

## DICOM Correction Proposal

STATUS	Letter Ballot
Date of Last Update	2023-09-02
Person Assigned	Clunie
Submitter Name	Jörg Riesmeier <dicom@jriesmeier.com>
Submission Date	2023-01-27

Correction Number	CP-2283
Log Summary: Clarify use of Concept Name Code Sequence in Encapsulated Documents	
Name of Standard PS3.3	
<p>Rationale for Correction:</p> <p>The Concept Name Code Sequence (0040,A043) Attribute in the Encapsulated Document Module is defined as “A coded representation of the document title.” This does not necessarily mean that its value is required to be identical to the Value of the Document Title (0042,0010), e.g. if the value of the “Title” entry as encoded in the PDF data is used. The same is true if structured content in a manner of a typical Structured Report is encoded in the Content Sequence (0040,A730). Therefore, it is proposed to add some clarifying Notes.</p> <p><i>Editorial changes:</i> Terms defined in the DICOM standard, such as “Template” or “Content Item”, should always be written with capital initials. For the term “Template”, the required changes to Part 3 probably cannot be done automatically since the term is also used with other meanings than the one defined in PS3.16 Section 3.1.</p> <p><i>Comment:</i> Yellow background color is used to highlight the relevant parts of the standard text.</p>	
Correction Wording:	

*Change PS3.3 Section C.24.2*

### C.24.2 Encapsulated Document Module

Table C.24-2 defines the **Attributes of the Encapsulated Document** ~~Attributes~~**Module**.

**Table C.24-2. Encapsulated Document Module Attributes**

Attribute Name	Tag	Type	Attribute Description
Instance Number	(0020,0013)	1	A number that identifies this SOP Instance. The value shall be unique within a Series.
Content Date	(0008,0023)	2	The date the document content creation was started.
Content Time	(0008,0033)	2	The time the document content creation was started.
Acquisition DateTime	(0008,002A)	2	The date and time that the original generation of the data in the document started.
Image Laterality	(0020,0062)	3	Laterality of the (possibly paired) body part that is the subject of the encapsulated document.

Attribute Name	Tag	Type	Attribute Description
			<p>Enumerated Values:</p> <p><b>R</b> right  <b>L</b> left  <b>U</b> unpaired  <b>B</b> both left and right</p> <p>If Modality (0008,0060) is M3D, then values for this Attribute shall refer to the intended placement of the created object regardless of how it was generated (see also Section C.35.1 "Manufacturing 3D Model Module").</p>
Burned In Annotation	(0028,0301)	1	<p>Indicates whether or not the encapsulated document contains sufficient burned in annotation to identify the patient and date the data was acquired.</p> <p>Enumerated Values:</p> <p><b>YES</b>  <b>NO</b></p> <p>Identification of patient and date as text in an encapsulated document (e.g., in an XML attribute or element) is equivalent to "burned in annotation". A de-identified document may use the value NO.</p> <p>If Modality (0008,0060) is M3D, the presence of identifying information embossed or engraved on any part of the model shall be indicated by a value of YES.</p>
Recognizable Visual Features	(0028,0302)	3	<p>Indicates whether or not the Instance contains sufficiently recognizable visual features to allow the Instance or a reconstruction from a set of Instances to identify the patient.</p> <p>Enumerated Values:</p> <p><b>YES</b>  <b>NO</b></p> <p>If this Attribute is absent, then the Instance may or may not contain recognizable visual features.</p>
Source Instance Sequence	(0042,0013)	1C	<p>A Sequence that identifies the set of Instances that were used to derive the encapsulated document.</p> <p>One or more Items shall be included in this Sequence.</p> <p>Required if derived from one or more DICOM Instances. May be present otherwise.</p> <p>Note</p> <p>Unlike other uses of Source Instance Sequence (0042,0013), such as in the General Reference Module, references to images are permitted in this Module. This Module does not include the Source Image Sequence (0008,2112). The Defined Context Group for Purpose of Reference Code Sequence (0040,A170) includes an appropriate concept.</p>
>Include Table 10-11 "SOP Instance Reference Macro Attributes"			

