

DICOM Correction Proposal

STATUS	Final Text
Date of Last Update	2011/08/15
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Submission date	2011/01/27

Correction Number	CP-1130
Log Summary: Clarify Referenced Image Sequence usage as Additional DICOMDIR keys	
Name of Standard	
PS 3.11 2011	
Rationale for Correction:	
<p>1) Referenced Image Sequence (0008,1140) in General Image Module (or in more specialized module) is a sequence whose content evolved a few years ago to add a mechanism to transmit information about the Purpose of Reference in Image SOP Instances. However, Application Profiles defining this Referenced Image Sequence as an additional DICOMDIR key in PS 3.11 were not updated leading to situations where different interpretations could be made of the Standard:</p> <ul style="list-style-type: none"> - In some profiles (e.g. STD-GEN-CD), expected content of Referenced Image Sequence is explicitly listed (Referenced SOP Class UID and Referenced SOP Instance UID). In other Profiles (e.g. STD-GEN-DVD-JPEG), just the Sequence itself is listed as additional Key. It is not clear if Purpose of Reference shall not be included in STD-GEN-CD, as well as if all content of the Referenced Image Sequence shall be copied or if Type 3 elements in the Sequence could be skipped when copying the sequence or not. - Other Profiles like STD-XABC-CD or STD-XA1K-DVD also list this sequence as additional key with condition attached to XA BIPLANE A or XA BIPLANE B. However, with the extension of Referenced Image Sequence in XA SOP Instance, the intent was clearly to enable reference to other images than just XA BIPLANE images. Should only the first item of the sequence be copied? It is felt that it would be beneficial if all these references could be copied in DICOMDIR Keys as well, not only BIPLANE cross-references. <p>2) In addition, new Enhanced Images include also now a Referenced Image Sequence that can be added in profiles like STD-GEN-DVD-JPEG. In most of the Enhanced Images, General Image module shall not be included in the Enhanced Images (e.g. CT, MR). Some objects are just silent about it, and Enhanced US Volume makes it required, but does not mandate that top level Sequence be equivalent to the same Sequence if present in the Shared Functional Group Sequence.</p> <p>The conditionality and content of the Referenced Image Sequence in DICOMDIR is explicitly clarified.</p>	
Sections of documents affected	
PS 3.11 Section A.3.3.1, PS 3.11 Section B.3.3.1, PS 3.11 Section D.3.3.1, PS 3.11 Section E.3.4 and PS 3.11 Section H.3.3.1	
Correction Wording:	

<i>Add text Table A.3-2 in Part 11</i>
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A.3.3.1 ADDITIONAL KEYS

Table A.3-2 specifies the type of Directory Records that shall be supported and the additional associated keys. Refer to the Basic Directory IOD in PS 3.3.

**Table A.3-2
STD-XABC-CD ADDITIONAL DICOMDIR KEYS**

Key Attribute	Tag	Directory Record Type	Type	Notes
Patient's Birth Date	(0010,0030)	PATIENT	2	
Patient's Sex	(0010,0040)	PATIENT	2	
Institution Name	(0008,0080)	SERIES	2	
Institution Address	(0008,0081)	SERIES	2	
Performing Physicians' Name	(0008,1050)	SERIES	2	
Icon Image Sequence	(0088,0200)	IMAGE	1	
Image Type	(0008,0008)	IMAGE	1	
Calibration Image	(0050,0004)	IMAGE	2	
Referenced Image Sequence	(0008,1140)	IMAGE	1C	Required if the SOP Instance referenced by the Directory Record has an Image Type (0008,0008) of BIPLANE A or BIPLANE B. <u>May be present otherwise.</u>
>Referenced SOP Class UID	(0008,1150)	IMAGE	1C	Required if Referenced Image Sequence (0008,1140) is present
>Referenced SOP Instance UID	(0008,1155)	IMAGE	1C	Required if Referenced Image Sequence (0008,1140) is present
<u>>All other elements from Referenced Image Sequence (including Purpose of Reference Code Sequence and its content)</u>		<u>IMAGE</u>	<u>3</u>	

Add text Table B.3-2 in Part 11

B.3.3.1 Additional Keys

Table B.3-2 specifies the type of Directory Records that shall be supported and the additional associated keys. Refer to the Basic Directory IOD in PS3.3.

