokes itself to allow a Presentation State SOP Instance reference to identify the target Image SOP Instances, or for a derived Image to reference its source Image, or similar linkages between instances.

Note

This is generally not required, as the DICOM SOP Instance itself identifies relationships to the relevant other SOP Instances.

10.8.1.2 entryRelationship/@typeCode=RSON (Purpose of Reference)

A Purpose of Reference Observation describes the purpose of the DICOM composite object reference. Appropriate codes, such as externally defined DICOM codes, may be used to specify the semantics of the purpose of reference. When this observation is absent, it implies that the reason for the reference is unknown.

Note

In Consolidated CDA r1.1, this was defined using a separate "Purpose of Reference Observation" template, which is included directly in this template specification.

10.8.1.3 entryRelationship/@typeCode=COMP (Referenced Frames)

A Referenced Frames Observation contains a list of integer values for the referenced frames of a DICOM multi-frame image SOP instance. It identifies the frame numbers within the referenced SOP instance to which the reference applies. The observation identifies frames using the same convention as DICOM, with the first frame in the referenced object being Frame 1. A Referenced Frames Observation must be used if a referenced DICOM SOP instance is a multi-frame image and the reference does not apply to all frames.

Note

In Consolidated CDA r1.1, this was defined using separate "Referenced Frames Observation" and "Boundary Observation" templates, which are included directly in this template specification.

Example 10.8-1. SOP instance observation example with purpose of reference

```
<observation classCode="DGIMG" moodCode="EVN">
   <templateId root="1.2.840.10008.9.18"/>
   <id root="1.2.840.113619.2.62.994044785528.20060823.200608232232322.3"/>
   <code code="1.2.840.10008.5.1.4.1.1.1"
      codeSystem="1.2.840.10008.2.6.1" codeSystemName="DCMUID"
      displayName="Computed Radiography Image">
   </code>
   <text mediaType="application/dicom">
      <reference value="http://www.example.org/wado?requestType=WADO
         &amp;studyUID=1.2.840.113619.2.62.994044785528.114289542805
         &amp;seriesUID=1.2.840.113619.2.62.994044785528.20060823223142485051
         &amp;objectUID=1.2.840.113619.2.62.994044785528.20060823.200608232232322.3
         &amp;contentType=application/dicom"/>
      <!--reference to image 1 (PA) -->
   </text>
   <effectiveTime value="20060823223232"/>
   <entryRelationship typeCode="RSON">
      <observation classCode="OBS" moodCode="EVN">
         <templateId root="2.16.840.1.113883.10.20.6.2.9"/>
         <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>
         <value xsi:type="CD" code="121112"
            codeSystem="1.2.840.10008.2.16.4"
            codeSystemName="DCM"
            displayName="Source of Measurement"/>
      </observation>
   </entryRelationship>
</observation>
```

10.9 Image Quality

Template ID	1.2.840.10008.9.15
Name	Image Quality
Effective Date	2015/03/24
Version Label	DICOM-20150324
Status	Active

Description	Provides a quality assessment for the image set identified by the invoking section. By default unless otherwise identified, applies to the image set interpreted by the document (typically a Study). If the quality rating applies to only a subset of the Study (e.g., a Series, or a specific Image), that subset shall be identified in the invoking section.
Classification	CDA Entry Level
Relationships	Included in 9.3 Imaging Procedure Description
Context	parent node
Open/Closed	open
Revision History	DICOM-20150324: Initial version Derived from Coded Observation

Name	Nest Level	Element/ Attribute	Card	Elem/Attr Conf	Data Type	Value Conf	Value	Subsidiary Template
Image Quality		observation	1..1	SHALL				
	@	@classCode	1..1	SHALL	CS	SHALL	OBS	
	@	@moodCode	1..1	SHALL	CS	SHALL	EVN	
	>	templateId	1..1	SHALL	II			
	>@	@root	1..1	SHALL	UID	SHALL	1.2.840.10008.9.15	
	>	id	1..1	SHALL	II			
	>	code	1..1	SHALL	CD		(111050, DCM, "Image Quality Assessment")	
	>	text	0..1	SHOULD				
Ref	>>	reference	1..1	SHALL	URL (XML IDREF)		*# contentRef*	
	>	statusCode	1..1	SHALL	CS	SHALL	COMPLETED	
Rating	>	value	1..1	SHALL	CD	SHOULD CWE	ValueSet CID 7036 “Image Quality Assessment”	
	>@	@xsi:type	1..1	SHALL	ST	SHALL	CD	

10.9.1 text/reference and Related Narrative Block Markup

The Observation entry SHOULD include a text/reference element, whose value attribute (not to be confused with the value element of the Observation class) SHALL begin with a '#' and SHALL point to its corresponding narrative in the parent section (using the approach defined in CDA Release 2, section 4.3.5.1). See Section 9.1.1.1.

Example 10.9-1. Image Quality example

```
<observation classCode="OBS" moodCode="EVN">
   <templateId root="1.2.840.10008.9.15"/>
   <id root="1.2.840.113619.2.62.994044785528.20060823.200608232232322.3"/>
   <code code="111050" codeSystem="1.2.840.10008.2.6.1"
      codeSystemName="DCM"
      displayName="Image Quality Assessment"/>
   <text>
      <reference value="#Q9"/>
   </text>
   <statusCode code="completed"/>
   <value xsi:type="CD" code="RID12"
```

```
      codeSystem="2.16.840.1.113883.6.256"
      codeSystemName="RADLEX"
      displayName="Diagnostic quality"/>
</observation>
```

A SR Diagnostic Imaging Report Transformation Guide

Retired. See PS3.20-2015.

Note

This Annex provided a transformation of SR documents based on TID 2000 Basic Diagnostic Imaging Report to HL7 CDA Release 2 Imaging Reports based on the HL7 Diagnostic Imaging Reports (DIR) Release 1.0 Informative specification Template 2.16.840.1.113883.10.20.6.

B SR Diagnostic Imaging Report Transformation Guide

Retired. See PS3.20-2015.

Note

This Annex provided a transformation of SR documents based on TID 2006 Imaging Report With Conditional Radiation Exposure and Protection Information to HL7 CDA Release 2 Imaging Reports based on the HL7 Diagnostic Imaging Reports (DIR) Release 1.0 Informative specification Template 2.16.840.1.113883.10.20.6.

C SR to CDA Imaging Report Transformation Guide

Constrained DICOM SR documents based on Imaging Report templates can be mapped to HL7 CDA Release 2 Imaging Reports based on Template 1.2.840.10008.9.1, as specified in Section 7.1. The SR report templates to which this transformation applies include:

- TID 2000 Basic Diagnostic Imaging Report
- TID 2005 Transcribed Diagnostic Imaging Report
- TID 2006 Imaging Report With Conditional Radiation Exposure and Protection Information

SR instances based on other templates may also be able to be mapped using the transformations in this Annex.

SR documents can be thought of as consisting of a document header and a document body, corresponding to a CDA document header and body. The header includes the modules related to the Patient, Study, Series, and Equipment Information Entities, plus the SR Document General Module, as specified in PS3.3. The SR Document Content Module contains the content tree (structured content) of the document body. Note, however, that DICOM SR considers the root content item, including the coded report title, and some context-setting content items as part of the document body content tree, but these constitute part of the CDA header. See Figure C-1.

C.1 Constraints

This Annex defines the transformation of an Enhanced SR SOP Instance to a CDA instance. The following constraints apply to such SOP Instances:

- Observation Context: The mapping does not support changing the observation context for the report as a whole from its default context, as specified in the Patient, Study, and Document Information Entities (see PS3.3 Section C.17.5 “Observation Context Encoding”)

  Note

  TID 2000, TID 2005 and TID 2006 specify inclusion of TID 1001 Observation Context as Mandatory, but TID 1001 has no content if all aspects of context are inherited, as under this constraint.

- Subject Context: The mapping does not support the subject of any of the report sections to be a specimen TID 1009), a device (TID 1010), or a non-human subject. Only a fetus subject context is supported for a Findings section.
- Procedure Context: The mapping allows identification of a different procedure than the procedure identified in the SR Study IE only as context for a Prior Procedure Descriptions section.
- De-identified Documents: There is no CDA implementation guidance from HL7 for de-identified documents, other than general rules for using the MSK null flavor (see Section 5.3.2). There is no CDA capability equivalent to the Encrypted Attributes Sequence (see PS3.3 Section C.12.1.1.4.1 “Encrypted Attributes Sequence”) for carrying encrypted re-identification data.
- Patient Study Module: Medical or clinical characteristics of the patient specified in the Patient Study Module are not mapped (see PS3.3 Section C.17.5 “Observation Context Encoding”)
- Clinical Trials: Template 1.2.840.10008.9.1 does not define attributes for clinical trials equivalent to those of the Patient, Study, and Series IEs (Clinical Trial Subject Module, Clinical Trial Study Module, Clinical Trial Series Module).
- Spatial Coordinates: The mapping does not support SCOORD observations. As CDA documents are principally for human reading, detailed ROI data is presumed to reside in the DICOM SOP Instances of the study, or in images ready for rendering with a Presentation State, not in the CDA report. Template 1.2.840.10008.9.1 does not support the CDA Region of Interest Overlay entry class (see Section 9.1.2.4).

