DICOM SR "Basic Diagnostic Imaging Report" to HL7 CDA Release2 "Diagnostic Imaging Report" Mapping

1 Scope

Constrained DICOM SR documents based on DICOM SR template 2000 are mapped to HL7 CDA Release2 Diagnostic Imaging Reports. Template 2000 specifies the "Basic Diagnostic Imaging Report" (PS 3.16-2006), a basic DICOM SR report template for general diagnostic imaging interpretation reports.

The following constraints apply to SR template 2000:

- Subject Context, Patient (TID 1007): The constrained DICOM SR Basic Diagnostic Imaging Report is restricted to cover one and only one patient subject.

- Open issue Subject Context, Fetus (TID 1008): Modeling of fetus subject context (Discuss with the Structured Document TC).

- Subject Context, Specimen (TID 1009): Specimen data is not included. DICOM WG26 specifies a new specimen information object definition which will replace the current DICOM specimen attributes (DICOM Supplement 122 is work in progress).

- Only Image DICOM Composite Objects are referenced

2 Use Cases

The basic use case for the mapping and transformation from DICOM SR to HL7 CDA is the facilitation of the exchange of imaging based observations between imaging information systems and clinical information systems. The DICOM SR "Basic Diagnostic Imaging Report" will typically base its observations and conclusions on imaging data and related clinical information.

Scenarios:
1) Mapping of the complete constrained DICOM SR "Basic Diagnostic Imaging Report" to an HL7 CDA Release 2 Diagnostic Imaging Report. The receiver optionally selects relevant parts of the transformed document for inclusion into a clinical HL7 CDA document (e.g. a clinical progress note or a summary report that cites the results of a variety of subspecialties involved in the treatment process of the patient)

2) Mapping of a subset of the original DICOM SR "Basic Diagnostic Imaging Report" which includes measurement data and the relevant context information (the minimal context that is required will be outlined in section 3.2.2). This subset comprises the relevant information provided by the responsible physician of the imaging institution to external parties (e.g. for ultrasound SR documents where only a subset of the measurement data will be communicated).

Point of discussion: Verification of transformed reports / accountability (flags and attributes in document header)
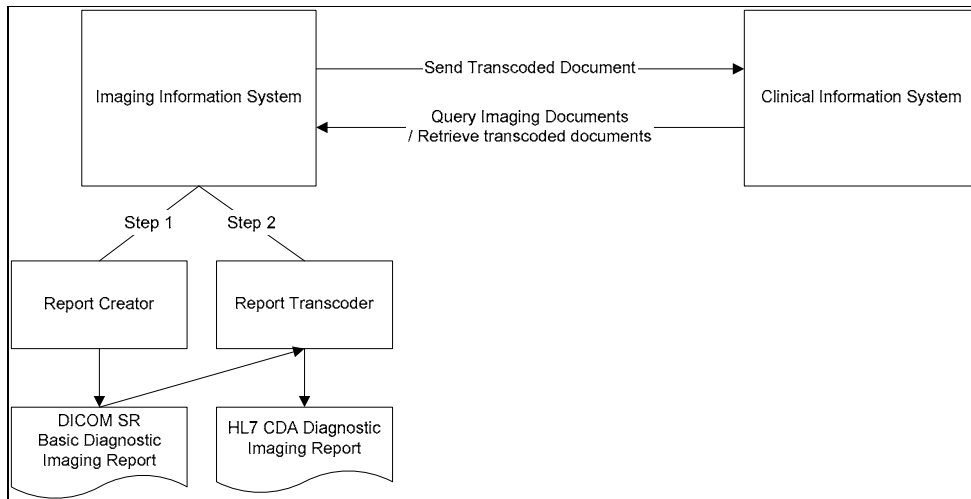
Fig. 1: Report Creation and Transformation

3 Structure of DICOM SR Documents

DICOM SR documents consist of document header and document body. The header metadata attribute values are grouped into modules such as "Patient", "General Study" etc. (refer to DICOM PS 3.3)

The SR Content Module contains the attributes for the root content item which includes the coded report title.

The content tree (structured content) of the document body is contained in the content sequence of that module. "Container" content items are part of the content sequence (SR document body structure). Content Item Relationships: Use of by-reference relationship).
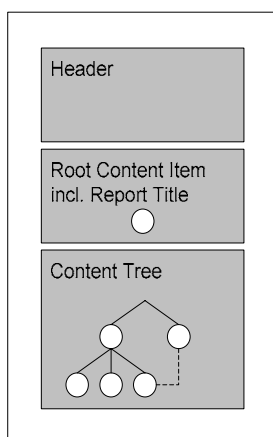
Fig. 2: SR Document Structure

3

Discuss documents from DRG (Germany), RSNA which specify report content requirements

3.1 Header

Header specified in DICOM PS 3.3

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	M
	Specimen Identification	C.7.1.2	C - Required if the Observation Subject is a Specimen
	Clinical Trial Subject	C.7.1.3	U
Study	General Study	C.7.2.1	M
	Patient Study	C.7.2.2	U
	Clinical Trial Study	C.7.2.3	U
Series	SR Document Series	C.17.1	M
	Clinical Trial Series	C.7.3.2	U
Equipment	General Equipment	C.7.5.1	M
Document	SR Document General	C.17.2	M
	SR Document Content	C.17.3	M
	SOP Common	C.12.1	M

Table. 1: DICOM SR Modules (DICOM PS 3.3)

Comment [HK1]: Document Body

Header Module Constraints:
- Patient -> Subset of attributes
- Specimen Identification Module -> not covered
- Clinical Trial Subject Module -> not covered
- General Study -> Subset of attributes
- Patient Study -> Subset of attributes
- Clinical Trial Study Module -> not covered
- SR Document Series -> Subset of attributes
- Clinical Trial Series Module -> not covered
- General Equipment Module -> covered by TID 1004 Device Observer Identifying Attributes
- SR Document General -> Subset of attributes
- SOP Common Module -> leave that out

- SR Document Content Module -> Document Body

- Insert details for Patient, General Study, Patient Study and SR Document General Module (attributes that can be mapped)

3.2 Document Body

3.2.1 DICOM SR "Basic Diagnostic Imaging Report" Template Structure and Constraints

Template 2000 is the top-level template of DICOM SR Basic Diagnostic Imaging Reports. It includes sub-templates as shown in Figure 3. The root content item (coded report title) and the content sequence details (structure and contents) are specified by those templates.
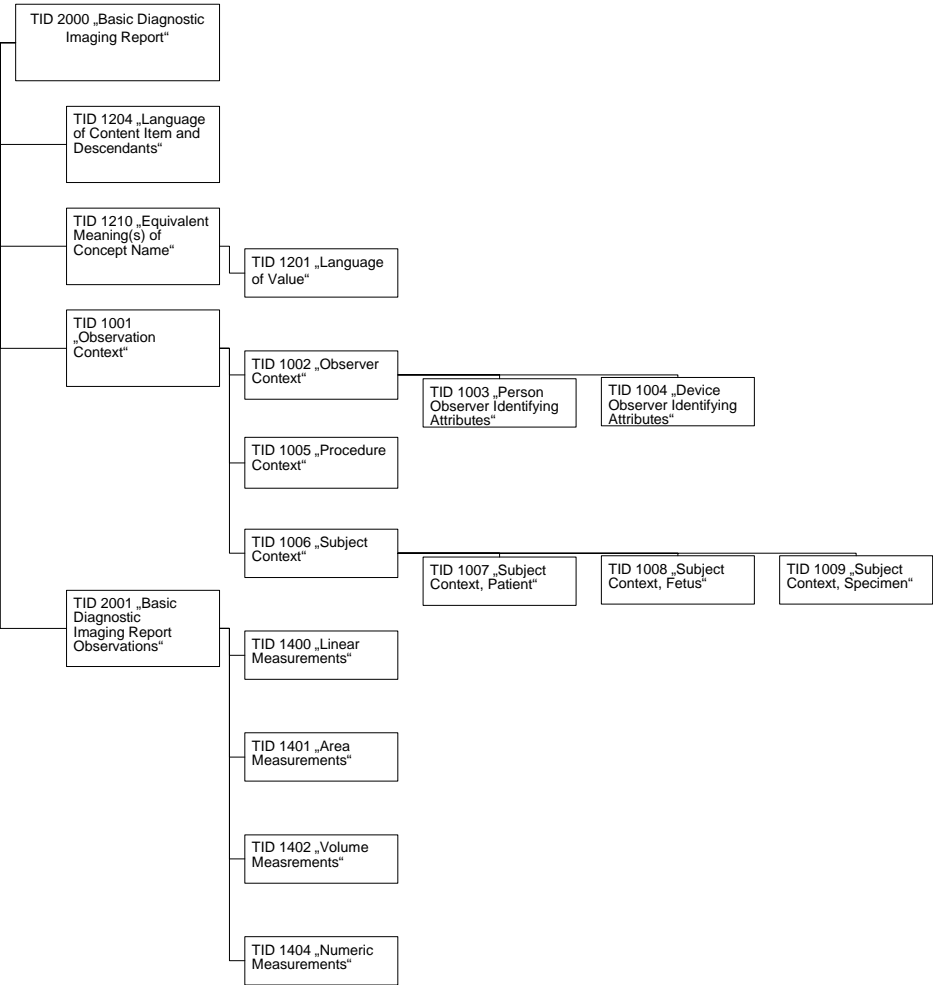
Fig. 3: Template Structure

Constraints on SR Subject Context Templates:

- Subject Context, Patient (TID 1007): The constrained DICOM SR Basic Diagnostic Imaging Report is restricted to cover one and only one patient subject.