**Table B.3-2
STD-XA1K Additional DICOMDIR Keys**

Key Attribute	Tag	Directory Record Level	Type	Notes
Patient's Birth Date	(0010,0030)	PATIENT	2	
Patient's Sex	(0010,0040)	PATIENT	2	
Institution Name	(0008,0080)	SERIES	2	
Institution Address	(0008,0081)	SERIES	2	
Performing Physicians' Name	(0008,1050)	SERIES	2	
Icon Image Sequence	(0088,0200)	IMAGE	1	
Image Type	(0008,0008)	IMAGE	1C	Required if the SOP Instance referenced by the Directory Record is an XA Image.
Calibration Image	(0050,0004)	IMAGE	2	
Referenced Image Sequence	(0008,1140)	IMAGE	1C	Required if the SOP Instance referenced by the Directory Record is an XA Image and has an Image Type (0008,0008) value 3 of BIPLANE A or BIPLANE B. . <u>May be present otherwise.</u>
>Referenced SOP Class UID	(0008,1150)	IMAGE	1C	Required if Referenced Image Sequence (0008,1140) is present
>Referenced SOP Instance UID	(0008,1155)	IMAGE	1C	Required if Referenced Image Sequence (0008,1140) is present
<u>>All other elements from Referenced Image Sequence (including Purpose of Reference Code Sequence and its content)</u>		<u>IMAGE</u>	<u>3</u>	
Lossy image Compression Ratio	(0028,2112)	IMAGE	1C	Required if present in image object with a non-zero length value.

Add text Table D.3-2 in Part 11

D.3.3.1 Additional Keys

File Set Creators and Updaters are required to generate the mandatory elements specified in PS 3.3. Table D.3-2 specifies the additional associated keys. At each directory record level other additional data elements can be added, but it is not required that File Set Readers be able to use them as keys. Refer to the Basic Directory IOD in PS 3.3.

**Table D.3-2
STD-GEN Additional DICOMDIR Keys**

Key Attribute	Tag	Directory Record Type	Type	Notes
Image Type	(0008,0008)	IMAGE	1C	Required if present in image object.
Referenced Image Sequence	(0008,1140)	IMAGE	1C	Required if present in image object.
>Referenced SOP Class UID	(0008,1150)	IMAGE	1C	Required if Referenced Image Sequence (0008,1140) is present
>Referenced SOP Instance UID	(0008,1155)	IMAGE	1C	Required if Referenced Image Sequence (0008,1140) is present.
<u>>All other elements from Referenced Image Sequence (including Purpose of Reference Code Sequence and its content)</u>		<u>IMAGE</u>	<u>3</u>	

Add text Table E.3-2 in Part 11

E.3.4 Other Parameters

This section defines other parameters in the STD-CTMR profiles which need to be specified in order to ensure interoperable information interchange.

**Table E.3-2
STD-CTMR Additional DICOMDIR Keys**

Key Attribute	Tag	Record Type	Type	Notes
Referenced Image Sequence	(0008,1140)	IMAGE	1C	Required if present in image object.
>Referenced SOP Class UID	(0008,1150)	IMAGE	1C	Required if Referenced Image Sequence (0008,1140) is present.
>Referenced SOP Instance UID	(0008,1155)	IMAGE	1C	Required if Referenced Image Sequence (0008,1140) is present.
<u>>All other elements from Referenced Image Sequence (including Purpose of Reference Code Sequence and its content)</u>		<u>IMAGE</u>	<u>3</u>	

Image Position (Patient)	(0020,0032)	IMAGE	1C	Required if present in image object.
Image Orientation (Patient)	(0020,0037)	IMAGE	1C	Required if present in image object.
Frame of Reference UID	(0020,0052)	IMAGE	1C	Required if present in image object.
Rows	(0028,0010)	IMAGE	1	
Columns	(0028,0011)	IMAGE	1	
Pixel Spacing	(0028,0030)	IMAGE	1C	Required if present in image object.