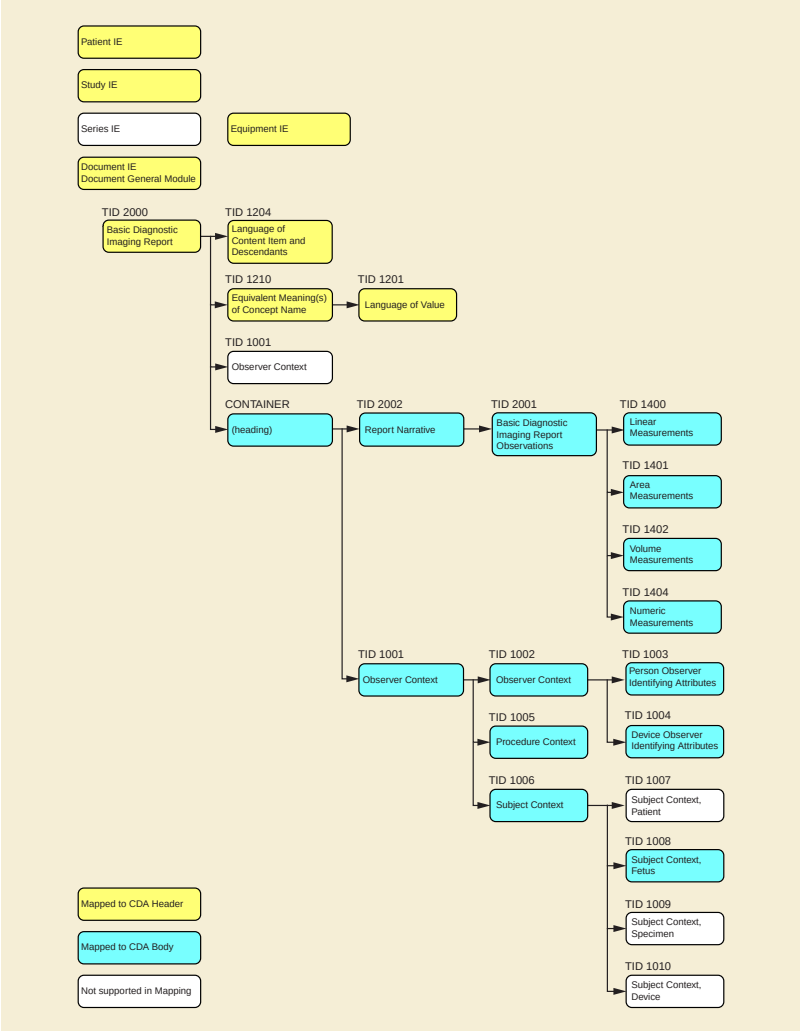

Figure C-1. TID 2000 Structure Summarized from PS3.16, and mapping to CDA

C.2 Conventions

Literal values to be encoded in CDA elements are represented in the mapping tables in normal font, as a string, or as a coded value triplet:

"NI"

(codeValue, codingScheme, codeMeaning)

Conventions for mapping from DICOM attributes in the transformed SR are described in Section 5.2.8.

Data mapped from an SR Content Item is identified by the Concept Name of the Content Item, represented in the mapping tables as a triplet in italic font:

(codeValue, codingScheme, codeMeaning)

Data mapped from a specific Attribute in an SR Content Item uses the triplet to identify the Content Item, with the > character and the specific attribute name and tag:

(codeValue, codingScheme, codeMeaning) > Attribute Name (gggg,eeee)

Additional notes are within square brackets:

[Note]

Mandatory CDA elements for which there is no corresponding source data in the SR SOP Instance may be coded with a nullFlavor attribute (see Section 5.3.2).

C.3 Header Transformation

For transformation of the SR content into the CDA header, the target elements of the CDA instance are listed in Table C.3-1 by their Business Names, together with the recommended source in an SR instance. This allows the transforming application to "pull" the relevant information from the SR to populate the CDA header.

Table C.3-1. CDA Header content from SR

CDA Business Name	DICOM SR
ImagingReport: DocType	*Concept Name Code Sequence (0040,A043)* [of the root content item]
ImagingReport: ContentTemplate	
ImagingReport: DocumentID	
ImagingReport: Title	*(121050, DCM, "Equivalent Meaning of Concept Name") > Concept Code Sequence (0040,A168) > Code Meaning (0008,0104)* if present; otherwise *Concept Name Code Sequence (0040,A043) > Code Meaning (0008,0104)* [of the root content item].
ImagingReport: CreationTime	*Content Date (0008,0023) + Content Time (0008,0033) + Timezone Offset From UTC (0008,0201)*
ImagingReport: Confidentiality	
ImagingReport: LanguageCode	*(121049, DCM, "Language of Content Item and Descendants")*
ImagingReport: SetId	
ImagingReport: VersionNumber	
ImagingReport: Patient:ID	*Patient ID (0010,0020)*
ImagingReport: Patient:IDIssuer	*Issuer of Patient ID Qualifiers Sequence (0010,0024) > Universal Entity ID (0040,0032)*
ImagingReport: Patient:Addr	*Patient's Address (0010,1040)*
ImagingReport: Patient:Tele	*Patient's Telephone Numbers (0010,2154)*
ImagingReport: Patient:Name	*Patient's Name (0010,0010)*
ImagingReport: Patient:Gender	*Patient's Sex (0010,0040)* [Map value "O" to nullFlavor UNK]
ImagingReport: Patient:BirthTime	*Patient's Birth Date (0010,0030) + Patient's Birth Time (0010,0032)*
ImagingReport: Patient:ProviderOrgName	*Issuer of Patient ID (0010,0021)*
ImagingReport: Patient:ProviderOrgTel	
ImagingReport: Patient:ProviderOrgAddr	
ImagingReport: SigningTime	*Verifying Observer Sequence (0040,A073) > Verification DateTime (0040,A030)*.
ImagingReport: SignerID	*Verifying Observer Sequence (0040,A073) > Verifying Observer Identification Code Sequence (0040,A088)* [code value as identifier]
ImagingReport: SignerAddr	
ImagingReport: SignerTel	
ImagingReport: SignerName	*Verifying Observer Sequence (0040,A073) > Verifying Observer Name (0040,A075)*

CDA Business Name	DICOM SR
ImagingReport: SignatureBlock	
ImagingReport: Author:AuthoringTime	*Content Date (0008,0023) + Content Time (0008,0033) + Timezone Offset From UTC (0008,0201)*
ImagingReport: Author:ID	*Author Observer Sequence (0040,A078) > Person Identification Code Sequence (0040,1101)* [code value as identifier]
ImagingReport: Author:Addr	
ImagingReport: Author:Tel	
ImagingReport: Author:Name	*Author Observer Sequence (0040,A078) > Person Name (0040,A123)*
ImagingReport: Recipient:Addr	
ImagingReport: Recipient:Tel	
ImagingReport: Recipient:Name	
ImagingReport: Recipient:Org	
ImagingReport: CustodianOrgID	*Custodial Organization Sequence (0040,A07C) > Institution Code Sequence (0008,0082)* [code value as identifier]
ImagingReport: CustodianOrgName	*Custodial Organization Sequence (0040,A07C) > Institution Name (0008,0080)*
ImagingReport: CustodianOrgAddr	
ImagingReport: CustodianOrgTel	
ImagingReport: EncounterID	*Admission Id (0038,0010)*
ImagingReport: EncounterIDIssuer	*Issuer of Admission ID Sequence (0038;0014) > Universal Entity ID (0040,0032)*
ImagingReport: EncounterTime	
ImagingReport: HealthcareFacilityName	
ImagingReport: HealthcareFacilityAddress	*Institution Address (0008,0081)*
ImagingReport:HealthcareProviderOrganizationName	*Institution Name (0008,0080)*
ImagingReport:AttendingPhysicianName	*Physician(s) of Record (0008,1048)*
ImagingReport:OrderPlacerNumber	*Referenced Request Sequence (0040,A370) > Placer Order Number/Imaging Service Request (0040,2016)*
ImagingReport:OrderAssigningAuthority	*Referenced Request Sequence (0040,A370) > Order Placer Identifier Sequence (0040,0026) > Universal Entity ID (0040,0032)*
ImagingReport:AccessionNumber	*Accession Number (0008,0050)*
ImagingReport:AccessionAssigningAuthority	*Issuer of Accession Number Sequence (0008,0051) > Universal Entity ID (0040,0032)*
ImagingReport:OrderedProcedureCode	*Referenced Request Sequence (0040,A370) > Requested Procedure Code Sequence (0032,1064)*
ImagingReport: OrderPriority	
ImagingReport:Study:StudyUID	*Study Instance UID (0020,000D)*
ImagingReport:Study:ProcedureCode	*Procedure Code Sequence (0008,1032)*
ImagingReport:Study:Modality	*(122142, DCM, "Acquisition Device Type")* or *(55111-9, LN, "Current Procedure Descriptions") > (122142, DCM, "Acquisition Device Type")*
ImagingReport:Study:AnatomicRegionCode	*(123014, DCM, "Target Region")* or *(55111-9, LN, "Current Procedure Descriptions") > (123014, DCM, "Target Region")*
ImagingReport:Study:StudyTime	*Study Date (0008,0020) + Study Time (0008,0030) + Timezone Offset From UTC (0008,0201)*
ImagingReport: Performer:Type	

CDA Business Name	DICOM SR
ImagingReport: Performer:ID	
ImagingReport: Performer:Name	
ImagingReport: ReferrerAddr	*Referring Physician Identification Sequence (0008,0096) > Person's Address (0040,1102)*
ImagingReport: ReferrerTel	*Referring Physician Identification Sequence (0008,0096) > Person's Telephone Numbers (0040,1103)*
ImagingReport: ReferrerName	*Referring Physician's Name (0008,0090)*
ImagingReport: TranscriptionistID	*Participant Sequence (0040,A07A) > Person Identification Code Sequence (0040,1101)* , [where Participation Type (0040,A080) equals "ENT" (Data Enterer); code value as identifier]
ImagingReport: TranscriptionistName	*Participant Sequence (0040,A07A) Person Name (0040,A123)* [where Participation Type (0040,A080) equals "ENT" (Data Enterer)]
ImagingReport: TransformedDocumentID	*SOP Instance UID (0008,0018)*

ImagingReport:Study:Modality and ImagingReport:Study:AnatomicRegionCode may be mapped from attributes in the root CONTAINER, if present there as in TID 2000, or in the Current Procedure Descriptions section CONTAINER, if present there as in TID 2006.

C.4 Body Transformation

For transformation of the body, this Section maps the SR content items to their target CDA elements. This allows the transforming application to traverse the SR content tree and construct equivalent CDA content.

C.4.1 Section Mapping

SR TID 2000, TID 2005 and TID 2006 specify that imaging report elements are contained in sections, represented as CONTAINERs with concept name codes from CID 7001.