- Open issue Subject Context, Fetus (TID 1008): Modeling of fetus subject context (Discuss with the Structured Document TC).

- Subject Context, Specimen (TID 1009): Specimen data is not included. DICOM WG26 specifies a new specimen information object definition which will replace the current DICOM specimen attributes (DICOM Supplement 122 is work in progress).

3.2.2 Minimum Context Information for Mapping Content Sequence Subset Data

For mapping a subset of the original DICOM SR "Basic Diagnostic Imaging Report" data to HL7 CDA Diagnostic Imaging Reports, the minimum context information that is required for the document header and body needs to be determined. The goal is to allow for a flexible exchange of relevant observations of the original document.
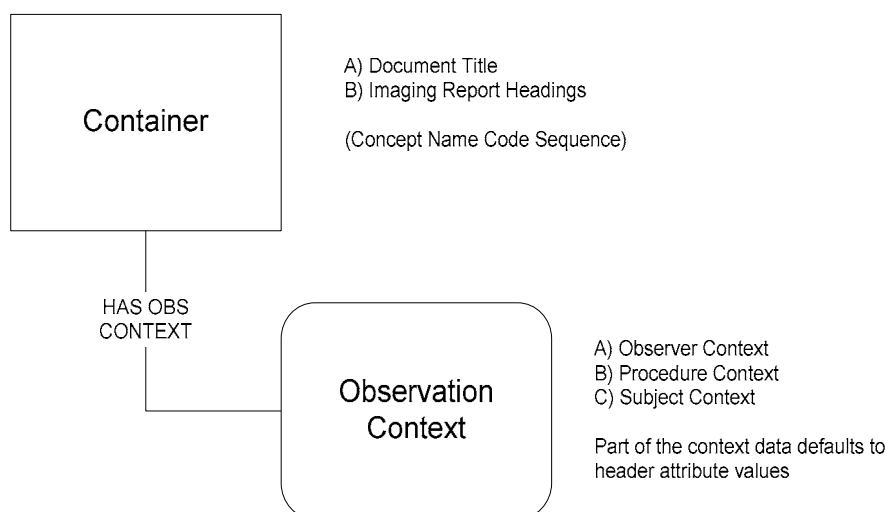
Fig. 4: Context information pattern used in DICOM SR Template 2000

The observation context data used in Template 2000 is related to the Container Content Item at the document or section level. Each observation at that level inherits the observation context. The observation context defined at document level may be overwritten at document section level.

The observation context consists of:
- Observer Context (Person or Device Observer)
- Procedure Context
- Subject Context (Patient or Fetus)

4 Structure of HL7 CDA Release2 Documents
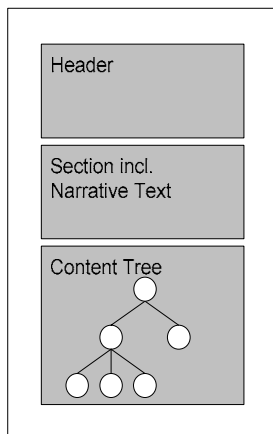
Fig. 5: CDA Document Structure

The CDA Header contains the document metadata. The structured document body may comprise multiple sections with narrative text and clinical statement entries which form the content tree of the document. Cloned entries (acts using the same Act.id value as the original act) may substitute DICOM by-reference relationships.

5 Mapping and Validation

5.1 DICOM SR Sample Document Representation

Insert brief description of encoding (encoding according to PS 3.17 SR encoding examples)

General topics (Annex A contains the sample documents)

The following is a simple and non-comprehensive illustration of the encoding of the Informative SR Content Tree Example in PS 3.3.

SR Tree Depth	Nesting	Attribute	Tag	VR	VL (hex)	Value
		SOP Class UID	(0008,0016)	UI	001e	1.2.840.10008.5.1.4. 1.1.88.33
		SOP Instance UID	(0008,0018)	UI	0012	1.2.3.4.5.6.7.300
		Study Date	(0008,0020)	DA	0008	19991029
		Content Date	(0008,0023)	DA	0008	19991029
		Study Time	(0008,0030)	TM	0006	154500
		Content Time	(0008,0033)	TM	0006	154510
		Accession Number	(0008,0050)	SH	0006	123456
		Modality	(0008,0060)	CS	0002	SR
		Manufacturer	(0008,0070)	LO	0004	WG6
		Referring Physician's Name	(0008,0090)	PN	0014	Luke^Will^^Dr.^M.D.
		Coding Scheme Identification Sequence	(0008,0110)	SQ	ffffffff	
	%item					
		Coding Scheme Designator	(0008,0102)	SH	000e	99STElsewhere
		Coding Scheme UID	(0008,010C)	UI	0010	1.2.3.4.6.7.8.91
		Responsible Organization	(0008,0116)	ST	0034	Informatics Dept St Elsewhere Hosp Boston, MA 02390
	%enditem					
	%endseq					
		Referenced Performed Procedure Step Sequence	(0008,1111)	SQ	ffffffff	
	%endseq					

Table 4: Sample Encoding of DICOM SR Template 2000

5.2 Equivalent HL7 CDA "Diagnostic Imaging Report" Sample Document Representation

The HL7 development framework (HDF) uses a model driven methodology and the derivation of specifications and interim work products from a common set of reference models. The basis for Refined Message Information Models is the HL7 Reference Information Model (RIM). The CDA RMIM contains act classes, entities, roles and participations derived from the core RIM artifacts.
The HL7 CDA XML representation builds on the HL7 V3 XML Implementation Technology Specification – Data Types and XML Implementable Technology Specification for V3 Structures. XML structures are derived from Hierarchical Message Descriptions (HMD).

CDA Characteristics:
Naming of entry act classes and act relationships (clinical statement), use of Act.code to distinguish clinical statement entries.

5.3 HL7 V3 Target Structure Validation
Validation against Constrained RMIM -> Schematron

8

6 HL7 CDA Release2 Diagnostic Imaging Report Target Structure

Brief Outline of Header, Section and Structured Body

6.1 Constrained HL7 CDA Release2 Diagnostic Imaging Report RMIM

Insert CDA "Diagnostic Imaging Report" RMIM

6.1.1 Header (Level 1)

DICOM SR Header, SR Content -> Mapping to HL7 CDA
Use of "Transform"

Relevant CDA Header Contents
- Identity of the patient ("recordTarget" participation) -> DICOM SR Subject Context: Patient
- Identity of the requested procedure ("documentationOf" act relationship) -> DICOM SR Procedure Context
- Identity of the dictating physician ("author" participation) -> DICOM SR Observer Context
- Identity of the transcriptionist ("dataEnterer" participation) -> DICOM SR Header (Participant Sequence, DICOM Supp 101)
- Identity of the report signing physician who is legally responsible ("legalAuthenticator" participation) -> DICOM SR Header (Verifying Observer Sequence)
- Identity of the report signing physician ("authenticator" participation) -> DICOM SR Header (Participant Sequence, DICOM Supp 101)
- Identity of the institution owning the report ("custodian" participation)
- Identity of the request/order ("inFulfillmentOf" act relationship) -> DICOM SR Procedure Context

6.1.2 Section (Level 2)

General Mapping of Document Sections

Mapping of DICOM SR Content Item to CDA Clinical Document Section

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	ACT
moodCode	CS	1..1	EVN

id	II	0..1	*Section Identifier*
code	CE	1..1	LOINC section code?
title	ST	0..1	<e.g. "Conclusions">

Table 5: CDA Section Attributes

Relevant attributes Value Type (0040,A040) "CONTAINER", Concept Name Code Sequence (0040,A043) -> Populate Section.title
- Continuity of Content?
- Narrative Text (Attested Content), References to Structured Body Entries within Narrative Text (Use of References versus WADO references)

