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7	Correction Number CP-1681
8	Log Summary: Reference to real world value map used during segmentation
9	Name of Standard
10	PS3.3, PS3.16
11	Rationale for Correction:
12	Segmentations and RT Structure Sets may be created by applying algorithms to images that depend on the range of values in the
13	image modified by the application of a real world value map, yet there is no specific way of recording which RWVM was used.
14	It is sufficient to reference an RWVM at the top level of the data set rather than adding a per-frame functional group macro, since
15	the referenced object itself (the RWVM in this case) contains its own list of referenced images and/or frame to which particular scale
16	factors are applicable (e.g., for those source images that have different per-frame scaling, such as is sometimes the case in PET).
17	Also, CP 1559 introduced the Source Instance Sequence and referenced the description of Source Image Sequence without
18	elaborating on it, or clarifying when one or the other should be used, and it inadvertently implied that Source Instance Sequence
19	could be used instead of Source Image Sequence because of the presence of a code for "source image" in its context group for the
20	purpose of reference, which is removed and expressly forbidden.
21	<i>[Ed. Note. It is assumed that it is more appropriate to reference the RWVM for this use in the Source Instance Sequence ("were used</i>
22	<i>to derive") rather than the Referenced Instance Sequence ("significantly related"). Is there any debate about this?]</i>
23	Correction Wording:

Amend DICOM PS3.3 as follows (changes to existing text are bold and underlined for additions and ~~struckthrough~~ for removals):

A.19 RT Structure Set IOD

A.19.4 RT Structure Set IOD Content Constraints

The Defined CID for Purpose of Reference Sequence (0040,A170) within Source Instance Sequence (0042,0013) in the Common Instance Reference Module shall be CID 70xx "Segmentation Non-Image Source Purposes of Reference".

A.51 Segmentation IOD

A.51.4 Segmentation IOD Content Constraints

...

The Defined CID for Purpose of Reference Sequence (0040,A170) within Source Instance Sequence (0042,0013) in the Common Instance Reference Module shall be CID 70xx "Segmentation Non-Image Source Purposes of Reference".

A.51.5 Segmentation Functional Groups

Table A.51-2 specifies the use of the Functional Group Macros used in the Multi-frame Functional Groups Module for the Segmentation IOD.

Table A.51-2. Segmentation Functional Group Macros

Functional Group Macro	Section	Usage
...
Derivation Image	C.7.6.16.2.6	C - Required if any of Pixel Measures (C.7.6.16.2.1) or Plane Position (Patient) (C.7.6.16.2.3) or Plane Orientation (Patient) (C.7.6.16.2.4) Functional Groups are not present. May be present otherwise. See Section A.51.5.1
...

A.51.5.1 Segmentation Functional Groups Description

When a Frame of Reference UID is present the segment shall be specified within that coordinate system, using the Pixel Measures, Plane Position (Patient) and Plane Orientation (Patient) Functional Groups. Since this defines the spatial relationship of the segment, the size of the segmentation frames need not be the same size, or resolution, as the image data used to generate the segment data. The Derivation Image Functional Group may also be present, to specify on which images the segmentation was actually performed (since there may be others in the same Frame of Reference that are spatially co-located, but were not used to perform the segmentation).

If the Frame of Reference UID is not present, each pixel of the segmentation shall correspond to a pixel in a referenced image, using the Derivation Image Functional Group. Hence, the rows and columns of each referenced image will match the segmentation image. If both the Frame of Reference UID and the Derivation Image Functional Group are present, the segmentation and referenced image pixels need not correspond.

The value of Purpose of Reference Sequence (0040,A170) in the Derivation Image Functional Group Macro shall be (121322, DCM, "Source Image for Image Processing Operation"). The value of Derivation Code Sequence (0008,9215) shall be (113076, DCM, "Segmentation").

Note

Non-image source instances used during segmentation, such as real world value maps, can be described in the top level data set in the Source Instance Sequence (0042,0013) of the General Reference Module and are implied to have been used for the derivation of all frames. I.e., there is no mechanism for selectively specifying on a per-frame basis which non-image instances were used Real World Value Map instances already contain a means of selectively applying different scale factors to different frames.