Each CONTAINER immediately subsidiary to the root CONTAINER shall be mapped to the section or subsection as specified in Table C.4-1. Note that some SR document sections are mapped to subsections under CDA Template 1.2.840.10008.9.1.

Table C.4-1. SR Section mapping to CDA

Coding Scheme Designator	Code Value	Code Meaning	Map to Template Section/Subsection
LN	11329-0	History	9.2 Clinical Information / 9.8.3 Medical (General) History
LN	55115-0	Request	9.2 Clinical Information / 9.8.1 Request
LN	55111-9	Current Procedure Descriptions	9.3 Imaging Procedure Description
LN	55114-3	Prior Procedure Descriptions	9.4 Comparison Study
LN	18834-2	Previous Findings	9.4 Comparison Study
LN	18782-3	Findings (Study Observation)	9.5 Findings or 9.5 Findings / 9.8.8 Fetus Findings (see C.4.1.3)
LN	59776-5	Findings	9.5 Findings or 9.5 Findings / 9.8.8 Fetus Findings (see C.4.1.3)
LN	19005-8	Impressions	9.6 Impression
LN	18783-1	Recommendations	9.6 Impression / 9.8.11 Recommendation
LN	55110-1	Conclusions	9.6 Impression
LN	55107-7	Addendum	9.7 Addendum
LN	18785-6	Indications for Procedure	9.2 Clinical Information / 9.8.2 Procedure Indications
LN	55108-5	Patient Presentation	9.2 Clinical Information

Coding Scheme Designator	Code Value	Code Meaning	Map to Template Section/Subsection
LN	55109-3	Complications	9.3 Imaging Procedure Description / 9.8.4 Complications
LN	55112-7	Summary	9.6 Impression
LN	55113-5	Key Images	9.6 Impression / 9.8.6 Key Images
LN	73569-6	Radiation Exposure and Protection Information	9.3 Imaging Procedure Description / 9.8.5 Radiation Exposure and Protection Information
LN	55752-0	Clinical Information	9.2 Clinical Information
LN	29549-3	Medications Administered	9.3 Imaging Procedure Description / 10.2 Procedural Medication
LN	73568-8	Communication of Critical Results	9.6 Impression / 9.8.10 Communication of Actionable Findings

CDA Template 1.2.840.10008.9.1 requires a minimum of an Imaging Procedure Description section and an Impression section.

The section/code element shall be populated in accordance with the relevant CDA template; note that the code might not be the same as the Concept Name code of the SR section CONTAINER. The title element of each CDA section shall be populated as shown in Table C.4-2.

Table C.4-2. CDA Section mapping from SR

CDA Business Name	DICOM SR
<section>: Title	*Concept Name Code Sequence (0040,A043)* > *Code Meaning (0008,0104)* [of the section CONTAINER content item]
<section>: Text	[See C.4.2]
<section>: CodedObservation[*]	[See C.4.3.1 and C.4.3.2]
<section>: QuantityMeasurement[*]	[See C.4.3.4]
<section>: SOPInstance[*]	[See C.4.3.3]

SR allows sections to be qualified by observation context, using TID 1001 and its subsidiary templates. This capability is constrained in this mapping.

C.4.1.1 Section Observer Context

TID 1002 Observer Context allows identification of a human or device author.

Table C.4-3. CDA Section author mapping from SR

CDA Business Name	DICOM SR
<section>: AuthorID	If *(121005, DCM, "Observer Type")* = (121007, DCM, "Device"), then *(121012, DCM, "Device Observer UID")* ID for human observer not represented in SR; use nullFlavor="UNK"
<section>: AuthorName	*(121008, DCM, "Person Observer Name")*
<section>: AuthorOrganization	*(121009, DCM, "Person Observer's Organization Name")*
<section>: AuthorDeviceModel	*(121015, DCM, "Device Observer Model Name")*
<section>: AuthorSoftware	*(121013, DCM, "Device Observer Name")*

C.4.1.2 Comparison Study Procedure Context

TID 1005 Procedure Context allows identification of a different procedure than the procedure identified in the SR Study IE as the context for the section observations. In the transformations of this Annex, only an identified comparison procedure is supported as Procedure Context, the SR section being transformed must be either Prior Procedure Descriptions or Previous Findings, and the CDA section shall be in accordance with the Comparison Study section Template 1.2.840.10008.9.4.

SR Instances using TID 2006 have additional attributes of a comparison procedure specified using TID 2007, which is used in the Prior Procedure Descriptions section. The attributes of both TID 1005 and TID 2007 are source data in the Table C.4-4 mapping.

Table C.4-4. Comparison Study mapping from SR

CDA Business Name	DICOM SR
ComparisonStudy: ProcedureTechnique: ProcedureCode	*(121023, DCM, "Procedure Code")*
ComparisonStudy: ProcedureTechnique: EffectiveTime	*(111060, DCM, "Study Date") + (111061, DCM, "Study Time")*
ComparisonStudy: ProcedureTechnique: Modality	*(122142, DCM, "Acquisition Device Type")*
ComparisonStudy: ProcedureTechnique: MethodCode	
ComparisonStudy: ProcedureTechnique: TargetSite	*(123014, DCM, "Target Region")*
ComparisonStudy: ProcedureTechnique: Laterality:	
ComparisonStudy: ProcedureTechnique: Ref:	
ComparisonStudy: ProcedureTechnique: ProviderOrganization	
ComparisonStudy: Study[*]: StudyUID	*(121018, DCM, "Procedure Study Instance UID")*
ComparisonStudy: Study[*]: Description	*(121065, DCM, "Procedure Description")* , if present, or *(121023, DCM, "Procedure Code") > Code Meaning (0008,0104)*
ComparisonStudy: Study[*]: Time	*(111060, DCM, "Study Date") + (111061, DCM, "Study Time")*

C.4.1.3 Fetus Subject Context

TID 1006 Subject Context allows identification of a different subject than the patient identified in the SR Patient IE. In the transformations of this Annex, only an identified fetus subject is supported as Subject Context for a Findings section. An SR section with a fetus subject context shall be mapped to a CDA section shall be in accordance with the Fetus Findings subsection Template 1.2.840.10008.9.9. This section is subsidiary to the top level Findings section; multiple SR fetus findings sections may be mapped to separate CDA Fetus Findings subsections.

Table C.4-5. CDA Fetus subject mapping from SR

CDA Business Name	DICOM SR
Findings: FetusFindings[*]: FetusID	*(121030, DCM, "Subject ID")* or *(11951-1, LN, "Fetus ID")*

C.4.2 Section/text

DICOM TID 2002 Report Narrative specifies that sections contain imaging report elements of type CODE, TEXT, IMAGE, or NUM.

Section/text in the CDA document contains the narrative text (attested content) of the document. Section/text shall be generated from all the Content Items subsidiary to a section CONTAINER of the SR document, such that the full meaning is be conveyed in an unambiguous manner in the narrative block.

The narrative rendered from each Content Item shall be encapsulated in a **<content>** element of the narrative block, allowing the associated entry to reference it.

C.4.3 Content Item Mapping

Each Content Item immediately subsidiary to a section CONTAINER shall be mapped to the corresponding entry level template, and shall be included subsidiary to the associated CDA section or subsection. This is in addition to its rendering in the section/text narrative block.

Coded concepts that are encoded in the SR using with the Coding Scheme Designator "SRT" shall be mapped to the equivalent SNOMED CT code. Mappings for value sets invoked in both SR and CDA are provided in PS3.16.

C.4.3.1 Coded Observations

SR CODE Content Items shall be mapped to Coded Observation entries.

Table C.4-6. CDA Coded Observation mapping from SR CODE

CDA Business Name	DICOM SR
CodedObservation[*]: ObsName	*Concept Name Code Sequence (0040,A043)*
CodedObservation[*]: ObsValue	*Concept Code Sequence (0040,A168)*
CodedObservation[*]: Time	*Observation DateTime (0040,A032)*
CodedObservation[*]: InterpretationCode	
CodedObservation[*]: ActionableFindingCode	
CodedObservation[*]: TargetSite	*(G-C0E3, SRT, "Finding Site")*
CodedObservation[*]:Laterality	*(G-C0E3, SRT, "Finding Site") > (G-C171, SRT, "Laterality")*
CodedObservation[*]:TopoModifier	
CodedObservation[*]:Method	
CodedObservation[*]: SOPInstance	[See C.4.3.3]
CodedObservation[*]: QuantityMeasurement	[See C.4.3.4]
CodedObservation[*]: CodedObservation	

The CODE observations in TID 2002 do not specifically include finding site, laterality, and topographical modifiers, but these modifiers are not forbidden in the template, and may be present in a SR SOP Instance being transformed to CDA.

C.4.3.2 Text Observations

SR TEXT Content Items are mapped to Coded Observation entries, but the code is a nullFlavor with the text content in originalText.

Table C.4-7. CDA Coded Observation mapping from SR TEXT

CDA Business Name or XPath	DICOM SR
CodedObservation[*]: ObsName	*Concept Name Code Sequence (0040,A043)*
observation/value/@nullFlavor	"NI"
observation/value/originalText	*Text Value (0040,A160)*
CodedObservation[*]: Time	*Observation DateTime (0040,A032)*
CodedObservation[*]: InterpretationCode	
CodedObservation[*]: ActionableFindingCode	
CodedObservation[*]: TargetSite	
CodedObservation[*]:Laterality	
CodedObservation[*]:TopoModifier	
CodedObservation[*]:Method	

CDA Business Name or XPath	DICOM SR
CodedObservation[*]: SOPInstance	[See C.4.3.3]
CodedObservation[*]: QuantityMeasurement	[See C.4.3.4]
CodedObservation[*]: CodedObservation	

C.4.3.3 Image Observations

SR IMAGE Content Items shall be mapped to SOP Instance Observation entries.