Nesting of sections
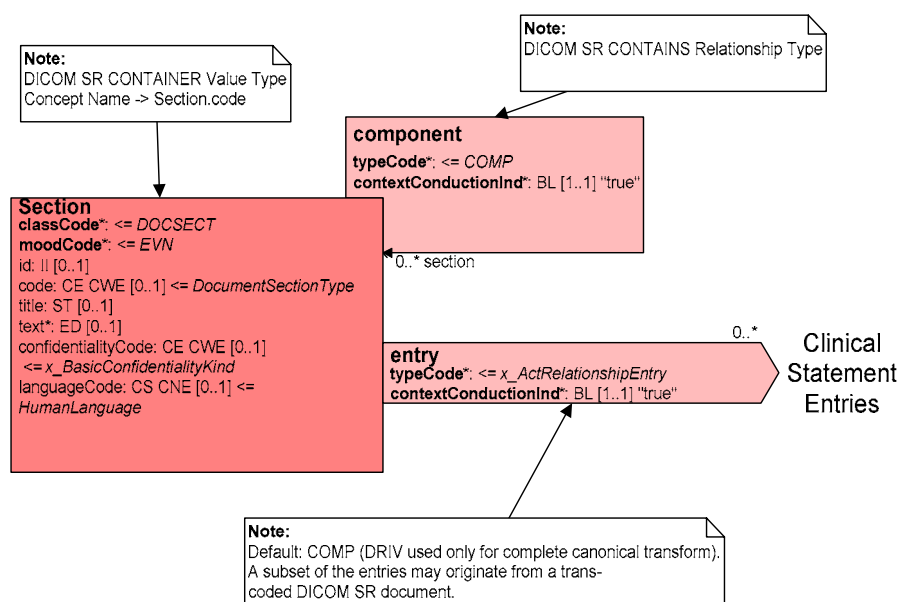
Fig. 6 Nested Sections

- Insert XML CDA Snippet (sample for nested sections
- SR Template 2000 uses nested sections: root content item (CONTAINER) -> Contains (Relationship) -> document sections (CONTAINER)

DICOM Objects Catalog Section

Refer to Annex B: Dicom Section (COCT_RM830110UV) -> Use CDA entry act class and actRelationships names

10

6.1.3 Structured Body (Level 3)

Quantity Measurement + DICOM Composite Object References with optional Region of Interest

Refer to Annex B: A_DicomCompositeObjectReference minimal
(COCT_RM830120UV): Use CDA entry act class and actRelationships names

In addition to that: Quantity Measurement + Subject ActRelationship, RegionOfInterest + Subject ActRelationship

Quantity Measurement Act Class (Observation)

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	OBS
moodCode	CS	1..1	EVN
code	CE	1..1	Concept Code Sequence (0040,A168) of Numeric Measurement (NUM)
effectiveTime	TS	0..1	Not used by NUM
languageCode	CE	0..1	Not used by NUM
value	PQ	1..1	Insert details of mapping of DICOM decimal string data type to PQ components

Table 6: Quantity Measurement

Equivalent relationship of SUBJ actRelationship (QuantityMeasurement to SopInstance) -> INFERRED FROM, R-INFERRED FROM DICOM Relationship Types

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	ROIOVL (A Region of Interest specified for an image using an overlay shape. Maps to the DICOM SR SCOORD Content Item).
moodCode	CS	1..1	EVN
id	SET<II>	1..*	An XML attribute "ID" of type XML ID, is added to RegionOfInterest within the CDA Schema. This attribute serves as the target of a <renderMultiMedia> reference.
code	CS	1..1	"ROI" + Graphic Type (0070,0023) Value
value	LIST<INT>	1..*	Graphic Data (0070,0022) The units of the coordinate values in RegionOfInterest.value are in pixels, expressed as a list of integers. The origin is in the upper left hand corner, with positive X values going

			to the right and positive Y values going down. Check mapping.

Table 7: Region of Interest

Equivalent relationship of SUBJ actRelationship (SopInstance to RegionOfInterest) -> -> SELECTED FROM, R-SELECTED FROM DICOM Relationship Types

For mapping of other actClasses and act Relationships refer to Annex B: 2
A_DicomCompositeObjectReference minimal (COCT_RM830120UV)

SOP Instance Constraints: Only Image References, no waveforms and related temporal coordinates

Link to context section (quantity measurement related to procedure context) via COMP actRelationship

QuantityMeasurement
(UUDD_RMnnnnnn)
Structured Contents of Linear, Area, Volume and Numeric Measurements transcoded from a DICOM SR original document. CMET COCT_RM830120 „ReferencedDicomComposite-Object" is reused.

QuantityMeasurement
classCode: <= *OBS*
moodCode: <= *EVN*
code: CD CWE [1..1] <= *ExternallyDefinedActCodes* (Concept Name Code Sequence)
effectiveTime: TS [0..1] (Observation Date Time (0040,A032))
languageCode: CE CWE [0..1] <= *HumanLanguage*
value: PQ [1..1] (DICOM Decimal String Data Type)

Note:
DICOM Value Type NUM
DICOM Data Type Decimal String mapped to value: PQ (Physical Quantity) Data Type

subject
typeCode: <= *SUBJ*
contextControlCode: CS CNE [0..1] <= *ContextControl* "AP"
contextConductionInd: BL [1..1] "true"

Note:
INFERRED FROM, R-INFERRED FROM
DICOM Relationship Types
Constraint on SOP Classes

subject
typeCode: <= *SUBJ*
contextControlCode: CS CNE [1..1] <= *ContextControl* "AP"
contextConductionInd: BL [1..1] "true"

0..*

SopInstance
classCode: <= *DGIMG*
moodCode: <= *EVN*
id: II [1..1] (SOP Instance UID (0008,0018))
code: CE CWE [1..1] <= *ExternallyDefinedActCodes* (SOP Class UID Code (0008,0016))
title*: ST [0..1] (SOP Class UID derived name)
text: ED [0..1] (WADO Reference)
effectiveTime: TS [0..1] (Content Date (0008,0023) and Content Time (0008,0033))
targetSiteCode: SET<CD> CWE [0..*] <= *ActSite*
subjectOrientationCode: CE CWE [0..1] <= *ImagingSubjectOrientation*

0..* sopInstance

reason
typeCode: <= *RSON*
contextControlCode: CS CNE [1..1] <= *ContextControl* "AP"
contextConductionInd: BL [1..1] "true"

0..1 purposeOfReference

PurposeOfReference
classCode: <= *OBS*
moodCode: <= *EVN*
code: CE CWE [1..1] <= *ExternallyDefinedActCodes* (PurposeOfReference Code: external DICOM codes CID 3407, 7002, 7003, 7005 defined in DICOM Part 16)

0..1 referencedFrames

component
typeCode: <= *COMP*
contextControlCode: CS CNE [1..1] <= *ContextControl* "AP"
contextConductionInd: BL [1..1] "true"

ReferencedFrames
classCode: <= *ROIBND*
moodCode: <= *EVN*
code: CV CNE [1..1] <= *ExternallyDefinedActCodes* (Multi-Frame)

component
typeCode: <= *COMP*

1..1 boundary

subjectOf
typeCode: <= *SUBJ*

Note:
SELECTED FROM, R-SELECTED FROM
DICOM Relationship Types

Boundary
classCode: <= *OBS*
moodCode: <= *EVN*
code: CE CNE [1..1] <= *ExternallyDefinedActCodes* (Spatial Boundary)
value: LIST<INT> [1..*] (Referenced Frame Number (0008,1160))

0..1 regionOfInterest

RegionOfInterest
classCode: <= *ROIOVL*
moodCode: <= *EVN*
id: SET<II> [1..*]
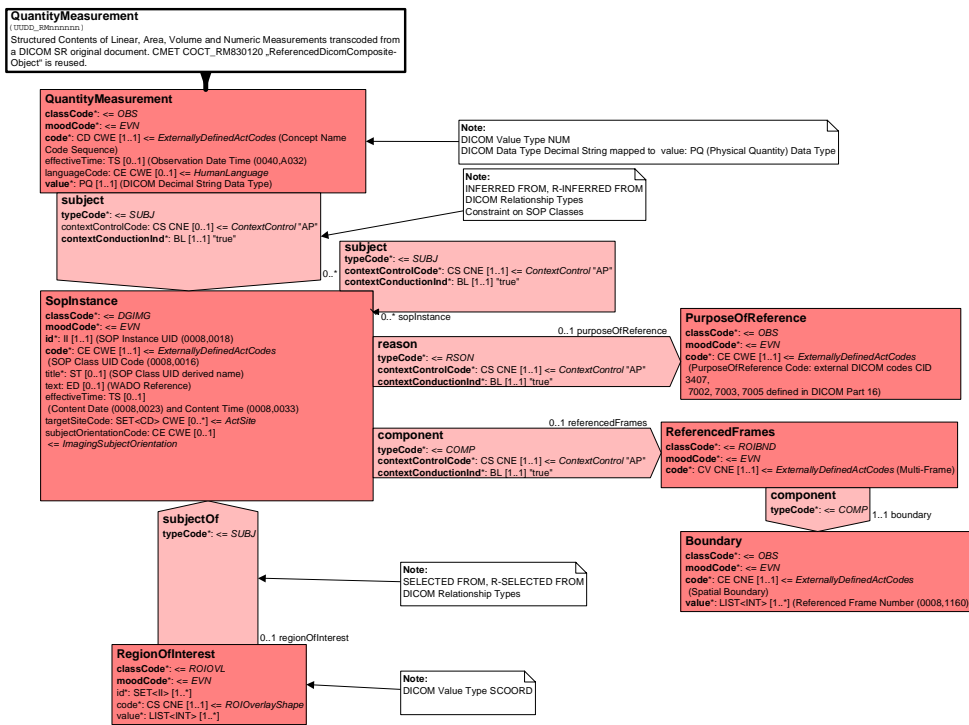**code**: CS CNE [1..1] <= *ROIOverlayShape*
value: LIST<INT> [1..*]