Attribute Name	Tag	Type	Attribute Description
>Purpose of Reference Code Sequence	(0040,A170)	3	Describes the purpose for which the reference is made, that is what role the source Instances played in the derivation of this encapsulated document  Only a single Item single Item is permitted in this Sequence.
>>Include Table 8.8-1 "Code Sequence Macro Attributes"			DCID 7060 "Encapsulated Document Source Purpose of Reference".
Referenced Image Sequence	(0008,1140)	3	The set of Image Instances referenced in the encapsulated document.  One or more Items are permitted in this Sequence.
>Include Table 10-3 "Image SOP Instance Reference Macro Attributes"			
>Relative URI Reference Within Encapsulated Document	(0068,7005)	1C	The relative URI reference used in the encapsulated document to reference the Image Instance in this Item.  This may be used to maintain referential integrity between a set of related encapsulated documents.  Required if the Encapsulated Document (0042,0011) contains a reference to the Image Instance in this Item.  See Section C.24.2.4.
Referenced Instance Sequence	(0008,114A)	3	The set of non-image SOP Instances referenced in the encapsulated document.  One or more Items are permitted in this Sequence.
>Include Table 10-11 "SOP Instance Reference Macro Attributes"			
>Relative URI Reference Within Encapsulated Document	(0068,7005)	1C	The relative URI reference used in the encapsulated document to reference the SOP Instance in this Item.  This may be used to maintain referential integrity between a set of related encapsulated documents.  Required if the Encapsulated Document (0042,0011) contains a reference to the SOP Instance in this Item.  See Section C.24.2.4.
Document Title	(0042,0010)	2	The title of the document.  Note  In the case of a PDF encapsulated document, this may be the value of the "Title" entry in the "Document Information Directory" as encoded in the PDF data.
Concept Name Code Sequence	(0040,A043)	2	A coded representation of the document title.  Note  1. <u>In the case of a PDF encapsulated document, the coded representation is not required to be identical to the Value of Document Title (0042,0010), e.g., when the "Title" entry of the PDF data is used.</u>

Attribute Name	Tag	Type	Attribute Description
			<p><b>2. <u>When the Content Sequence (0040,A730) is present and its structured content is used in a manner of a typical Structured Report, the coded representation serves as the Document Title of this Structured Report. See Section C.24.2.2 for further explanation.</u></b></p> <p>Zero or one Item shall be included in this Sequence.</p>
>Include Table 8.8-1 "Code Sequence Macro Attributes"			<p>For documents with Modality (0008,0060) equal to M3D, BCID 7061 "Model Document Title".</p> <p>For all other <del>E</del>ncapsulated documents, BCID 7020 "Document Title".</p>
Document Class Code Sequence	(0040,E008)	3	<p>Additional classifications of the document, beyond the title represented in Concept Name Code Sequence <b>(0040,A043)</b>. May be equivalent to HL7 v2.x TXA-2.</p> <p>One or more Items are permitted in this Sequence.</p>
>Include Table 8.8-1 "Code Sequence Macro Attributes"			No Baseline CID is defined.
Verification Flag	(0040,A493)	3	<p>Indicates whether the <del>E</del>ncapsulated <del>D</del>ocument is Verified.</p> <p>Enumerated Values:</p> <p><b>UNVERIFIED</b> Not attested by a legally accountable person.</p> <p><b>VERIFIED</b> Attested to (signed) by a Verifying Observer or Legal Authenticator named in the document, who is accountable for its content.</p>
HL7 Instance Identifier	(0040,E001)	1C	<p>Instance Identifier of the encapsulated HL7 Structured Document, encoded as a UID (OID or UUID), concatenated with a caret ("^") and Extension value (if Extension is present in Instance Identifier).</p> <p>Required if encapsulated document is a CDA document.</p>
Predecessor Documents Sequence	(0040,A360)	3	<p>References to SOP Instances whose content has been wholly or partially included in this document with or without modification.</p> <p>One or more Items are permitted in this Sequence.</p>
>Include Table C.17-3 "Hierarchical SOP Instance Reference Macro Attributes"			<p>Purpose of Reference Code Sequence in the Hierarchical SOP Instance Reference Macro DCID 7062 "Purpose of Reference to Predecessor 3D Model" if Modality (0008,0060) is M3D; otherwise, DCID 7009 "Purpose of Reference to Predecessor Report".</p>
Identical Documents Sequence	(0040,A525)	3	<p>Duplicates of this document, stored with different SOP Instance UIDs.</p> <p>One or more Items are permitted in this Sequence.</p> <p>See Section C.17.2.2 for further explanation.</p>
>Include Table C.17-3 "Hierarchical SOP Instance Reference Macro Attributes"			
MIME Type of Encapsulated Document	(0042,0012)	1	The type of the encapsulated document stream described using the MIME Media Type (see RFC 2046).