A.57 Surface Segmentation IOD

A.57.4 Surface Segmentation IOD Content Constraints

The Defined CID for Purpose of Reference Sequence (0040,A170) within Source Instance Sequence (0042,0013) in the Common Instance Reference Module shall be CID 70xx "Segmentation Non-Image Source Purposes of Reference".

C.12.4 General Reference Module

Table C.12-10 specifies the Attributes that reference source and other related instances and describe the manner of derivation.

Table C.12-10. General Reference Module Attributes

Attribute Name	Tag	Type	Attribute Description
Referenced Image Sequence	(0008,1140)	3	Other images significantly related to this image (e.g., post-localizer CT image or Mammographic biopsy or partial view images). One or more Items are permitted in this Sequence.
>Include Table 10-3			
>Purpose of Reference Code Sequence	(0040,A170)	3	Describes the purpose for which the reference is made. Only a single Item is permitted in this Sequence.
>>Include Table 8.8-1			Defined CID 7201 "Referenced Image Purposes of Reference".
Referenced Instance Sequence	(0008,114A)	3	Non-image composite SOP Instances that are significantly related to this Image, including waveforms that may or may not be temporally synchronized with this image. One or more Items are permitted in this Sequence.
>Include Table 10-11			
>Purpose of Reference Code Sequence	(0040,A170)	1	Code describing the purpose of the reference to the Instance(s). Only a single Item shall be included in this Sequence.
>>Include Table 8.8-1			Defined CID 7004 "Waveform Purposes of Reference" for referenced waveforms. Defined CID 7022 "Radiotherapy Purposes of Reference" for referenced RT Instances.
Derivation Description	(0008,2111)	3	A text description of how this image was derived. See Section C.12.4.1.1 for further explanation.
Derivation Code Sequence	(0008,9215)	3	A coded description of how this image was derived. See Section C.12.4.1.1 for further explanation. One or more Items are permitted in this Sequence. More than one Item indicates that successive derivation steps have been applied.
>Include Table 8.8-1			Defined CID 7203 "Image Derivation".
Source Image Sequence	(0008,2112)	3	The set of Image SOP Class/Instance pairs of the Images that were used to derive this Image. One or more Items are permitted in this Sequence. See Section C.12.4.1.2 for further explanation.
>Include Table 10-3			

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 image or frame(s) played in the derivation of this image. Only a single Item is permitted in this Sequence.
>>Include Table 8.8-1			Defined CID 7202 "Source Image Purposes of Reference".
>Spatial Locations Preserved	(0028,135A)	3	The extent to which the spatial locations of all pixels are preserved during the processing of the source image that resulted in the current image Enumerated Values: YES NO REORIENTED_ONLY A projection radiograph that has been flipped, and/or rotated by a multiple of 90 degrees Note 1. This applies not only to images with a known relationship to a 3D space, but also to projection images. For example, a projection radiograph such as a mammogram that is processed by a point image processing operation such as contrast enhancement, or a smoothing or edge enhancing convolution, would have a value of YES for this attribute. A projection radiograph that had been magnified or warped geometrically would have a value of NO for this attribute. A projection radiograph that has been flipped, and/or rotated by a multiple of 90 degrees, such that transformation of pixel locations is possible by comparison of the values of Patient Orientation (0020,0020) would have a value of REORIENTED_ONLY. This attribute is typically of importance in relating images with Presentation Intent Type (0008,0068) values of FOR PROCESSING and FOR PRESENTATION. 2. When the value of this attribute is NO, it is not possible to locate on the current image any pixel coordinates that are referenced relative to the source image, such as for example, might be required for rendering CAD findings derived from a referenced FOR PROCESSING image on the current FOR PRESENTATION image.
>Patient Orientation	(0020,0020)	1C	The Patient Orientation values of the source image. Required if the value of Spatial Locations Preserved (0028,135A) is REORIENTED_ONLY.
Source Instance Sequence	(0042,0013)	3	The set of non-image composite SOP instances that were used to derive this instance. One or more Items are permitted in this Sequence. See Section C.12.4.1.2 for further explanation.
>Include Table 10-11			
>Purpose of Reference Code Sequence	(0040,A170)	3	Describes the purpose for which the reference is made, that is what role the source instance(s) played in the derivation of this instance. Only a single Item single Item is permitted in this Sequence.
>>Include Table 8.8-1			Defined CID 7013 " Non-Image Source Instance Purposes of Reference".