Note:
DICOM Value Type SCOORD

Fig. 7: Quantity Measurement and DICOM Composite Object Reference with ROI

6.1.4 DICOM SR Observation Context

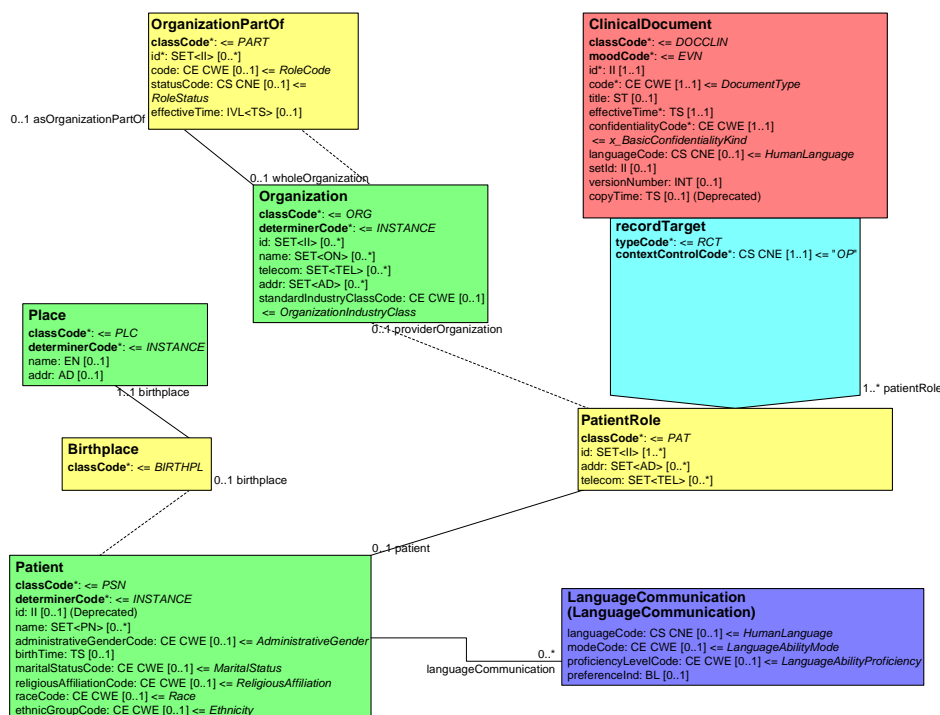### 6.1.4.1 Subject Context

Subject Context, Patient

Fig. 8 Patient Context

Since constraint on single patient context applies to document -> subject context is on document level only. Attributes from SR Header -> Patient Module and Template 1007 are used. No mapping for Organization, Birthplace Role and Place Entity. Mapping is triggered if Template 1006, Subject Class Code equals (121025, DCM,"Patient") which is the default value.

PatientRole

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	PAT

13

id	SET<II>	1..*	"Subject ID": Defaults to value of Patient ID (0010,0020) in Patient Module.
addr	SET<AD>	0..*	Patient's Address (0010,1040) in Patient Demographic Module.
telecom	SET<TEL>	0..*	Patient's Telephone Numbers (0010,2154)) in Patient Demographic Module.

Table 8: Patient Role

Patient Entity

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	PSN
determinerCode	CS	1..1	INSTANCE
name	SET<PN>	0..*	"Subject Name": Defaults to value of Patient's Name (0010,0010) in Patient Module.
administrativeGenderCode	CE	0..1	"Subject Sex": Defaults to value equivalent to Patient's Sex (0010,0040) in Patient Module.
birthTime	TS	0..1	"Subject Birth Date": Defaults to value of Patient's Birth Date (0010,0030) in Patient Module.
maritalStatusCode	CE	0..1	Not mapped, no DICOM attribute specified.
religiousAffiliationCode	CE	0..1	Patient's Religious Preference (0010,21F0) in Patient Demographic Module.
raceCode	CE	0..1	Ethnic Group (0010,2160) in Patient Demographic Module.
ethnicGroupCode	CE	0..1	Ethnic Group (0010,2160): Ethnic group or race of patient -> no distinction between ethnicity and race

Table 9: Patient Entity

LanguageCommunication

Attribute	Data Type	Multiplicity	Value
languageCode	CS	0..1	Patient's Primary Language Code Sequence (0010,0101) in Patient Demographic Module.

modeCode	CE	0..1	Not mapped, no DICOM attribute specified.
proficiencyLevelCode	CE	0..1	Not mapped, no DICOM attribute specified.
preferenceInd	BL	0..1	Check details

Table 10: Language Communication

Subject Context, Fetus

6.1.4.2 Procedure Context

Procedure Context DICOM SR to CDA Mapping:

- DICOM UIDREFs covered by image references + CDA section which contains UIDs of the referenced Study / Series / Instance

- Placer Order Number -> Order.id (CDA Header)

- Study Component UIDs, Filler Order Number and Accession Number not relevant for results reporting in the CDA context

- Procedure Context

    - CDA Header: Documentation of Service Event or

    - Entries: Procedure.code / Act.code (depending on diagnostic or interventional procedure)

CDA Header

Service Event Attribute Values default to DICOM SR „General Study" Module Header Attribute Values
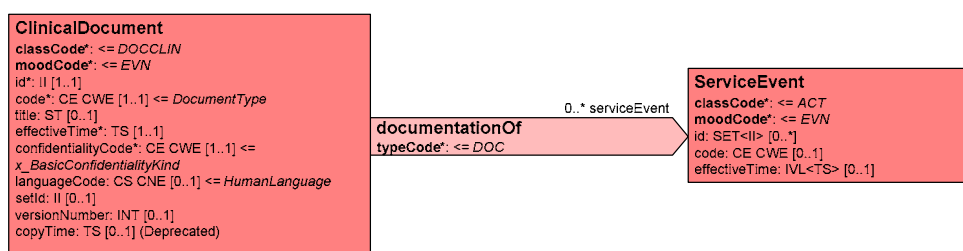

Fig. 9: CDA Header Procedure Context (Service Event)

Attribute	Data	Multiplicity	Value

	Type		
classCode	CS	1..1	ACT
moodCode	CS	1..1	EVN
id	SET<II>	0..*	Study Instance UID (0020,000D)
Code	CE	1..1	Procedure Code Sequence (0008,1032) or Procedure Code (Template 1005)
effectiveTime	IVL<TS>	0..1	Single TS is used instead of interval: Study Date (0008,0020) and Study Time (0008,0030)

Table 11: Service Event

CDA Entries (Clinical Statement, Structured Body)

Procedure or Act (Clinical Statement) Entry Level -> moodCode: EVN

The ServiceEvent Procedure Context of the document header may be overwritten in the CDA structured body if there is a need to refer to multiple imaging procedures or acts. The selection of the "Procedure" or "Act" entry from the clinical statement choice box depends on the nature of the imaging service that has been performed. The "Procedure" entry shall be used for image-guided interventions and minimal invasive imaging services, whereas the "Act" entry shall be used for diagnostic imaging services. The set of attributes is identical for the "Procedure" and "Act" Context.