Table C.4-8. CDA SOP Instance Observation mapping from SR IMAGE

CDA Business Name	DICOM SR
SOPInstance[*]:SOPInstanceUID	*Referenced SOP Sequence (0008,1199) > Referenced SOP Instance UID (0008,1155)*
SOPInstance[*]:SOPClassUID	*Referenced SOP Sequence (0008,1199) > Referenced SOP Class UID (0008,1150)*
SOPInstance[*]:WADOReference	[WADO link constructed from image reference; also used in linkHtml in narrative block]
SOPInstance[*]:PurposeOfReference	*Concept Name Code Sequence (0040,A043)*
SOPInstance[*]:ReferencedFrames	*Referenced SOP Sequence (0008,1199) > Referenced Frame Number (0008,1160)*

C.4.3.4 Numeric Observations

SR NUM Content Items shall be mapped to Quantity Measurement entries.

Table C.4-9. CDA Quantity Measurement mapping from SR NUM

CDA Business Name	DICOM SR
QuantityMeasurement[*]: MeasurementName	*Concept Name Code Sequence (0040,A043)*
QuantityMeasurement[*]: MeasurementValue	*Measured Value Sequence (0040,A300) > Numeric Value (0040,A30A)*
QuantityMeasurement[*]: MeasurementUnits	*Measured Value Sequence (0040,A300) > Measurement Units Code Sequence (0040,08EA) > Code Value (0008,0100)*
QuantityMeasurement[*]: Time	*Observation DateTime (0040,A032)*
QuantityMeasurement[*]: InterpretationCode	
QuantityMeasurement[*]: ActionableFindingCode	
QuantityMeasurement[*]: TargetSite	*(G-C0E3, SRT, "Finding Site")*
QuantityMeasurement[*]:Laterality	*(G-C0E3, SRT, "Finding Site") > (G-C171, SRT, "Laterality")*
QuantityMeasurement[*]:Method	*(G-C036, SRT, "Measurement Method")*
QuantityMeasurement[*]:TopoModifier	*(G-A1F8, SRT, "Topographical modifier")*
QuantityMeasurement[*]: SOPInstance	[See C.4.3.3]
QuantityMeasurement[*]: QuantityMeasurement	[See C.4.3.4]

The SR templates invoked for NUM measurements from TID 2000 do not specifically include finding site, laterality, and topographical modifiers, but these modifiers are not forbidden in the template, they are used in many other NUM value templates (e.g., TID 300 Measurement), and may be present in a SR SOP Instance being transformed to CDA.

C.4.3.5 Inferred From Image Observations

SR TID 2001 and TID 2002 allow Content Items to be INFERRED FROM IMAGE observations. The INFERRED FROM relationship is mapped to the entryRelationship with typeCode=SPRT, and the IMAGE observation is mapped to a CDA SOP Instance Observation entry subsidiary to its parent CDA Coded Observation or Quantity Measurement entry. This entryRelationship is shown in the Coded Observation and Quantity Measurement CDA Templates.

C.4.3.6 Inferred From Numeric Observations

SR TID 2001 and TID 2002 allow Content Items to be INFERRED FROM NUM observations. The INFERRED FROM relationship is mapped to the entryRelationship with typeCode=SPRT, and the NUM observation is mapped to CDA Quantity Measurement entry subsidiary to its parent CDA Coded Observation or Quantity Measurement entry. This entryRelationship is shown in the Coded Observation and Quantity Measurement CDA Templates.

C.4.3.7 Inferred From Spatial Coordinates Observations

SR TID 1400, TID 1401, TID 1402, and TID 1404 allow NUM Content Items to be INFERRED FROM SCOORD observations, which are SELECTED FROM IMAGE observations. This Annex does not specify the transformation for SCOORD observations; these would use the CDA Region Of Interest entry, which PS3.20 forbids (see Section 9.1.2.4).

C.4.4 Specific Section Content Mapping

Certain sections in a CDA Imaging Report have specific mappings from the DICOM SR header, or from specialized templates with content for particular uses.

C.4.4.1 Procedure Indications

The DICOM SR Document General Module may specify the Reason for the Requested Procedure as either free text in attribute (0040,1002), and/or as multiple coded values in attribute (0040,100A). These are mapped to the Procedure Indications subsection of the Clinical Information section of the CDA Imaging Report.

Note

Procedure indications may also be specified as SR content items in the (18785-6, LN, "Indications for Procedure") CONTAINER, which may be mapped to the CDA instance in accordance with Section C.4.3. It is an implementation decision how to handle multiple representations of indications in the SR document.

Table C.4-10. Clinical Information Procedure Indications mapping from SR

CDA Business Name	DICOM SR
ClinicalInformation: ProcedureIndications: Text	*Referenced Request Sequence (0040,A370) > Reason for the Requested Procedure (0040,1002)*
ClinicalInformation: ProcedureIndications: CodedObservation[*]: ObsName	(432678004, SNOMED, "Indication for procedure")
ClinicalInformation: ProcedureIndications: CodedObservation[*]: ObsValue	*Referenced Request Sequence (0040,A370) > Reason for the Requested Procedure Code Sequence (0040,100A)*

C.4.4.2 Current Procedure Descriptions

SR Instances using TID 2006 have a Current Procedure Descriptions section specified using TID 2007. Source data in that template and from the General Study Module is mapped into the CDA Procedure Description section.

Table C.4-11. Current Procedure Description mapping from SR

CDA Business Name	DICOM SR
ProcedureDescription: ProcedureTechnique: ProcedureCode	*Procedure Code Sequence (0008,1032)*

CDA Business Name	DICOM SR
ProcedureDescription: ProcedureTechnique: EffectiveTime	*(111060, DCM, "Study Date") + (111061, DCM, "Study Time")*
ProcedureDescription: ProcedureTechnique: Modality	*(122142, DCM, "Acquisition Device Type")*
ProcedureDescription: ProcedureTechnique: MethodCode	
ProcedureDescription: ProcedureTechnique: TargetSite	*(123014, DCM, "Target Region")*
ProcedureDescription: ProcedureTechnique: Laterality	
ProcedureDescription: ProcedureTechnique: Ref	

C.4.4.3 Radiation Exposure and Protection Information

The Radiation Exposure and Protection Information section defined in SR TID 2006 is specified using TID 2008, which provides additional source data for mapping into the equivalent CDA subsection of the Imaging Procedure Description section.

Table C.4-12. CDA Radiation Exposure and Protection Information mapping from SR

CDA Business Name	DICOM SR
RadiationExposure: IrradiationAuthorizingID	
RadiationExposure: IrradiationAuthorizingName	*(113850, DCM, "Irradiation Authorizing ")*
RadiationExposure:SOPInstance[doseReport]	*(113701, DCM, "X-Ray Radiation Dose Report")* [from Current Procedure Description section]
RadiationExposure:CodedObservation[pregnancy]	*(111532, DCM, "Pregnancy Status")*
RadiationExposure:CodedObservation[indication]	*(18785-6, LN, "Indications for Procedure")*
RadiationExposure:CodedObservation[exposure]	*(113921, DCM, "Radiation Exposure")*
RadiationExposure:QuantityMeasurement	
RadiationExposure: RadioactivityDose	
RadiationExposure: Radiopharmaceutical	
RadiationExposure: FreeTextRadiopharmaceutical	*(113922, DCM, "Radioactive Substance Administered")*

The Radiation Exposure Content Item in TID 2008 uses Value Type TEXT, not NUM, and is therefore mapped to a Coded Observation entry in accordance with Section C.4.3.2.

C.4.4.4 Key Images

TID 2005 Transcribed Diagnostic Imaging Report specifies a section structure for the Key Images section of an SR, which allows mapping into the equivalent CDA subsection of the Impression section.

Table C.4-13. Key Image mapping from SR

CDA Business Name	DICOM SR
KeyImages: Title	"Key Images" [or equivalent in local language]
KeyImages: Text	*(113012, DCM, "Key Object Description")*
KeyImages: Text: GraphicRef[*]	[Reference to ObservationMedia entry]
KeyImages: Text: ExtRef[*]: URL	[WADO link constructed from image reference]
KeyImages: SOPInstance[*]	[See C.4.3.3]
KeyImages: Graphic[*]: Image	[Thumbnail constructed from referenced image]
KeyImages: Graphic[*]: MediaType	[recommended "image/jpeg"]
KeyImages: Graphic[*]: ImageURI	

C.5 Example

C.5.1 DICOM SR "Basic Diagnostic Imaging Report" (TID 2000)

The SR sample document encoding includes information on the SR document body tree depth (column 1: SR Tree Depth), nesting level for nested artifacts such as sequences and sequence items (column 2: Nesting), DICOM attribute names (column 3: Attribute), DICOM tag (column 4: Tag), the DICOM attribute value representation (Column 5: VR as specified in PS3.5), the hexadecimal value of value length (column 6: VL (hex)) and the sample document attribute values (column 7: Value).