C.12.4.1 General Reference Module Attributes

C.12.4.1.1 Derivation Description

If an Image is identified to be a Derived Image (see Section C.7.6.1.1.2), Derivation Description (0008,2111) and Derivation Code Sequence (0008,9215) describe the way in which the image was derived. They may be used whether or not the Source Image Sequence (0008,2112) is provided. They may also be used in cases when the Derived Image pixel data is not significantly changed from one of the source images and the SOP Instance UID of the Derived Image is the same as the one used for the source image.

Note

1. Examples of Derived Images that would normally be expected to affect professional interpretation and would thus have a new UID include:
 - a. images resulting from image processing of another image (e.g., unsharp masking),
 - b. a multiplanar reformatted CT image,
 - c. a DSA image derived by subtracting pixel values of one image from another.
 - d. an image that has been decompressed after having been compressed with a lossy compression algorithm. To ensure that the user has the necessary information about the lossy compression, the approximate compression ratio may be included in Derivation Description (0008,2111).

An example of a Derived Image that would normally not be expected to affect professional interpretation and thus would not require a new UID is an image that has been padded with additional rows and columns for more display purposes.

2. An image may be lossy compressed, e.g., for long term archive purposes, and its SOP Instance UID changed. PS3.4 provides a mechanism by which a query for the original image Instance may return a reference to the UID of the lossy compressed version of the image using the Alternate Representation Sequence (0008,3001). This allows an application processing a SOP Instance that references the original image UID, e.g., a Structured Report, to obtain a reference to an accessible version of the image even if the original SOP Instance is no longer available.

C.12.4.1.2 Source Image and Source InstanceSequence

If an Image is identified to be a Derived Image (see Section C.7.6.1.1.2), Source Image Sequence (0008,2112) is an optional list of ~~Referenced SOP Class UID (0008,1150) / Referenced SOP Instance UID (0008,1155) pairs that identify the~~ source images used to create the Derived image. Source Instance Sequence (0042,0013) is an optional list of non-image source instances that were used to create this instance. ~~Source Image Sequence (0008,2112) and/or Source Instance Sequence (0042,0013)~~ may be used whether or not there is a description of the way the imageinstance was derived in Derivation Description (0008,2111) or Derivation Code Sequence (0008,9215).

Images shall not be referenced by Source Instance Sequence (0042,0013).

Note

Multiple Items may be present within Source Image Sequence (0008,2112) and/or Source Instance Sequence (0042,0013), in which case either:

- a. those imageinstances were combined to make the derived imageinstance (e.g., multiple source images to make an MPR or MIP), or
- b. each of the items represents a step in the successive derivation of an imageinstance (e.g., when an image has had successive lossy compression steps applied to it),
- c. some combination of the above.

The Purpose of Reference Code Sequence (0040,A170) and the Attributes within the referenced imageinstances themselves may be used to determine the history of the derivation, which is not otherwise explicitly specified.

Amend DICOM PS3.16 as follows (changes to existing text are bold and underlined for additions and ~~struckthrough~~ for removals):

CID 7004 Waveform Purposes of Reference

Type: Extensible
Version: 20090409

Table CID 7004. Waveform Purposes of Reference

Coding Scheme Designator	Code Value	Code Meaning
DCM	121301	Simultaneous Doppler
DCM	121302	Simultaneous Hemodynamic
DCM	121303	Simultaneous ECG
DCM	121304	Simultaneous Voice Narrative
DCM	121305	Simultaneous Respiratory Waveform
DCM	121306	Simultaneous Arterial Pulse Waveform
DCM	121307	Simultaneous Phonocardiographic Waveform

CID 7013 Non-Image Source Instance Purposes of Reference

Type: Extensible
Version: ~~20160908~~yyyymmdd

Table CID 7013. Non-Image Source Instance Purposes of Reference

Coding Scheme Designator	Code Value	Code Meaning
DCM	121324	Source image
DCM	128224	Source measurement
DCM	128225	Source report
DCM	128226	Source raw data

Include CID 70xx "Segmentation Non-Image Source Purposes of Reference"

Note

This context group previously contained a code for "source image", which has been removed.