Fig. 12: Procedure Context for Image-Guided Interventions

Fig. 9 and 10 show the procedure context for image-guided interventions and diagnostic imaging services and its relationship to CDA document sections plus quantity measurements.
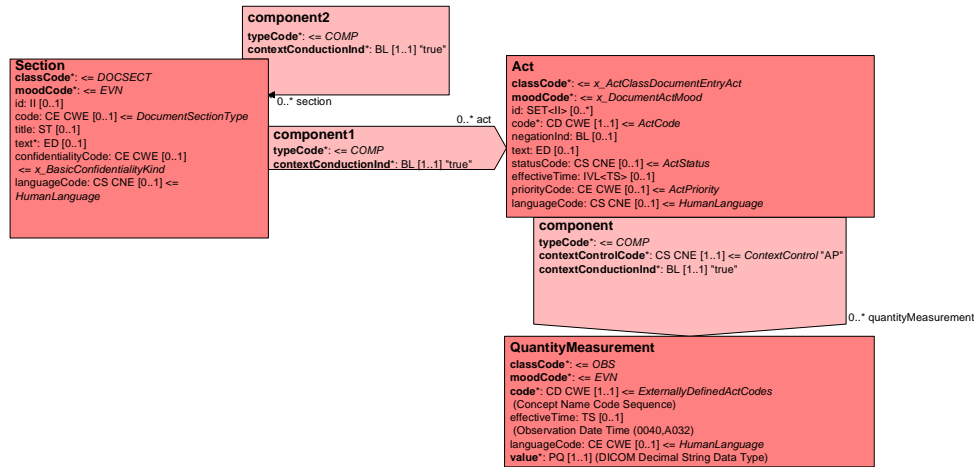
16

component2
typeCode*: <= COMP
contextConductionInd*: BL [1..1] "true"

Section
classCode*: <= DOCSECT
moodCode*: <= EVN
id: II [0..1]
code: CE CWE [0..1] <= DocumentSectionType
title: ST [0..1]
text*: ED [0..1]
confidentialityCode: CE CWE [0..1]
<= x_BasicConfidentialityKind
languageCode: CS CNE [0..1] <=
HumanLanguage

0..* section

0..* act

component1
typeCode*: <= COMP
contextConductionInd*: BL [1..1] "true"

Act
classCode*: <= x_ActClassDocumentEntryAct
moodCode*: <= x_DocumentActMood
id: SET<II> [0..*]
code*: CD CWE [1..1] <= ActCode
negationInd: BL [0..1]
text: ED [0..1]
statusCode: CS CNE [0..1] <= ActStatus
effectiveTime: IVL<TS> [0..1]
priorityCode: CE CWE [0..1] <= ActPriority
languageCode: CS CNE [0..1] <= HumanLanguage

component
typeCode*: <= COMP
contextControlCode*: CS CNE [1..1] <= ContextControl "AP"
contextConductionInd*: BL [1..1] "true"

0..* quantityMeasurement

QuantityMeasurement
classCode*: <= OBS
moodCode*: <= EVN
code*: CD CWE [1..1] <= ExternallyDefinedActCodes
(Concept Name Code Sequence)
effectiveTime: TS [0..1]
(Observation Date Time (0040,A032)
languageCode: CE CWE [0..1] <= HumanLanguage
value*: PQ [1..1] (DICOM Decimal String Data Type)

Fig. 11: Procedure Context for Diagnostic Imaging Services

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	ACT
moodCode	CS	1..1	EVN
Id	SET<II>	0..*	Study Instance UID (0020,000D)
Code	CE	1..1	Procedure Code Sequence (0008,1032) or Procedure Code (Template 1005)
Text	ED	0..1	Study Description (0008,1030)
effectiveTime	IVL<TS>	0..1	Single TS is used instead of interval: Study Date (0008,0020) and Study Time (0008,0030)

Table 12: Common Set of Attributes for Procedure and Act Context

6.1.5 Observer Context

Observer maps to AssignedAuthorRole

Human and Device Observer Context (Choice Box)

Person and Device Observer Context at Document Level -> may be overwritten at section level
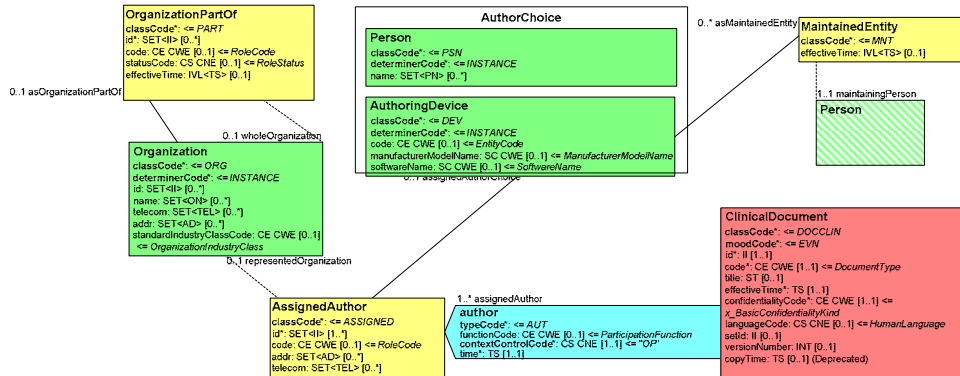
Fig. 12: Document Observer Context

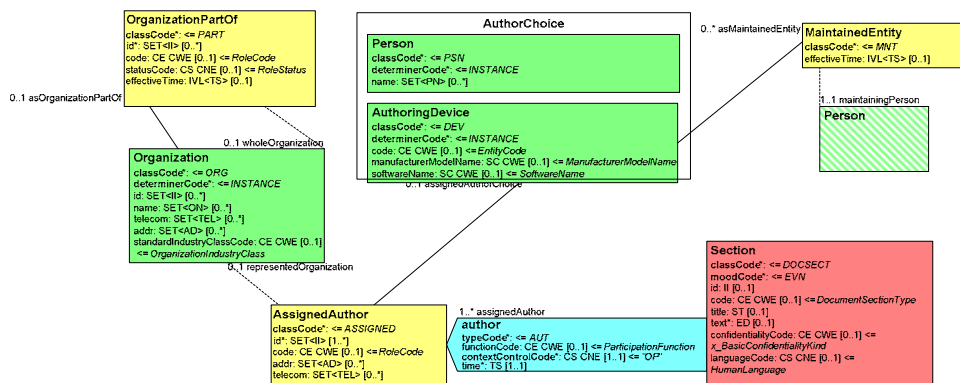Person and Device Observer Context at Document Level

Fig. 13: Section Observer Context

Organization

-> Person Observer's OrganizationName

6.1.5.1 Human Observer

Assigned Author

Person Observer:
Person Identification Code Sequence (from SR Document General Module, part of
Author Observer Sequence specified in DICOM Supp 101)
Person Observer's Role in the Organization
 Person Observer's Role in this procedure -> maps to other Cda participations

Person

PNAME, Person Observer Name
Code covered by Person Entity Class (Element)

6.1.5.2 Device Observer

Assigned Author

Device Observer:
AssignedAuthor.id: Device Observer UID
Device Observer Name (Station Name)
AssignedAuthor.address: Device Location

AuthoringDevice

Device Observer Model Name (Character String)
Device Observer Manufacturer (Character String)

Device
Observer Serial Number and Location cannot be mapped

MaintainedEntity

Person

Annex A: Sample Documents

1 DICOM SR "Basic Diagnostic Imaging Report" (TID 2000)

Insert sample document (structure according to PS 3.17 SR encoding examples)

2 Transcoded HL7 CDA Release2 "Diagnostic Imaging Report"

- Replace Body Height Measurement with Soft Tissue Mass Diameter
- Reference that measurement within Section Narrative Text
- Check Section Codes
- Add Observation Context

```xml
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="CDASINR.xsl"?>
<ClinicalDocument xmlns="urn:hl7-org:v3" xmlns:voc="urn:hl7-org:v3/voc"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="urn:hl7-org:v3 CDA.xsd">
    <typeId root="2.16.840.1.113883.1.3" extension="POCD_HD000040"/>
    <templateId root="2.16.840.1.113883.3.27.1776"/>
    <id root="1.2.528.1.1001.100.22.877.2205.36316062498.20040213160821659"/>
    <code code="18748-4" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"
displayName="Diagnostic Imaging Report"/>
    <title>Diagnostic Imaging Report</title>
    <effectiveTime value="20040213170821"/>
    <confidentialityCode code="N" codeSystem="2.16.840.1.113883.5.25"/>
    <recordTarget>
        <patientRole>
            <id root="2.16.840.1.113883.9876.409.2.10" extension="4030012"/>
            <patient>
                <name>
                    <given>George</given>
                    <family>Bainter</family>
                </name>
                <administrativeGenderCode codeSystem="2.16.840.1.113883.5.1" code="M"/>
                <birthTime value="19331201"/>
            </patient>
        </patientRole>
    </recordTarget>
    <author>
        <time value="200402131708"/>
        <assignedAuthor>
            <id extension="KP00017" root="2.16.840.1.113883.19.5"/>
            <assignedPerson>
                <name>
                    <given>Richard</given>
                    <family>Blitz</family>
```

```
                    <suffix>MD</suffix>
                </name>
            </assignedPerson>
            <representedOrganization>
                <id root="2.16.840.1.113883.19.5"/>
            </representedOrganization>
        </assignedAuthor>
    </author>
    <custodian>
        <assignedCustodian>
            <representedCustodianOrganization>
                <id root="2.16.840.1.113883.19.5"/>
                <name>Ubiquitous General Hospital</name>
            </representedCustodianOrganization>
        </assignedCustodian>
    </custodian>
    <legalAuthenticator>
        <time value="20040213171021"/>
        <signatureCode code="S"/>
        <assignedEntity>
            <id extension="FB000009" root="2.16.840.1.113883.3.933"/>
            <assignedPerson>
                <name>
                    <given>Richard</given>
                    <family>Blitz</family>
                    <suffix>MD</suffix>
                </name>
            </assignedPerson>
        </assignedEntity>
    </legalAuthenticator>
    <inFulfillmentOf>
        <order>
            <id extension=" 68514041"/>
            <!-- *      accession number?          *-->
        </order>
    </inFulfillmentOf>
    <component>
        <structuredBody>
            <component>
                <!--
********************************************************************
            DICOM Objects Section
********************************************************************
    -->
                <section classCode="DOCSECT" moodCode="EVN">
                    <code code="121181" codeSystem="1.2.840.10008.2.16.4" codeSystemName="DICOM
Object Catalog"/>
                    <!-- Not for display -->
                    <title>DICOM Object Catalog</title>
                    <entry>
                        <!--
********************************************************************
            Study
********************************************************************
    -->
                        <act classCode="ACT" moodCode="EVN">
                            <id root="2.16.840.1.113664.3.5.1.3.115864140"/>
                            <code code="113014" codeSystem="1.2.840.10008.2.16.4"
codeSystemName="DICOM" displayName="DICOM Study"/>
                            <!--
****************************************************************
            Series
****************************************************************
    -->
                            <entryRelationship typeCode="COMP">
                                <act classCode="ACT" moodCode="EVN">
```