Table C.5-1. Sample document encoding

SR Tree Depth	Nesting	Attribute	Tag	VR	VL (hex)	Value
		Instance Creation Date	(0008,0012)	DA	0008	20060827
		Instance Creation Time	(0008,0013)	TM	0006	224157
		Instance Creator UID	(0008,0014)	UI	001c	1.2.276.0.7230010.3.0.3.5.4
		SOP Class UID	(0008,0016)	UI	001e	1.2.840.10008.5.1.4.1.1.88.22
		SOP Instance UID	(0008,0018)	UI	003c	1.2.840.113619.2.62.994044785528.20060823.200608232232322.9
		Study Date	(0008,0020)	DA	0008	20060823
		Content Date	(0008,0023)	DA	0008	20060823
		Study Time	(0008,0030)	TM	0006	222400
		Content Time	(0008,0033)	TM	0006	224352
		Accession Number	(0008,0050)	SH	0008	10523475
		Issuer of Accession Number Sequence	(0008,0051)	SQ	ffffffff	
	%item					
	>	Local Namespace Entity ID	(0040,0032)	UT	0008	WUH-RIS
	>	Universal Entity ID	(0040,0032)	UT	0024	1.2.840.113619.2.62.994044785528.27
	>	Universal Entity ID Type	(0040,0033)	CS	0004	ISO
	%enditem					
	%endseq					
		Modality	(0008,0060)	CS	0002	SR
		Manufacturer	(0008,0070)	LO	000a	DicomWg20
		Referring Physician's Name	(0008,0090)	PN	0010	Smith^John^^^MD
		Procedure Code Sequence	(0008,1032)	SQ	ffffffff	
	%item					

SR Tree Depth	Nesting	Attribute	Tag	VR	VL (hex)	Value
	>	Code Value	(0008,0100)	SH	0006	11123
	>	Coding Scheme Designator	(0008,0102)	SH	0008	99WUHID
	>	Code Meaning	(0008,0104)	LO	000c	X-Ray Study
	%enditem					
	%endseq					
		Referenced Performed Procedure Step Sequence	(0008,1111)	SQ	ffffffff	
	%endseq					
		Patient's Name	(0010,0010)	PN	0008	Doe^John
		Patient ID	(0010,0020)	LO	000a	0000680029
		Issuer of Patient ID	(0010,0021)	LO	001a	World University Hospital
		Issuer of Patient ID Qualifiers Sequence	(0010,0024)	SQ	ffffffff	
	%item					
	>	Universal Entity ID	(0040,0032)	UT	0024	1.2.840.113619.2.62.994044785528.10
	>	Universal Entity ID Type	(0040,0033)	CS	0004	ISO
	%enditem					
	%endseq					
		Patient's Birth Date	(0010,0030)	DA	0008	19641128
		Patient's Sex	(0010,0040)	CS	0002	M
		Study Instance UID	(0020,000d)	UI	002e	1.2.840.113619.2.62.994044785528.114289542805
		Series Instance UID	(0020,000e)	UI	0036	1.2.840.113619.2.62.994044785528.20060823223142485052
		Study ID	(0020,0010)	SH	0008	10523475
		Series Number	(0020,0011)	IS	0004	560
		Instance Number	(0020,0013)	IS	0006	07851
1		Value Type	(0040,a040)	CS	000a	CONTAINER
1		Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1	%item					
1	>	Code Value	(0008,0100)	SH	0008	18782-3
1	>	Coding Scheme Designator	(0008,0102)	SH	0002	LN
1	>	Code Meaning	(0008,0104)	LO	000c	X-Ray Report
1	%enditem					
1	%endseq					

SR Tree Depth	Nesting	Attribute	Tag	VR	VL (hex)	Value
1		Continuity Of Content	(0040,a050)	CS	0008	SEPARATE
		Verifying Observer Sequence	(0040,a073)	SQ	ffffffff	
	%item					
	>	Verifying Organization	(0040,a027)	LO	001a	World University Hospital
	>	Verification DateTime	(0040,a030)	DT	000e	20060827141500
	>	Verifying Observer Name	(0040,a075)	PN	0012	Blitz^Richard^^^MD
	>	Verifying Observer Identification Code Sequence	(0040,a088)	SQ	ffffffff	
	%item					
	>>	Code Value	(0008,0100)	SH	0008	08150000
	>>	Coding Scheme Designator	(0008,0102)	SH	0008	99WUHID
	>>	Code Meaning	(0008,0104)	LO	0016	Verifying Observer ID
	%enditem					
	%endseq					
	%enditem					
	%endseq					
		Referenced Request Sequence	(0040,a370)	SQ	ffffffff	
	%item					
	>	Accession Number	(0008,0050)	SH	0008	10523475
	>	Issuer of Accession Number Sequence	(0008,0051)	SQ	ffffffff	
	%item					
	>>	Local Namespace Entity ID	(0040,0032)	UT	0008	WUH-RIS
	>>	Universal Entity ID	(0040,0032)	UT	0024	1.2.840.113619.2.62.994044785528.27
	>>	Universal Entity ID Type	(0040,0033)	CS	0004	ISO
	%enditem					
	%endseq					
	>	Referenced Study Sequence	(0008,1110)	SQ	ffffffff	

SR Tree Depth	Nesting	Attribute	Tag	VR	VL (hex)	Value
	%item					
	>>	Referenced SOP Class UID	(0008,1150)	UI	001a	1.2.840.10008.5.1.4.1.1.1
	>>	Referenced SOP Instance UID	(0008,1155)	UI	003c	1.2.840.113619.2.62.994044785528.20060823.200608232232322.3
	%enditem					
	%endseq					
	>	Study Instance UID	(0020,000d)	UI	002e	1.2.840.113619.2.62.994044785528.114289542805
	>	Requested Procedure Description	(0032,1060)	LO	0020	CHEST TWO VIEWS, PA AND LATERAL
	>	Requested Procedure Code Sequence	(0032,1064)	SQ	ffffffff	
	%item					
	>>	Code Value	(0008,0100)	SH	0006	11123
	>>	Coding Scheme Designator	(0008,0102)	SH	0008	99WUHID
	>>	Code Meaning	(0008,0104)	LO	000c	X-Ray Study
	%enditem					
	%endseq					
	>	Order Placer Identifier Sequence	(0040,0026)	SQ	ffffffff	
	%item					
	>>	Local Namespace Entity ID	(0040,0032)	UT	0008	WUH-CPOE
	>>	Universal Entity ID	(0040,0032)	UT	0024	1.2.840.113619.2.62.994044785528.29
	>>	Universal Entity ID Type	(0040,0033)	CS	0004	ISO
	%enditem					
	%endseq					
	>	Requested Procedure ID	(0040,1001)	SH	0006	123453
	>	Reason for the Requested Procedure	(0040,1002)	LO	0014	Suspected lung tumor
	>	Placer Order Number/Imaging Service Request	(0040,2016)	LO	0006	123451
	%enditem					
	%endseq					

SR Tree Depth	Nesting	Attribute	Tag	VR	VL (hex)	Value
		Performed Procedure Code Sequence	(0040,a372)	SQ	ffffffff	
	%item					
	>	Code Value	(0008,0100)	SH	0006	11123
	>	Coding Scheme Designator	(0008,0102)	SH	0008	99WUHID
	>	Code Meaning	(0008,0104)	LO	000c	X-Ray Study
	%enditem					
	%endseq					
		Current Requested Procedure Evidence Sequence	(0040,a375)	SQ	ffffffff	
	%item					
	>	Referenced Series Sequence	(0008,1115)	SQ	ffffffff	
	%item					
	>>	Referenced SOP Sequence	(0008,1199)	SQ	ffffffff	
	%item					
	>>>	Referenced SOP Class UID	(0008,1150)	UI	001a	1.2.840.10008.5.1.4.1.1.1
	>>>	Referenced SOP Instance UID	(0008,1155)	UI	003c	1.2.840.113619.2.62.994044785528.20060823.200608232232322.3
	%enditem					
	%item					
	>>>	Referenced SOP Class UID	(0008,1150)	UI	001a	1.2.840.10008.5.1.4.1.1.1
	>>>	Referenced SOP Instance UID	(0008,1155)	UI	003c	1.2.840.113619.2.62.994044785528.20060823.200608232231422.3
	%enditem					
	%endseq					
	>>	Series Instance UID	(0020,000e)	UI	0036	1.2.840.113619.2.62.994044785528.20060823223142485051
	%enditem					
	%endseq					
	>	Study Instance UID	(0020,000d)	UI	002e	1.2.840.113619.2.62.994044785528.114289542805
	%enditem					
	%endseq					
		Completion Flag	(0040,a491)	CS	0008	COMPLETE
		Verification Flag	(0040,a493)	CS	0008	VERIFIED

SR Tree Depth	Nesting	Attribute	Tag	VR	VL (hex)	Value
1		Content Sequence	(0040,a730)	SQ	ffffffff	
1.1	%item					
1.1	>	Relationship Type	(0040,a010)	CS	0010	HAS CONCEPT MOD
1.1	>	Value Type	(0040,a040)	CS	0004	CODE
1.1	>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.1	%item					
1.1	>>	Code Value	(0008,0100)	SH	0006	122142
1.1	>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.1	>>	Code Meaning	(0008,0104)	LO	0018	Acquisition Device Type
1.1	%enditem					
1.1	%endseq					
1.1	>	Concept Code Sequence	(0040,a168)	SQ	ffffffff	
1.1	%item					
1.1	>>	Code Value	(0008,0100)	SH	0002	XR
1.1	>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.1	>>	Code Meaning	(0008,0104)	LO	0002	XR
1.1	%enditem					
1.1	%endseq					
1.1	%enditem					
1.2	%item					
1.2	>	Relationship Type	(0040,a010)	CS	0010	HAS CONCEPT MOD
1.2	>	Value Type	(0040,a040)	CS	0004	CODE
1.2	>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.2	%item					
1.2	>>	Code Value	(0008,0100)	SH	0006	123014
1.2	>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.2	>>	Code Meaning	(0008,0104)	LO	000e	Target Region
1.2	%enditem					
1.2	%endseq					
1.2	>	Concept Code Sequence	(0040,a168)	SQ	ffffffff	
1.2	%item					
1.2	>>	Code Value	(0008,0100)	SH	0008	T-D3000
1.2	>>	Coding Scheme Designator	(0008,0102)	SH	0004	SRT

SR Tree Depth	Nesting	Attribute	Tag	VR	VL (hex)	Value
1.2	>>	Code Meaning	(0008,0104)	LO	0006	Chest
1.2	%enditem					
1.2	%endseq					
1.2	%enditem					
1.3	%item					
1.3	>	Relationship Type	(0040,a010)	CS	0010	HAS CONCEPT MOD
1.3	>	Value Type	(0040,a040)	CS	0004	CODE
1.3	>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.3	%item					
1.3	>>	Code Value	(0008,0100)	SH	0006	121049
1.3	>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.3	>>	Code Meaning	(0008,0104)	LO	0028	Language of Content Item and Descendants
1.3	%enditem					
1.3	%endseq					
1.3	>	Concept Code Sequence	(0040,a168)	SQ	ffffffff	
1.3	%item					
1.3	>>	Code Value	(0008,0100)	SH	0006	en-US
1.3	>>	Coding Scheme Designator	(0008,0102)	SH	0008	ISO639_1
1.3	>>	Code Meaning	(0008,0104)	LO	000e	English (U.S.)
1.3	%enditem					
1.3	%endseq					
1.3	%enditem					
1.4	%item					
1.4	>	Relationship Type	(0040,a010)	CS	0010	HAS CONCEPT MOD
1.4	>	Value Type	(0040,a040)	CS	0004	TEXT
1.4	>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.4	%item					
1.4	>>	Code Value	(0008,0100)	SH	0006	121050
1.4	>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.4	>>	Code Meaning	(0008,0104)	LO	0022	Equivalent Meaning of Concept Name
1.4	%enditem					
1.4	%endseq					
1.4	>	Text Value	(0040,a160)	UT	001c	Chest X-Ray, PA and LAT View
1.4	%enditem					
1.5	%item					