Add text Table H.3-2 in Part 11

H.3.3.1 Additional Keys

File Set Creators and Updaters are required to generate the mandatory elements specified in PS 3.3. Table H.3-2 specifies the additional associated keys. At each directory record level other additional data elements can be added, but it is not required that File Set Readers be able to use them as keys. Refer to the Basic Directory IOD in PS 3.3.

**Table H.3-2
STD-GEN-DVD and STD-GEN-SEC-DVD Additional DICOMDIR Keys**

Key Attribute	Tag	Directory Record Type	Type	Notes
Patient's Birth Date	(0010,0030)	PATIENT	1C	Required if present in any objects referenced by subordinate records with a non-zero length value.
Patient's Sex	(0010,0040)	PATIENT	1C	Required if present in any objects referenced by subordinate records with a non-zero length value.
Institution Name	(0008,0080)	SERIES	1C	Required if present in any objects referenced by subordinate records with a non-zero length value.
Institution Address	(0008,0081)	SERIES	1C	Required if present in any objects referenced by subordinate records with a non-zero length value.
Performing Physicians' Name	(0008,1050)	SERIES	1C	Required if present in any objects referenced by subordinate records with a non-zero length value.
Image Type	(0008,0008)	IMAGE	1C	Required if present in image object.

Calibration Image	(0050,0004)	IMAGE	1C	Required if present in image object with a non-zero length value.
Referenced Image Sequence	(0008,1140)	IMAGE or SPECTROSCOPY	1C	Required if present in image object with one or more items, either in the top level dataset or nested within a functional group sequence of the Shared Functional Groups Sequence (5200,9229). <u>This sequence shall be the entire contents of the sequence present in image object (all items and elements shall be copied in the same order and no addition or removal shall be done). When more than one sequence is present in the image object, the top level dataset sequence shall be copied.</u>
Lossy Image Compression Ratio	(0028,2112)	IMAGE	1C	Required if present in image object with a non-zero length value.
Rows	(0028,0010)	IMAGE or SPECTROSCOPY	1	
Columns	(0028,0011)	IMAGE or SPECTROSCOPY	1	
Frame of Reference UID	(0020,0052)	IMAGE or SPECTROSCOPY	1C	Required if present in image or spectroscopy object.
Synchronization Frame of Reference UID	(0020,0200)	IMAGE or SPECTROSCOPY	1C	Required if present in image or spectroscopy object.
Number of Frames	(0028,0008)	IMAGE or SPECTROSCOPY	1C	Required if present in image or spectroscopy object.
Acquisition Time Synchronized	(0018,1800)	IMAGE or SPECTROSCOPY	1C	Required if present in image or spectroscopy object.
Acquisition Datetime	(0008,002A)	IMAGE or SPECTROSCOPY	1C	Required if present in image or spectroscopy object.
Image Position (Patient)	(0020,0032)	IMAGE or SPECTROSCOPY	1C	Required if present in image or spectroscopy object, either in the top level dataset or nested within a functional group sequence of the Shared Functional Groups Sequence (5200,9229).

Image Orientation (Patient)	(0020,0037)	IMAGE or SPECTROSCOPY	1C	Required if present in image or spectroscopy object, either in the top level dataset or nested within a functional group sequence of the Shared Functional Groups Sequence (5200,9229).
Pixel Spacing	(0028,0030)	IMAGE or SPECTROSCOPY	1C	Required if present in image or spectroscopy object, either in the top level dataset or nested within a functional group sequence of the Shared Functional Groups Sequence (5200,9229).