Attribute Name	Tag	Type	Attribute Description
List of MIME Types	(0042,0014)	1C	<p>MIME Types of subcomponents of the encapsulated document.</p> <p>Required if the encapsulated document incorporates subcomponents with MIME types different than the primary MIME Type of the encapsulated document.</p> <p>Note</p> <p>An Encapsulated CDA that includes an embedded JPEG image and an embedded PDF would list "image/jpeg\application/pdf".</p>
Encapsulated Document	(0042,0011)	1	Encapsulated Document stream, containing a document encoded according to the MIME Type.
Encapsulated Document Length	(0042,0015)	3	<p>The length of the Encapsulated Document stream, not including any trailing padding added for encapsulation as a DICOM object.</p> <p>If present, shall be equal to the Value Length if even, or one less than the Value Length if odd.</p> <p>Note</p> <p>In the absence of this Attribute, the value of Encapsulated Document (0042,0011) may have been padded to even length as required for all DICOM Data Element Values, so it would not be possible to extract the original unpadded document if it were of odd length.</p>
Value Type	(0040,A040)	1C	<p>The type of the value encoded in this Content Item.</p> <p>Enumerated Values:</p> <p><b>CONTAINER</b></p> <p>Required if Content Sequence (0040,A730) is present.</p>
Content Sequence	(0040,A730)	3	<p>A potentially recursively nested Sequence of Items that conveys structured content.</p> <p>One or more Items are permitted in this Sequence.</p> <p>See Section C.17.3.2.4 and Section C.24.2.2 for further explanation.</p>
>Relationship Type	(0040,A010)	1	<p>The type of relationship between the (enclosing) Source Content Item and the Target Content Item.</p> <p>IODs specify additional constraints on Relationships (including lists of Enumerated Values).</p> <p>Enumerated Values:</p> <p><b>CONTAINS</b>  <b>HAS OBS CONTEXT</b>  <b>HAS ACQ CONTEXT</b>  <b>HAS CONCEPT MOD</b></p> <p>See Section C.17.3.2.4 for further explanation.</p>
>Include Table C.17-6 "Document Relationship Macro Attributes"			