SR Tree Depth	Nesting	Attribute	Tag	VR	VL (hex)	Value
1.5	>	Relationship Type	(0040,a010)	CS	0010	HAS OBS CONTEXT
1.5	>	Value Type	(0040,a040)	CS	0004	CODE
1.5	>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.5	%item					
1.5	>>	Code Value	(0008,0100)	SH	0006	121005
1.5	>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.5	>>	Code Meaning	(0008,0104)	LO	000e	Observer Type
1.5	%enditem					
1.5	%endseq					
1.5	>	Concept Code Sequence	(0040,a168)	SQ	ffffffff	
1.5	%item					
1.5	>>	Code Value	(0008,0100)	SH	0006	121006
1.5	>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.5	>>	Code Meaning	(0008,0104)	LO	0006	Person
1.5	%enditem					
1.5	%endseq					
1.5	%enditem					
1.6	%item					
1.6	>	Relationship Type	(0040,a010)	CS	0010	HAS OBS CONTEXT
1.6	>	Value Type	(0040,a040)	CS	0006	PNAME
1.6	>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.6	%item					
1.6	>>	Code Value	(0008,0100)	SH	0006	121008
1.6	>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.6	>>	Code Meaning	(0008,0104)	LO	0014	Person Observer Name
1.6	%enditem					
1.6	%endseq					
1.6	>	Person Name	(0040,a123)	PN	0012	Blitz^Richard^^^MD
1.6	%enditem					
1.7	%item					
1.7	>	Relationship Type	(0040,a010)	CS	0008	CONTAINS
1.7	>	Value Type	(0040,a040)	CS	000a	CONTAINER
1.7	>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.7	%item					

SR Tree Depth	Nesting	Attribute	Tag	VR	VL (hex)	Value
1.7	>>	Code Value	(0008,0100)	SH	0006	121060
1.7	>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.7	>>	Code Meaning	(0008,0104)	LO	0008	History
1.7	%enditem					
1.7	%endseq					
1.7	>	Continuity Of Content	(0040,a050)	CS	0008	SEPARATE
1.7	>	Content Sequence	(0040,a730)	SQ	ffffffff	
1.7.1	%item					
1.7.1	>>	Relationship Type	(0040,a010)	CS	0008	CONTAINS
1.7.1	>>	Value Type	(0040,a040)	CS	0004	TEXT
1.7.1	>>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.7.1	%item					
1.7.1	>>>	Code Value	(0008,0100)	SH	0006	121060
1.7.1	>>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.7.1	>>>	Code Meaning	(0008,0104)	LO	0008	History
1.7.1	%enditem					
1.7.1	%endseq					
1.7.1	>>	Text Value	(0040,a160)	UT	000c	Sore throat.
1.7.1	%enditem					
1.7	%endseq					
1.7	%enditem					
1.8	%item					
1.8	>	Relationship Type	(0040,a010)	CS	0008	CONTAINS
1.8	>	Value Type	(0040,a040)	CS	000a	CONTAINER
1.8	>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.8	%item					
1.8	>>	Code Value	(0008,0100)	SH	0006	121070
1.8	>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.8	>>	Code Meaning	(0008,0104)	LO	0008	Findings
1.8	%enditem					
1.8	%endseq					
1.8	>	Continuity Of Content	(0040,a050)	CS	0008	SEPARATE
1.8	>	Content Sequence	(0040,a730)	SQ	ffffffff	

SR Tree Depth	Nesting	Attribute	Tag	VR	VL (hex)	Value
1.8.1	%item					
1.8.1	>>	Relationship Type	(0040,a010)	CS	0008	CONTAINS
1.8.1	>>	Value Type	(0040,a040)	CS	0004	TEXT
1.8.1	>>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.8.1	%item					
1.8.1	>>>	Code Value	(0008,0100)	SH	0006	121071
1.8.1	>>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.8.1	>>>	Code Meaning	(0008,0104)	LO	0008	Finding
1.8.1	%enditem					
1.8.1	%endseq					
1.8.1	>>	Text Value	(0040,a160)	UT	01ae	The cardiomediastinum is within normal limits. The trachea is midline. The previously described opacity at the medial right lung base has cleared. There are no new infiltrates. There is a new round density at the left hilus, superiorly (diameter about 45mm). A CT scan is recommended for further evaluation. The pleural spaces are clear. The visualized musculoskeletal structures and the upper abdomen are stable and unremarkable.
1.8.1	>>	Content Sequence	(0040,a730)	SQ	ffffffff	
1.8.1.1	%item					
1.8.1.1	>>>	Relationship Type	(0040,a010)	CS	000e	INFERRED FROM
1.8.1.1	>>>	Observation DateTime	(0040,a032)	DT	000e	20060823223912
1.8.1.1	>>>	Value Type	(0040,a040)	CS	0004	NUM
1.8.1.1	>>>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.8.1.1	%item					
1.8.1.1	>>>>	Code Value	(0008,0100)	SH	0008	M-02550
1.8.1.1	>>>>	Coding Scheme Designator	(0008,0102)	SH	0004	SRT
1.8.1.1	>>>>	Code Meaning	(0008,0104)	LO	0008	Diameter
1.8.1.1	%enditem					
1.8.1.1	%endseq					
1.8.1.1	>>>	Measured Value Sequence	(0040,a300)	SQ	ffffffff	
1.8.1.1	%item					
1.8.1.1	>>>>	Measurement Units Code Sequence	(0040,08ea)	SQ	ffffffff	
1.8.1.1	%item					
1.8.1.1	>>>>>	Code Value	(0008,0100)	SH	0002	mm

SR Tree Depth	Nesting	Attribute	Tag	VR	VL (hex)	Value
1.8.1.1	>>>>>	Coding Scheme Designator	(0008,0102)	SH	0004	UCUM
1.8.1.1	>>>>>	Code Meaning	(0008,0104)	LO	0002	mm
1.8.1.1	%enditem					
1.8.1.1	%endseq					
1.8.1.1	>>>>	Numeric Value	(0040,a30a)	DS	0002	45
1.8.1.1	%enditem					
1.8.1.1	%endseq					
1.8.1.1	>>>	Content Sequence	(0040,a730)	SQ	ffffffff	
1.8.1.1.1	%item					
1.8.1.1.1	>>>>	Referenced SOP Sequence	(0008,1199)	SQ	ffffffff	
1.8.1.1.1	%item					
1.8.1.1.1	>>>>>	Referenced SOP Class UID	(0008,1150)	UI	001a	1.2.840.10008.5.1.4.1.1.1
1.8.1.1.1	>>>>>	Referenced SOP Instance UID	(0008,1155)	UI	003c	1.2.840.113619.2.62.994044785528.20060823.200608232232322.3
1.8.1.1.1	%enditem					
1.8.1.1.1	%endseq					
1.8.1.1.1	>>>>	Relationship Type	(0040,a010)	CS	000e	INFERRED FROM
1.8.1.1.1	>>>>	Value Type	(0040,a040)	CS	0006	IMAGE
1.8.1.1.1	>>>>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.8.1.1.1	%item					
1.8.1.1.1	>>>>>	Code Value	(0008,0100)	SH	0006	121112
1.8.1.1.1	>>>>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.8.1.1.1	>>>>>	Code Meaning	(0008,0104)	LO	0016	Source of Measurement
1.8.1.1.1	%enditem					
1.8.1.1.1	%endseq					
1.8.1.1.1	%enditem					
1.8.1.1	%endseq					
1.8.1.1	%enditem					
1.8.1	%endseq					
1.8.1	%enditem					
1.8	%endseq					
1.8	%enditem					
1.9	%item					
1.9	>	Relationship Type	(0040,a010)	CS	0008	CONTAINS
1.9	>	Value Type	(0040,a040)	CS	000a	CONTAINER

SR Tree Depth	Nesting	Attribute	Tag	VR	VL (hex)	Value
1.9	>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.9	%item					
1.9	>>	Code Value	(0008,0100)	SH	0006	121072
1.9	>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.9	>>	Code Meaning	(0008,0104)	LO	000c	Impressions
1.9	%enditem					
1.9	%endseq					
1.9	>	Continuity Of Content	(0040,a050)	CS	0008	SEPARATE
1.9	>	Content Sequence	(0040,a730)	SQ	ffffffff	
1.9.1	%item					
1.9.1	>>	Relationship Type	(0040,a010)	CS	0008	CONTAINS
1.9.1	>>	Value Type	(0040,a040)	CS	0004	TEXT
1.9.1	>>	Concept Name Code Sequence	(0040,a043)	SQ	ffffffff	
1.9.1	%item					
1.9.1	>>>	Code Value	(0008,0100)	SH	0006	121073
1.9.1	>>>	Coding Scheme Designator	(0008,0102)	SH	0004	DCM
1.9.1	>>>	Code Meaning	(0008,0104)	LO	000a	Impression
1.9.1	%enditem					
1.9.1	%endseq					
1.9.1	>>	Text Value	(0040,a160)	UT	009c	No acute cardiopulmonary process. Round density in left superior hilus, further evaluation with CT is recommended as underlying malignancy is not excluded.
1.9.1	%enditem					
1.9	%endseq					
1.9	%enditem					
1	%endseq					