21

```xml
<id root="2.16.840.1.113664.96.601"/>
<code code="113015" codeSystem="1.2.840.10008.2.16.4"
codeSystemName="DICOM" displayName="DICOM Series"/>
<!-- Add Modality Qualifier Code -->
<!--
    ***********************************************************
    SopInstance
    ***********************************************************
-->
<entryRelationship typeCode="COMP">
    <observation classCode="DGIMG" moodCode="EVN">
        <id root="2.16.840.1.113664.1.96"/>
        <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"/>
        <text mediaType="application/DICOM">
href="http://192.168.254.55/ami/bin/IHERetrieveDocument?requestType=DOCUMENT&amp;documentUID=1.113
654.5.15.1351&amp;preferredContentType=image%2Fjpeg"</text>
        <!-- text mediaType application/DICOM inserted-->
    </observation>
</entryRelationship>
                </act>
            </entryRelationship>
        </act>
    </entry>
</section>
<!--
*************************************************************
        End of  DICOM Objects Section
*************************************************************
-->
        </component>
        <component>
            <!--
*************************************************************
            Findiings Section
*************************************************************
-->
            <section>
                <code code="18782-3" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"/>
                <title>RADIOLOGY STUDY OBSERVATION (Findings)</title>
                <!-- Add imaging procedure that has been performed -->
                <text>There is a large, approximately 3 cm soft tissue mass with poorly defined margins. No
calcification is identified in the mass. There is a small degree of elevation of the minor fissure. Given the patient's
history the mass is suspicious for malignancy. Comparison with prior films may be helpful in determining the rate of
growth of the mass.
<paragraph/>
                    <paragraph/>
Otherwise, the lung fields are somewhat over inflated consisted with the patient's smoking history and this likely
represents a component of COPD.
<paragraph/>
                    <paragraph/>
The cardiomediastinal silhouette is within normal limits. The aorta follows a tortuous course to the abdomen. The
lung hila and pulmonary vasculature are normal without evidence of focal mediastinal adenopathy.The bony
structures show senescent changes consistent with the patient's age. The visible chest wall and abdominal soft
tissues have a normal radiographic appearance.</text>
                <!-- Add SopInstance Reference Structured Entries, also reflect that in the text (attested
content), references of structured entries in narrative text-->
                <!--
*************************************************************
            Quantity Measurement
*************************************************************
-->
                <entry>
                    <observation classCode="OBS" moodCode="EVN">
```

```xml
                    <code code="50373000" codeSystem="2.16.840.1.113883.6.96"
codeSystemName="SNOMED CT" displayName="Body height measure"/>
                        <!-- Example should be based on measurement found in Thorax pa projection image
(right upper lung lobe, align with soft tissue mass diameter included in narrative text (attested content in findings
and conclusions section) -->
                    <effectiveTime value="200402131708"/>
                    <value xsi:type="PQ" value="0.03" unit="m">
                        <translation value="1.1811" code="[in_I]" codeSystem="2.16.840.1.113883.6.8"
codeSystemName="UCUM"/>
                    </value>
                    <!--
*********************************************************************
        Quantity Measurement WADO reference
*********************************************************************
    -->
                    <entryRelationship typeCode="SUBJ">
                        <observation classCode="DGIMG" moodCode="EVN">
                            <id root="2.16.840.1.113664.1.96"/>
                            <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"/>
                                <!-- title is not used for CDA observations. Insertion of SOP Class UID derived
name: <title>Computed Radiography Image</title> is not valid against the schema-->
                            <text mediaType="application/DICOM">
href="http://192.168.254.55/ami/bin/IHERetrieveDocument?requestType=DOCUMENT&amp;documentUID=1.113
654.5.15.1351&amp;preferredContentType=image%2Fjpeg"</text>
                            <effectiveTime value="20040921"/>
                        </observation>
                    </entryRelationship>
                    <!--
*********************************************************************
        End of  Quantity Measurement
*********************************************************************
    -->
                </observation>
            </entry>
        </section>
        <!--
*********************************************************************
        End of Findings Section
*********************************************************************
    -->
    </component>
    <component>
        <!--
*********************************************************************
        Conclusions Section
*********************************************************************
    -->

            <section>


            <!-- <code code="18782-3" codeSystem="2.16.840.1.113883.6.1"
codeSystemName="LOINC"/>
                there is no LOINC code for Radiology Study Conclusions -->
                <code code="121076" codeSystem="1.2.840.10008.2.16.4" codeSystemName="DICOM"/>
                <title>Conclusions</title>
                <text>3 cm soft tissue mass in the right upper lobe suspicious for malignancy. Computed
tomography would be useful in further evaluating the extent of the lesion and the mediastinum.</text>
            </section>
            <!--
*********************************************************************
        End of Conclusions Section
*********************************************************************
    -->
```
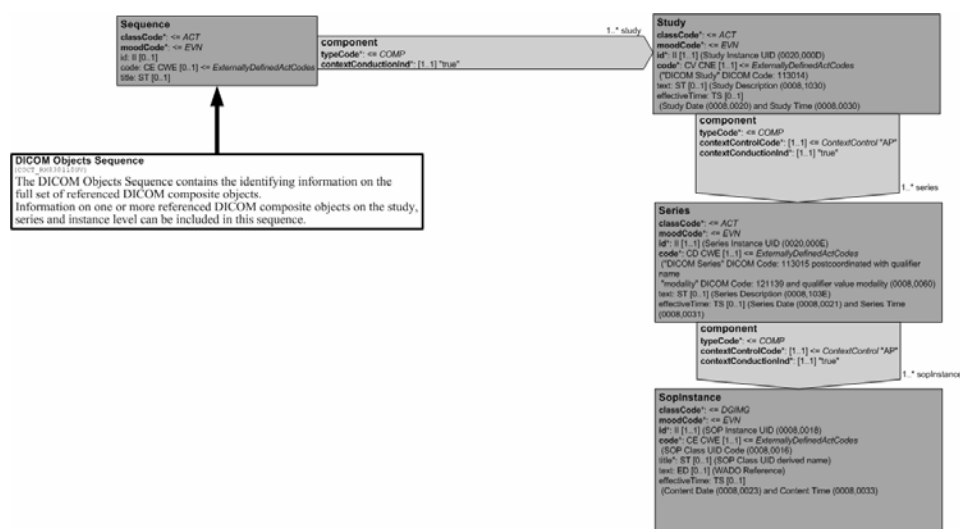
```xml
        </component>
      </structuredBody>
    </component>
</ClinicalDocument>
```

Annex B: HL7 V3 DICOM CMETs (CMET Membership Ballot, January 2007)

Draft published December 6, 2006

1 A_DicomSequence minimal (COCT_RM830110UV)

The A_DicomSequence minimal CMET is used to reference DICOM composite objects within HL7 Version 3 messages. It provides a single location for the identifying information of the study/series/instance hierarchical context of DICOM composite objects that are referenced for a specific purpose. Additional information on this context (e.g. Study Description) may optionally be added. Mappings from DICOM object attributes to the various Act attributes are provided. The CMETs for the HL7 V3 message sequence and the CDA Release 2 section are structurally identical. For the CDA section pattern different clone names are used according to the specified entry names of CDA Release 2.