CID 70xx Segmentation Non-Image Source Purposes of Reference

Type: Extensible
Version: yyyymmdd

Table CID 70xx. Segmentation Non-Image Source Purposes of Reference

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
DCM	ddd001	Source real world value map		

CID 7022 Radiotherapy Purposes of Reference

Type: Extensible
Version: 20160314

Table CID 7022. Radiotherapy Purposes of Reference

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
DCM	121310	RT treatment plan for the position being verified		

CID 7023 RT Process Output

Type: Extensible
Version: 20160908

Table CID 7023. RT Process Output

Coding Scheme Designator	Code Value	Code Meaning
DCM	128184	Pre-Planning Result
DCM	128185	RT Prescription Result
DCM	128186	Dose Calculation Image Series
DCM	128187	Coordinate Alignment Image Series
DCM	128188	RT Treatment Simulation Result
DCM	128189	RT Planning Result
DCM	128190	Dosimetric Result
DCM	128191	Patient Setup Verification Result
DCM	128192	RT Treatment Session Result
DCM	128193	RT Treatment Course Summary
DCM	128194	RT Treatment QA Result

Note

The concepts in the CID are intended to be a declarative statement to represent the output of an operation, without implying that this operation was part of a particular workflow or that the output will be used in any future operation.

CID 7024 RT Process Input

Type: Extensible
Version: 20160908

Table CID 7024. RT Process Input

Coding Scheme Designator	Code Value	Code Meaning
DCM	128180	For RT Workflow
DCM	128197	For RT Prescription
DCM	128198	For RT Treatment Planning
DCM	128200	For RT Plan Summation
DCM	128201	For Physician Review
DCM	128202	For Physicist Review
DCM	128204	For Plan Quality Assurance
DCM	128205	For Machine Quality Assurance
DCM	128206	For Patient Setup Verification

Note

The concepts in the CID are intended to be a declarative statement to represent the potential input of an operation, without implying that this operation is part of a particular workflow, that this input will be used at all in any subsequent operation, that only parts of the referenced instances will be used, or that instances other than those referenced will be used as input.

CID 7025 RT Process Input Used

Type: Extensible
Version: 20160908

Table CID 7025. RT Process Input Used

Coding Scheme Designator	Code Value	Code Meaning
DCM	128209	RT Workflow Input Used
DCM	128210	RT Prescription Input Used
DCM	128211	RT Treatment Planning Input Used
DCM	128212	RT Plan Summation Input Used
DCM	128213	Physician Review Input Used
DCM	128214	Physicist Review Input Used
DCM	128215	Plan Quality Assurance Input Used
DCM	128216	Machine Quality Assurance Input Used
DCM	128217	Patient Setup Verification Input Used

Note

The concepts in the CID are intended to be a declarative statement to represent input that has been used in an operation, without implying that this operation was part of a particular workflow or how this input was collected.

CID 7201 Referenced Image Purposes of Reference

Type: Extensible
Version: 20090409

Table CID 7201. Referenced Image Purposes of Reference

Coding Scheme Designator	Code Value	Code Meaning
DCM	121311	Localizer
DCM	121312	Biopsy localizer
DCM	121313	Other partial views
DCM	121314	Other image of biplane pair
DCM	121315	Other image of stereoscopic pair
DCM	121316	Images related to standalone object
DCM	121317	Spectroscopy
DCM	121338	Anatomic image
DCM	121339	Functional image
DCM	121340	Spectral filtered image
DCM	121341	Device localizer
DCM	121346	Acquisition frames corresponding to volume
DCM	121347	Volume corresponding to spatially-related acquisition frames