C.5.2 Transcoded HL7 CDA Release 2 Imaging Report

```
<?xml version="1.0" encoding="utf-8"?>
<?xml-stylesheet type="text/xsl" href="CDA-DIR.xsl"?>
<ClinicalDocument xmlns="urn:hl7-org:v3"
      xmlns:voc="urn:hl7-org:v3/voc"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xmlns:ps3-20="urn:dicom-org:ps3-20"
      xsi:schemaLocation="urn:hl7-org:v3 CDA.xsd">
   <realmCode code="UV"/>
   <typeId root="2.16.840.1.113883.1.3" extension="POCD_HD000040"/>
   <templateId root="1.2.840.10008.9.1"/>
   <templateId root="1.2.840.10008.9.20"/>
   <templateId root="1.2.840.10008.9.21"/>
```

```
<templateId root="1.2.840.10008.9.22"/>
<id root="1.2.840.113619.2.62.994044785528.12"extension="20060828170821659"/>
<code code="18748-4" codeSystem="2.16.840.1.113883.6.1"
   codeSystemName="LOINC" displayName="Diagnostic Imaging Report"/>
<title>Chest X-Ray, PA and LAT View</title>
<effectiveTime value="20060828170821"/>
<confidentialityCode code="N" codeSystem="2.16.840.1.113883.5.25"/>
<languageCode code="en-US"/>
<recordTarget>
   <patientRole>
      <id root="1.2.840.113619.2.62.994044785528.10" extension="0000680029"/>
      <addr nullFlavor="NI"/>
      <telecom nullFlavor="NI"/>
      <patient>
         <name>
            <given>John</given>
            <family>Doe</family>
         </name>
         <administrativeGenderCode codeSystem="2.16.840.1.113883.5.1"code="M"/>
         <birthTime value="19641128"/>
      </patient>
   </patientRole>
</recordTarget>
<author>
   <time value="20060823224352"/>
   <assignedAuthor>
      <id extension="121008" root="2.16.840.1.113883.19.5"/>
      <addr nullFlavor="NI"/>
      <telecom nullFlavor="NI"/>
      <assignedPerson>
         <name>
            <given>Richard</given>
            <family>Blitz</family>
            <suffix>MD</suffix>
         </name>
      </assignedPerson>
   </assignedAuthor>
</author>
<custodian>
   <!-- custodian values have been added based on organizational policy (int his
    case they are not mapped from the SR sample document) -->
   <assignedCustodian>
      <representedCustodianOrganization>
         <id root="2.16.840.1.113883.19.5"/>
         <name>World University Hospital</name>
         <telecom nullFlavor="NI"/>
         <addr nullFlavor="NI"/>
      </representedCustodianOrganization>
   </assignedCustodian>
</custodian>
<!-- legal authenticator present in sample, document is VERIFIED -->
<legalAuthenticator>
   <time value="20060827141500"/>
   <!-- Verification DateTime (0040,A030) -->
   <signatureCode code="S"/>
   <assignedEntity>
      <id extension="08150000" root="1.2.840.113619.2.62.994044785528.33"/>
      <addr nullFlavor="NI"/>
      <telecom nullFlavor="NI"/>
      <assignedPerson>
```

```
            <name>
               <given>Richard</given>
               <family>Blitz</family>
               <suffix>MD</suffix>
            </name>
         </assignedPerson>
      </assignedEntity>
   </legalAuthenticator>
   <!-- Mapped from Referring Physician's Name (0008,0090) SR sample document -->
   <participant typeCode="REF">
      <associatedEntity classCode="PROV">
         <id nullFlavor="NI"/>
         <addr nullFlavor="NI"/>
         <telecom nullFlavor="NI"/>
         <associatedPerson>
            <name>
               <given>John</given>
               <family>Smith</family>
               <suffix>MD</suffix>
            </name>
         </associatedPerson>
      </associatedEntity>
   </participant>
   <inFulfillmentOf>
      <order>
         <id extension="123451" root="1.2.840.113619.2.62.994044785528.29"/>
         <ps3-20:accessionNumber extension="10523475"root="1.2.840.113619.2.62.994044785528.27"/>
      </order>
   </inFulfillmentOf>
   <documentationOf>
      <serviceEvent classCode="ACT">
         <id root="1.2.840.113619.2.62.994044785528.114289542805"/>
         <!-- Study Instance UID -->
         <code code="11123" codeSystem="1.2.840.113619.2.62.5661"
            codeSystemName="99WUHID" displayName="X-Ray Study"/>
         <translation code="XR" displayName="XR"
            codeSystem="1.2.840.10008.2.16.4" codeSystemName="DCM"/>
         <translation code="51185008" displayName="Chest"
            codeSystem="2.16.840.1.113883.6.96" codeSystemName="SNOMED CT"/>
         <!-- anatomy code mapped from old style SNOMED in SR to new -->
      </code>
   </code>
   <effectiveTime>
      <low value="20060823222400"/>
   </effectiveTime>
</serviceEvent>
</documentationOf>
<!-- transformation of a DICOM SR -->
<relatedDocument typeCode="XFRM">
   <parentDocument>
      <id root="1.2.840.113619.2.62.994044785528.20060823.200608232232322.9"/>
      <!-- SOP Instance UID (0008,0018) of SR sample document-->
   </parentDocument>
</relatedDocument>
<component>
   <structuredBody>
      <component>
         <!--**************** Clinical Information Section *****************-->
         <section>
            <templateId root="1.2.840.10008.9.2"/>
```

```
    <code code="55752-0" codeSystem="2.16.840.1.113883.6.1"codeSystemName="LOINC" displayName="Clinical Information"/>
    <title>Clinical Information</title>
    <component>
      <!--**************** Procedure Indications Subsection *****************
        Section text mapped from "Reason for the Requested Procedure" (0040,1002)
        within the Referenced Request Sequence (0040,A370) of the SR header, under
        the assumption that the header attribute value has been displayed to, and
        accepted by, the legal authenticator.-->
      <section>
        <templateId root="2.16.840.1.113883.10.20.22.2.29"/>
        <id root="1.2.840.10213.2.62.044785528.1142895426"/>
        <code code="59768-2" codeSystem="2.16.840.1.113883.6.1"
        codeSystemName="LOINC" displayName="Procedure Indications"/>
        <title>Indications for Procedure</title>
        <text>Suspected lung tumor</text>
      </section>
      <!--**************** End of Procedure Indications Subsection *****************-->
    </component>
    <component>
      <!--**************** History Subsection *****************-->
      <section>
        <templateId root="2.16.840.1.113883.10.20.22.2.39"/>
        <id root="1.2.840.10213.2.62.7044785528.114289875"/>
        <code code="11329-0" codeSystem="2.16.840.1.113883.6.1"
        codeSystemName="LOINC" displayName="History General"/>
        <title>History</title>
        <text>
          <paragraph>
            <caption>History</caption>
            <content ID="Fndng1">Sore throat.</content>
          </paragraph>
        </text>
        <entry>
          <!-- History report element (TEXT) -->
          <observation classCode="OBS" moodCode="EVN">
            <templateId root="2.16.840.1.113883.10.20.6.2.12"/>
            <code code="121060" codeSystem="1.2.840.10008.2.16.4"
              codeSystemName="DCM" displayName="History"/>
            <value xsi:type="ED">
              <reference value="#Fndng1"/>
            </value>
          </observation>
        </entry>
      </section>
      <!--**************** End of History Subsection *****************-->
    </component>
    <!--**************** End of Clinical Information Section *****************-->
  </component>
  <component>
    <!--**************** Imaging Procedure Description Section *****************-->
    <section classCode="DOCSECT" moodCode="EVN">
      <templateId root="1.2.840.10008.9.3"/>
      <id root="1.2.840.10213.2.62.9940434234785528.11428954534542805"/>
      <code code="55111-9" codeSystem="2.16.840.1.113883.6.1"
      codeSystemName="LOINC" displayName="Current Imaging Procedure Description"/>
      <title>Imaging Procedure Description</title>
      <text> </text>
      <entry>
        <procedure moodCode="EVN" classCode="PROC">
          <templateId root="1.2.840.10008.9.14"/>
```

```
      <id root="1.2.840.6544.33.9100653988998717.997527582345600170"/>
      <code code="11123" displayName="X-Ray Study"
      codeSystem="1.2.840.113619.2.62.5661" codeSystemName="99WUHID"/>
      <effectiveTime value="20060823222400"/>
      <methodCode code="XR" displayName="XR"
      codeSystem="1.2.840.10008.2.16.4" codeSystemName="DCM"/>
      <targetSiteCode code="51185008" displayName="Chest"
      codeSystem="2.16.840.1.113883.6.96" codeSystemName="SNOMED CT"/>
    </procedure>
  </entry>
  <component>
    <!--**************** DICOM Object Catalog Sub-section *****************-->
    <section classCode="DOCSECT" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.6.1.1"/>
      <code code="121181" codeSystem="1.2.840.10008.2.16.4"
        codeSystemName="DCM" displayName="DICOM Object Catalog"/>
      <entry>
        <!--**************** Study *****************-->
        <act classCode="ACT" moodCode="EVN">
          <templateId root="2.16.840.1.113883.10.20.6.2.6"/>
          <id root="1.2.840.113619.2.62.994044785528.114289542805"/>
          <code code="113014" codeSystem="1.2.840.10008.2.16.4"
            codeSystemName="DCM" displayName="Study"/>
          <!--**************** Series (Parent SR Document) *****************-->
          <entryRelationship typeCode="COMP">
            <act classCode="ACT" moodCode="EVN">
              <id root="1.2.840.113619.2.62.994044785528.20060823222132232023"/>
              <code code="113015" codeSystem="1.2.840.10008.2.16.4"
                    codeSystemName="DCM" displayName="Series">
                <qualifier>
                  <name code="121139" codeSystem="1.2.840.10008.2.16.4"
                    codeSystemName="DCM" displayName="Modality">
                  </name>
                  <value code="CR" codeSystem="1.2.840.10008.2.16.4"
                    codeSystemName="DCM" displayName="SR Document">
                  </value>
                </qualifier>
              </code>
              <!--**************** SOP Instance UID *****************-->
              <!-- Reference to SR Document -->
              <entryRelationship typeCode="COMP">
                <observation classCode="DGIMG" moodCode="EVN">
                  <templateId root="2.16.840.1.113883.10.20.6.2.8"/>
                  <id
                  root="1.2.840.113619.2.62.994044785528.20060823.200608242334312.3"/>
                  <code code="1.2.840.10008.5.1.4.1.1.88.22"codeSystem="1.2.840.10008.2.6.1"
                    codeSystemName="DCMUID"displayName="Enhanced SR">
                  </code>
                  <text mediaType="application/dicom">
                    <reference value="http://www.example.org/wado?requestType=WADO