Note: The A_DicomSequence minimal CMET may be used in combination with COCT_RM830120 to provide additional structured information on individual references to DICOM composite objects. COCT_RM830120 is used to put the references into the context of other acts and observations (e.g. relate referenced DICOM images to lab observations).

The following description of the act classes and act relationships contains the attribute mappings of HL7 V3 attributes to DICOM (Digital Imaging and Communications in Medicine) tags. The group and element number of the mapped DICOM tags are listed in parenthesis. The CDA mappings specify the use of the CMET act classes and act relationships for a CDA Release 2 document section which contains section entries.

1 Sequence

The DICOM Objects Sequence contains the identifying information on DICOM composite objects referenced in a HL7 V3 message for a specific purpose. The sequence can be used for any HL7 V3 message which includes references to composite DICOM objects, such as images and structured reports. Information on one or more referenced DICOM composite objects on the study, series and instance level can be included in a sequence.

Table 1 Sequence Act

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	ACT
moodCode	CS	1..1	EVN
id	II	0..1	*Sequence Identifier*
code	CE	1..1	Externally defined DICOM codes, e.g. <121181 as code property, 1.2.840.10008.2.16.4 as codeSystem property, DCM as codeSystemName property, e.g. "DICOM Object Catalog" as displayName property>
title	ST	0..1	<e.g. "DICOM Object Catalog">

1.1 CDA Mapping (Class Name and Attributes used for CDA Documents)

Section (replaces Sequence)

The CDA DICOM Objects Section contains the identifying information on DICOM composite objects referenced in a CDA Release2 document for a specific purpose. The CDA DICOM Objects Section can be used within any CDA Release 2 document which includes references to composite DICOM objects in the structured part of the CDA document, such as images and structured reports. Information on one or more referenced DICOM composite objects on the study, series and instance level can be included in this section.

Table 2 Section Act

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	ACT
moodCode	CS	1..1	EVN
id	II	0..1	*Section Identifier*
code	CE	1..1	Externally defined DICOM codes, e.g. <121181 as code property, 1.2.840.10008.2.16.4 as codeSystem property, DCM as codeSystemName property, e.g. "DICOM Object Catalog" as displayName

			property>
title	ST	0..1	<e.g. "DICOM Object Catalog">

DICOM Supplement 101:

Specifies the semantics of the section e.g. "DICOM Object Catalog" (DICOM Code Value: 121181) which contains information on the full set of DICOM composite objects referenced in the CDA document: "It is recommended that this list be transcoded to CDA Entries in a Section with Section.Title "DICOM Object Catalog" and a Section.Code of 121181 from the DICOM Controlled Terminology (see PS3.16)."

2 ActRelationship COMPONENT (Sequence to Study)

This actRelationship "COMPONENT" is used to link Sequence with one or more associated study acts.

2.1 CDA Mapping (ActRelationship Name and Attributes used for CDA Documents)

- ActRelationship Clone name: entry (replaces COMPONENT)
- ActRelationship.typeCode: x_ActRelationshipEntry (Constraint: Fixed value = COMP)
- ContextConductionInd: "true"

3 Study

The Study act class contains the DICOM study information that defines the characteristics of a referenced medical study performed on a patient. A 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.

Table 3 DICOM Study Reference in an HL7 v3 Act

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	ACT
moodCode	CS	1..1	EVN
id	II	1..1	*<Study Instance UID (0020,000D)* as root property with no extension property>: Unique identifier for the Study
code	CV	1..1	<113014 as code property, 1.2.840.10008.2.16.4 as codeSystem property, DCM as codeSystemName property, "DICOM Study" as displayName property>

text	ST	0..1	*<Study Description (0008,1030)>* Institution-generated description or classification of the Study (component) performed.
effectiveTime	TS	0..1	*<Study Date (0008,0020)*: Date the Study started; and *Study Time (0008,0030)*: Time the Study started.>

3.1 CDA Mapping (Class Name and Attributes used for CDA Documents)

- Act clone name of the CDA entry is "Act" instead of "Study". The attributes and attribute values of this CDA entry "Act" are identical to those listed in table 3.

4 ActRelationship COMPONENT (Study to Series)

This actRelationship "COMPONENT" is used to link one study act with one or more associated series acts.

4.1 CDA Mapping (ActRelationship Name and Attributes used for CDA Documents)

- ActRelationship Clone name: entryRelationship (replaces COMPONENT)
- ActRelationship.typeCode: x_ActRelationshipEntry (Constraint: Fixed value = COMP)
- ActRelationship.contextControlCode: "AP" (Additive Propagating)
- ContextConductionInd: "true"

5 Series

The Series act class 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.

Table 4 DICOM Series Reference in an HL7 v3 Act

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	ACT
moodCode	CS	1..1	EVN
id	II	1..1	*<Series Instance UID (0020,000E)* as root property with no extension property>): Unique identifier of the Series.
code	CD	0..1	<113015 as code property, 1.2.840.10008.2.16.4 as codeSystem property, DCM as codeSystemName property, "DICOM Series" as displayName property, Modality as qualifier property (see text and Table 5)>

text	ST	0..1	*<Series Description (0008,103E)>* User provided description of the Series
effectiveTime	TS	0..1	*<Series Date (0008,0021)* : Date the Series started. and *Series Time (0008,0031)*: Time the Series started.>

The code for the Act representing a Series uses a qualifier property to indicate the modality. The qualifier property is a list of coded name/value pairs. For this use, only a single list entry is used, as described in Table 5.

Table 5 Modality Qualifier for the Series Act.Code

Property	Data Type	Value
name	CV	<121139 as code property, 1.2.840.10008.2.16.4 as codeSystem property, DCM as codeSystemName property, "Modality" as displayName property>
value	CD	*<Modality (0008,0060)* as code property, 1.2.840.10008.2.16.4 as codeSystem property, DCM as codeSystemName property, *Modality code meaning* (from PS3.16) as displayName property>

5.1 CDA Mapping (Class Name and Attributes used for CDA Documents)

- Act Clone Name: Act
- Act clone name of the CDA entry is "Act" instead of "Series". The attributes and attribute values of this CDA entry "Act" are identical to those listed in table 4 and 5.

6 ActRelationship COMPONENT (Series to SopInstance)

This actRelationship "COMPONENT" is used to link one series act with one or more associated SopInstance acts.

6.1 CDA Mapping (ActRelationship Name and Attributes used for CDA Documents)

- ActRelationship Clone name: entryRelationship (replaces COMPONENT)
- ActRelationship.typeCode: x_ActRelationshipEntry (Constraint: Fixed value = COMP)
- ActRelationship.contextControlCode: "AP" (Additive Propagating)
- ContextConductionInd: "true"

7 SopInstance

Please refer to for the description of the SopInstance act class.

2 A_DicomCompositeObjectReference minimal (COCT_RM830120UV)
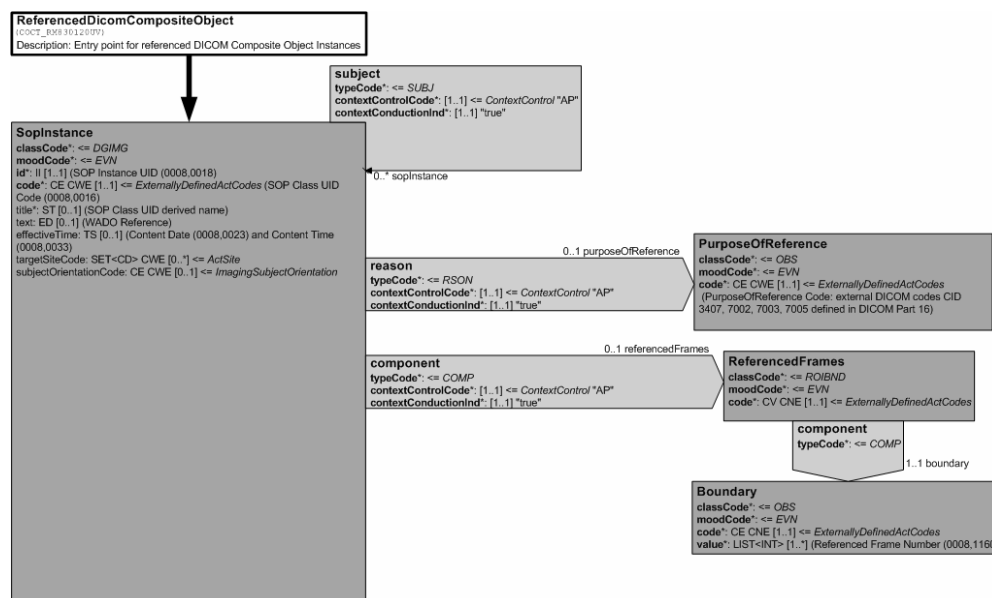
The A_DicomCompositeObjectReference minimal CMET is used to reference DICOM composite objects within HL7 Version 3 messages in the context of acts and observations. It provides detailed information on the referenced DICOM composite object such as images, presentation states and DICOM structured documents. Mappings from DICOM object attributes to the various Act attributes are provided. The CMETs for the HL7 V3 message DICOM composite object references and the corresponding CDA Release 2 section entries are structurally identical. For the CDA section entries different clone names are used according to the specified entry names in the CDA Release2.