Attribute Name	Tag	Type	Attribute Description
>Include Table C.17-5 "Document Content Macro Attributes"			
Continuity of Content	(0040,A050)	1C	<p>This flag specifies for a CONTAINER whether or not its contained Content Items are logically linked in a continuous textual flow, or are separate Items.</p> <p>Enumerated Values:  <b>SEPARATE</b>  <b>CONTINUOUS</b></p> <p>See Section C.18.8.1.1 for further explanation.</p> <p>Required if Content Sequence (0040,A730) is present.</p>
Content Template Sequence	(0040,A504)	1C	<p>Template that describes the content of this Content Item and its subsidiary Content Items.</p> <p>Only a single Item shall be included in this Sequence.</p> <p>Required if Content Sequence (0040,A730) is present and if a <b>Template</b> defined and known to the implementation at the time of encoding was used to define the content of this Item, and the <b>Template</b> consists of a single CONTAINER with nested content, and it is the outermost invocation of a set of nested <b>Templates</b> that start with the same CONTAINER (see Section C.18.8.1.2).</p>
>Mapping Resource	(0008,0105)	1	<p>Mapping Resource that defines the <b>Template</b>. See Section 8.4.</p> <p>Defined Terms:  <b>DCMR</b> DICOM Content Mapping Resource</p>
>Mapping Resource UID	(0008,0118)	3	<p>Uniquely identifies the Mapping Resource that defines the <b>Template</b>.</p> <p>Note</p> <p>The <b>Unique Identifier</b> for the DICOM Content Mapping Resource "DCMR" is defined in PS3.6.</p>
>Template Identifier	(0040,DB00)	1	Template identifier.

#### Note

- One could distinguish four stages in the creation of ~~the an~~ Encapsulated Document **ObjectSOP Instance**, identified by the following Attributes:
  - Measurement and/or data collection, identified by Acquisition DateTime (0008,002A) in the Encapsulated Document Module.
  - Creation of the original documentation of the data collection, identified by Content Date (0008,0023) and Content Time (0008,0033).
  - Rendering of the original documentation into the format that will be encapsulated, e.g., a PDF document. The rendering time is not captured by any DICOM Attribute, but may be encoded in the rendering.
  - Encapsulation of the rendering into a DICOM Object, identified by Instance Creation Date (0008,0012) and Instance Creation Time (0008,0013) in the SOP Common Module.
- DICOM does not specify requirements for consistency between DICOM Attribute values and data in the encapsulated document. It is expected that applications will ensure consistency in a manner appropriate to the application. For example, the Patient ID in an encapsulated CDA document may be that of a

different institution, which originated the document, and it may be appropriate for the DICOM Attribute value to be different.

*Change PS3.3 Section C.24.2.2*

## C.24.2.2 Content Sequence

Content Sequence (0040,A730) encodes structured content relevant to the Encapsulated Document (0042,0011). This allows structured data in DICOM encoded form to accompany or describe some or all of the contents of the otherwise opaque encapsulated document, and enables receiving implementations to extract that data, e.g., to tabulate numeric measurements, provide them as merge fields for dictation, or store them in a database.

### Note

Some encapsulated document formats may themselves have some structured content, e.g., the non-narrative part of an HL7 CDA object, or the XMP metadata of a PDF object. This mechanism allows a DICOM-aware system to extract data without needing to parse or understand what is encapsulated.

There is no expectation that all of the narrative or visually rendered content in the encapsulated document be replicated in a structured form in the Content Sequence (0040,A730), nor is it expected that all of the information in the Content Sequence (0040,A730) be present in the encapsulated document. E.g., the structured content might contain codes describing the encapsulated document, or the encapsulated document may contain observations that are not replicated in the structured content.

The use of the Content Sequence (0040,A730) follows the pattern established for Structured Reports, and each Item of the Sequence in the top level Data Set is a Content Item (see Section C.17.3.2 "Content Item Attributes").

Each Item of the Sequence in the top level Data Set may, for instance, be a numeric measurement **eContent iItem** (see Section C.18.1 "Numeric Measurement Macro"). E.g.:

- NUM (8821-1, LN, "Left Ventricular ED Volume") = 98 (mm3, UCUM, "mm3")
- NUM (8808-8, LN, "Left Ventricular Ejection Fraction by Angiography") = 65 (% , UCUM, "Percent")

Alternatively, nested **eContent iItems** may be used in the manner of a typical Structured Report, and an appropriate **iTemplate** from PS3.16 invoked (e.g., the TID 1500 Measurement Report **iTemplate**), in which case the Concept Name Code Sequence (0040,A043) serves as Document Title and the name of the top level CONTAINER **eContent iItem** of the Structured Report, and such Content Items as measurements are nested within containers, may be related to regions of interest, given tracking identifiers, etc.