                      &amp;studyUID=1.2.840.113619.2.62.994044785528.114289542805
                      &amp;seriesUID=1.2.840.113619.2.62.994044785528.20060823222132232023
                      &amp;objectUID=1.2.840.113619.2.62.994044785528.20060823.200608232232322.9
                      &amp;contentType=application/dicom"/>
                    <!--reference to image 1 (PA) -->
                  </text>
                  <effectiveTime value="20060823223232"/>
                </observation>
              </entryRelationship>
            </act>
```

```
        </entryRelationship>
        <!--*************** Series (CR Images) ****************-->
        <entryRelationship typeCode="COMP">
          <act classCode="ACT"
            moodCode="EVN">
            <id root="1.2.840.113619.2.62.994044785528.20060823223142485051"/>
            <code code="113015" codeSystem="1.2.840.10008.2.16.4"
                codeSystemName="DCM" displayName="Series">
              <qualifier>
                <name code="121139" codeSystem="1.2.840.10008.2.16.4"
                  codeSystemName="DCM" displayName="Modality">
                </name>
                <value code="CR" codeSystem="1.2.840.10008.2.16.4"
                  codeSystemName="DCM" displayName="Computed Radiography">
                </value>
              </qualifier>
            </code>
            <!--*************** SOP Instance UID *****************-->
            <!-- 2 References (chest PA and LAT) -->
            <entryRelationship typeCode="COMP">
              <observation classCode="DGIMG" moodCode="EVN">
                <templateId root="2.16.840.1.113883.10.20.6.2.8"/>
                <id root="1.2.840.113619.2.62.994044785528.20060823.200608232232322.3"/>
                <code code="1.2.840.10008.5.1.4.1.1.1"codeSystem="1.2.840.10008.2.6.1"
                  codeSystemName="DCMUID"displayName="Computed Radiography Image Storage">
                </code>
                <text mediaType="application/dicom">
                  <reference value="http://www.example.org/wado?requestType=WADO
                    &amp;studyUID=1.2.840.113619.2.62.994044785528.114289542805
                    &amp;seriesUID=1.2.840.113619.2.62.994044785528.20060823223142485051
                    &amp;objectUID=1.2.840.113619.2.62.994044785528.20060823.200608232232322.3
                    &amp;contentType=application/dicom"/>
                  <!--reference to image 1 (PA) -->
                </text>
                <effectiveTime value="20060823223232"/>
              </observation>
            </entryRelationship>
            <entryRelationship typeCode="COMP">
              <observation classCode="DGIMG" moodCode="EVN">
                <templateId root="2.16.840.1.113883.10.20.6.2.8"/>
                <id root="1.2.840.113619.2.62.994044785528.20060823.200608232231422.3"/>
                <code code="1.2.840.10008.5.1.4.1.1.1"codeSystem="1.2.840.10008.2.6.1"
                  codeSystemName="DCMUID"displayName="Computed Radiography Image Storage">
                </code>
                <text
                  mediaType="application/dicom">
                  <reference value="http://www.example.org/wado?requestType=WADO
                  &amp;studyUID=1.2.840.113619.2.62.994044785528.114289542805
                  &amp;seriesUID=1.2.840.113619.2.62.994044785528.20060823223142485051
                  &amp;objectUID=1.2.840.113619.2.62.994044785528.20060823.200608232231422.3
                  &amp;contentType=application/dicom"/>
                  <!--reference to image 2 (LAT) -->
                </text>
                <effectiveTime value="20060823223142"/>
              </observation>
            </entryRelationship>
          </act>
        </entryRelationship>
      </act>
    </entry>
```

```
        </section>
        <!--**************** End of DICOM Object Catalog Subsection *****************-->
      </component>
    </section>
    <!--**************** End of Imaging Procedure Description Section *****************-->
  </component>
  <component>
    <!--**************** Findings Section  *****************-->
    <section>
      <templateId root="2.16.840.1.113883.10.20.6.1.2"/>
      <id root="1.2.840.10213.2.62.9940434234785528.114289545000804445"/>
      <code code="59776-5" codeSystem="2.16.840.1.113883.6.1"codeSystemName="LOINC" displayName="Findings"/>
      <title>Findings</title>
      <text>
        <paragraph>
          <caption>Finding</caption>
          <content ID="Fndng2">The cardiomediastinum is within normal limits. The trachea is midline.
          The previously described opacity at the medial right lung base has cleared. There are no new
          infiltrates. There is a new round density at the left hilus,superiorly (diameter about 45mm).
          A CT scan is recommended for further evaluation. The pleural spaces are clear. The visualized
          musculoskeletal structures and the upper abdomen are stable and unremarkable.</content>
        </paragraph>
        <paragraph>
          <caption>Diameter</caption>
          <content ID="Diam2">45mm</content>
        </paragraph>
        <paragraph>
          <caption>Source of Measurement</caption>
          <content ID="SrceOfMeas2">
            <linkHtml
              href="http://www.example.org/wado?requestType=WADO
                &amp;studyUID=1.2.840.113619.2.62.994044785528.114289542805
                &amp;seriesUID=1.2.840.113619.2.62.994044785528.20060823223142485051
                &amp;objectUID=1.2.840.113619.2.62.994044785528.20060823.200608232232322.3
                &amp;contentType=application/dicom">Chest_PA</linkHtml>
          </content>
        </paragraph>
      </text>
      <entry>
        <observation classCode="OBS" moodCode="EVN">
          <!-- Text Observation -->
          <templateId root="2.16.840.1.113883.10.20.6.2.12"/>
          <code code="121071" codeSystem="1.2.840.10008.2.16.4"codeSystemName="DCM" displayName="Finding"/>
          <value xsi:type="ED">
            <reference value="#Fndng2"/>
          </value>
          <!-- inferred from measurement -->
          <entryRelationship typeCode="SPRT">
            <observation classCode="OBS" moodCode="EVN">
              <templateId root="2.16.840.1.113883.10.20.6.2.14"/>
              <code code="246120007" codeSystem="2.16.840.1.113883.6.96"codeSystemName="SNOMED"
                displayName="Nodule size">
                <originalText>
                  <reference value="#Diam2"/>
                </originalText>
              </code>
              <!-- no DICOM attribute <statusCode code="completed"/> -->
              <effectiveTime value="20060823223912"/>
              <value xsi:type="PQ" value="45" unit="mm"/>
              <!-- inferred from image -->
```

```
                <entryRelationship typeCode="SUBJ">
                  <observation classCode="DGIMG" moodCode="EVN">
                    <templateId root="2.16.840.1.113883.10.20.6.2.8"/>
                    <!-- (0008,1155) Referenced SOP Instance UID-->
                    <id root="1.2.840.113619.2.62.994044785528.20060823.200608232232322.3"/>
                    <!-- (0008,1150) Referenced SOP Class UID -->
                    <code code="1.2.840.10008.5.1.4.1.1.1"codeSystem="1.2.840.10008.2.6.1"
                      codeSystemName="DCMUID"displayName="Computed Radiography Image Storage">
                    </code>
                    <text mediaType="application/dicom">
                      <!--reference to CR DICOM image (PA view) -->
                      <reference
                      value="http://www.example.org/wado?requestType=WADO
                        &amp;studyUID=1.2.840.113619.2.62.994044785528.114289542805
                        &amp;seriesUID=1.2.840.113619.2.62.994044785528.20060823223142485051
                        &amp;objectUID=1.2.840.113619.2.62.994044785528.20060823.200608232232322.3
                        &amp;contentType=application/dicom"/>
                    </text>
                    <effectiveTime value="20060823223232"/>
                    <!-- Purpose of Reference -->
                    <entryRelationship typeCode="RSON">
                      <observation classCode="OBS" moodCode="EVN">
                        <templateId root="2.16.840.1.113883.10.20.6.2.9"/>
                        <code code="ASSERTION"codeSystem="2.16.840.1.113883.5.4"/>
                        <value xsi:type="CD" code="121112"codeSystem="1.2.840.10008.2.16.4"
                            codeSystemName="DCM"displayName="Source of Measurement">
                          <originalText>
                            <reference value="#SrceOfMeas2"
                            />
                          </originalText>
                        </value>
                      </observation>
                    </entryRelationship>
                  </observation>
                </entryRelationship>
              </observation>
            </entryRelationship>
          </observation>
        </entry>
      </section>
      <!--**************** End of Findings Section *****************-->
    </component>
    <component>
      <!--**************** Impressions Section *****************-->
      <section>
        <templateId root="1.2.840.10008.9.5"/>
        <id root="1.2.840.10213.2.62.9940434234785528.114289545345927752"/>
        <code code="19005-8" codeSystem="2.16.840.1.113883.6.1"codeSystemName="LOINC" displayName="Impressions"/>
        <title>Impressions</title>
        <text>
          <paragraph>
            <caption>Impression</caption>
            <content ID="Fndng3">No acute cardiopulmonary process. Round density in left superior hilus, further
            evaluation with CT is recommended as underlying malignancy is not excluded.</content>
          </paragraph>
        </text>
        <entry>
          <!-- Impression report element (TEXT) -->
          <observation classCode="OBS" moodCode="EVN">
            <!-- Text Observation -->
```

```
                <templateId root="2.16.840.1.113883.10.20.6.2.12"/>
                <code code="121073" codeSystem="1.2.840.10008.2.16.4"codeSystemName="DCM" displayName="Impression"/>
                <value xsi:type="ED">
                   <reference value="#Fndng3"/>
                </value>
              </observation>
            </entry>
          </section>
          <!--**************** End of Impressions
           Section *****************-->
        </component>
      </structuredBody>
   </component>
</ClinicalDocument>
```