Note: The A_DicomCompositeObjectReference minimal CMET COCT_RM830120 may be used in combination with COCT_RM830110 which provides a single location for lookup of referenced DICOM composite objects of an HL7 V3 message (identifying information on the DICOM study/series/instance hierarchy can be found there).

The following description of the act classes and act relationships contains the attribute mappings of HL7 V3 attributes to DICOM (Digital Imaging and Communications in Medicine) tags. The group and element number of the mapped DICOM tags are listed in parenthesis. The CDA mappings specify the use of the CMET act classes and act relationships as CDA Release 2 document section entries.

1 SopInstance

30

The SopInstance act class contains the DICOM Service Object Pair (SOP) Instance information for referenced DICOM composite objects. The SopInstance act class is used to reference both, image and non-image DICOM instances. The text attribute contains the DICOM WADO (Web Access to Persistent DICOM Objects, DICOM Standard PS 3.18) reference.

Table 1 DICOM Composite Object Reference in an HL7 v3 Act

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	DGIMG
moodCode	CS	1..1	EVN
id	II	1..1	*<SOP Instance UID (0008,0018)* as root property with no extension property> Uniquely identifies the SOP Instance.
code	CE	1..1	*<SOP Class UID (0008,0016)* as code property, 1.2.840.10008.2.6.1 as codeSystem property, DCMUID as codeSystemName property, *SOP Class UID Name* (from PS3.6) as displayName property>: Unique Identifier for the SOP Class as Code Property
title	ST	0..1	SOP Class UID derived name
text	ED	0..1	<application/DICOM as mediaType property, *WADO reference* (see Table X.3-6) as reference property>
effectiveTime	TS	0..1	*<Content Date (0008,0023): The date the content creation (e.g. image pixel data, document) started;* and *Content Time (0008,0033): The time the content creation (e.g. image pixel data, document) started.>*

The DGIMG classCode is used to reference all DICOM Composite Instances, not just diagnostic images.

WADO is a service that enables the Web Client System to retrieve DICOM Persistent Objects managed by a Web Enabled DICOM Server, through the HTTP/HTTPs protocol. The WADO reference uses an URI with query parameters (Table 7). Access to the content of a data object is enabled by specifying a "link" pointing to a specific DICOM Persistent Object by means of its URL/URI and specifying its DICOM object Instance UID and the transfer syntax to be employed.

Table 2 WADO Reference in HL7 DGIMG Observation.Text

WADO Component	Source
<scheme>://<authority>/<path>	Configuration setting, used by the conversion process, identifying the WADO server
?requestType=WADO	Fixed

&studyUID=<*uid*>	Study Instance UID for referenced instance
&seriesUID=<*uid*>	Series Instance UID for referenced instance
&objectUID=<*uid*>	SOP Instance UID for referenced instance
&contentType=application/DICOM	Fixed

1.1 CDA Mapping (Class Name and Attributes used for CDA Documents)

- Act clone name of the CDA entry is "Observation" instead of "SopInstance". The attributes and attribute values of this CDA entry "Observation" are identical to those listed in table 1 and 2.

2 ActRelationship SUBJECT (SopInstance recursive actRelationship)

This optional recursive "SUBJECT" actRelationship is used to link a referenced DICOM Presentation State to one or more associated referenced DICOM images (SopInstance act class is used in both cases) it is applied to.

2.1 CDA Mapping (ActRelationship Name and Attributes used for CDA Documents)

- ActRelationship Clone name: entryRelationship (replaces SUBJECT)
- ActRelationship.typeCode: x_ActRelationshipEntry (Constraint: Fixed value = SUBJ)
- ActRelationship.contextControlCode: "AP" (Additive Propagating)
- ContextConductionInd: "true"

3 ActRelationship REASON (SopInstance to PurposeOfReference)

This optional "REASON" actRelationship is used to relate a referenced DICOM composite object (SopInstance ActClass) with the PurposeOfReference ActClass which includes the coded purpose(s) of reference.

3.1 CDA Mapping (ActRelationship Name and Attributes used for CDA Documents)

- ActRelationship Clone name: entryRelationship (replaces REASON)
- ActRelationship.typeCode: x_ActRelationshipEntry (Constraint: Fixed value = RSON)
- ActRelationship.contextControlCode: "AP" (Additive Propagating)
- ContextConductionInd: "true"

4 PurposeOfReference

Describes the purpose the DICOM composite object reference is made for. Appropriate codes such as externally defined DICOM codes may be used to specify the semantics of the purpose of reference. When absent, implies that the reason for the reference is unknown.

Codes specified in DICOM Part 16 "Content Mapping Resource" (DICOM PS 3.16) shall be used to designate the coded purpose of reference. Candidate codes are contained in the DICOM Context Groups 3407, 7002, 7003 and 7005. The attribute mapping for the code attributes are listed in table 3.

Table 3 DICOM Coded Purpose of Reference in an HL7 v3 Act

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	OBS
moodCode	CS	1..1	EVN
code	CE	1..1	*<Code Value (0008,0100) as code property,* 1.2.840.10008.2.16.4 as codeSystem property, *Coding Scheme Designator (0008,0102) as* codeSystemName property, *Code Meaning (0008,0104)* as displayName property>

4.1 CDA Mapping (Class Name and Attributes used for CDA Documents)

- Act Clone Name: Observation
- Act clone name of the CDA entry is "Observation" instead of "PurposeOfReference"
- The attributes and attribute values of this "Observation" CDA entry are identical to those listed in table 3

5 ActRelationship COMPONENT (SopInstance to ReferencedFrames)

This optional "COMPONENT" actRelationship is used to link a referenced DICOM composite object to one or more frames of a DICOM multi-frame image SOP instance.

5.1 CDA Mapping (ActRelationship Name and Attributes used for CDA Documents)

- ActRelationship Clone name: entryRelationship (replaces COMPONENT)
- ActRelationship.typeCode: x_ActRelationshipEntry (Constraint: Fixed value = COMP)
- ActRelationship.contextControlCode: "AP" (Additive Propagating)
- ContextConductionInd: "true"

6 ReferencedFrames

This act class shall be used if the referenced DICOM SOP instance is a multi-frame image and the reference does not apply to all frames. The list of integer values for the referenced frames of a DICOM multi-frame image SOP instance is contained in the Boundary ActClass.

Table 4 DICOM Referenced Frames in an HL7 v3 Act

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	ROIBND
moodCode	CS	1..1	EVN
code	CV	1..1	<*Code Value (0008,0100)* as code property, 1.2.840.10008.2.16.4 as codeSystem property, DCM as codeSystemName property, *Code Meaning (0008,0104)* as displayName property>: Proposal to define an appropriate DICOM code has been submitted

6.1 CDA Mapping (Class Name and Attributes used for CDA Documents)

- Act Clone Name: Observation
- Act clone name of the CDA entry is "Observation" instead of "ReferencedFrames"

7 ActRelationship Component (ReferencedFrames to Boundary)

This "COMPONENT" actRelationship is used to link the ReferencedFrames ActClass to the Boundary ActClass which contains the list of integer values for the referenced frames of a DICOM multi-frame image SOP instance.

7.1 CDA Mapping (ActRelationship Name and Attributes used for CDA Documents)

- ActRelationship Clone name: entryRelationship (replaces COMPONENT)
- ActRelationship.typeCode: x_ActRelationshipEntry (Contstraint: Fixed value = COMP)

8 Boundary

The act class 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 first frame shall be denoted as frame number 1. This act class shall be used if the referenced DICOM SOP instance is a multi-frame image and the reference does not apply to all frames.

Table 5 Boundary ActClass

Attribute	Data Type	Multiplicity	Value
classCode	CS	1..1	OBS
moodCode	CS	1..1	EVN
code	CE	1..1	<*Code Value (0008,0100)* as code property, 1.2.840.10008.2.16.4 as codeSystem property, DCM as codeSystemName property, *Code Meaning (0008,0104)* as displayName

			property>: Proposal to define an appropriate DICOM code has been submitted
value	LIST<INT>	1..*	*<Referenced Frame Number (0008,1160)>* Identifies the frame numbers within the Referenced SOP Instance to which the reference applies. The first frame shall be denoted as frame number 1. Values shall be provided if the Referenced SOP Instance is a multi-frame image and the reference does not apply to all frames.

8.1 CDA Mapping (Class Name and Attributes used for CDA Documents)

- Act Clone Name: ObservationAct clone name of the CDA entry is "Observation" instead of "Boundary"