Coding Scheme Designator	Code Value	Code Meaning
DCM	121348	Temporal Predecessor
DCM	121349	Temporal Successor

CID 7202 Source Image Purposes of Reference

Type: Extensible
Version: 20151113

Table CID 7202. Source Image Purposes of Reference

Coding Scheme Designator	Code Value	Code Meaning
DCM	121320	Uncompressed predecessor
DCM	121321	Mask image for image processing operation
DCM	121322	Source image for image processing operation
DCM	121329	Source image for montage
DCM	121330	Lossy compressed predecessor
DCM	121358	For Processing predecessor
DCM	113130	Predecessor containing group of imaging subjects

CID 7203 Image Derivation

Type: Extensible
Version: 20161106

Table CID 7203. Image Derivation

Coding Scheme Designator	Code Value	Code Meaning
DCM	113040	Lossy Compression
DCM	113041	Apparent Diffusion Coefficient
DCM	113042	Pixel by pixel addition
DCM	113043	Diffusion weighted
DCM	113044	Diffusion Anisotropy
DCM	113045	Diffusion Attenuated
DCM	113046	Pixel by pixel division
DCM	113047	Pixel by pixel mask
DCM	113048	Pixel by pixel Maximum
DCM	113049	Pixel by pixel mean
DCM	113050	Metabolite Maps from spectroscopy data
DCM	113051	Pixel by pixel Minimum
DCM	113052	Mean Transit Time
DCM	113053	Pixel by pixel multiplication
DCM	113054	Negative Enhancement Integral
DCM	113055	Regional Cerebral Blood Flow
DCM	113056	Regional Cerebral Blood Volume
DCM	113057	R-Coefficient
DCM	113058	Proton Density

Coding Scheme Designator	Code Value	Code Meaning
DCM	113059	Signal Change
DCM	113060	Signal to Noise
DCM	113061	Standard Deviation
DCM	113062	Pixel by pixel subtraction
DCM	113063	T1
DCM	113064	T2*
DCM	113065	T2
DCM	113066	Time Course of Signal
DCM	113067	Temperature encoded
DCM	113068	Student's T-Test
DCM	113069	Time To Peak
DCM	113084	Tmax
DCM	113070	Velocity encoded
DCM	113071	Z-Score
DCM	113072	Multipanar reformatting
DCM	113073	Curved multipanar reformatting
DCM	113074	Volume rendering
DCM	113075	Surface rendering
DCM	113076	Segmentation
DCM	113077	Volume editing
DCM	113078	Maximum intensity projection
DCM	113079	Minimum intensity projection
DCM	113085	Spatial resampling
DCM	113086	Edge enhancement
DCM	113087	Smoothing
DCM	113088	Gaussian blur
DCM	113089	Unsharp mask
DCM	113090	Image stitching
DCM	113091	Spatially-related frames extracted from the volume
DCM	113092	Temporally-related frames extracted from the set of volumes
DCM	113097	Multi-energy proportional weighting
DCM	113093	Polar to Rectangular Scan Conversion
DCM	113131	Extraction of individual subject from group

D DICOM Controlled Terminology Definitions (Normative)

This Annex specifies the meanings of codes defined in DICOM, either explicitly or by reference to another part of DICOM or an external reference document or standard.

DICOM Code Definitions (Coding Scheme Designator "DCM" Coding Scheme Version "01")

Table D-1. DICOM Controlled Terminology Definitions

Code Value	Code Meaning	Definition	Notes
113040	Lossy Compression	Lossy compression has been applied to an image.	
113041	Apparent Diffusion Coefficient	Values are derived by calculation of the apparent diffusion coefficient.	
113042	Pixel by pixel addition	Values are derived by the pixel by pixel addition of two images.	
113043	Diffusion weighted	Values are derived by calculation of the diffusion weighting.	
113044	Diffusion Anisotropy	Values are derived by calculation of the diffusion anisotropy.	
113045	Diffusion Attenuated	Values are derived by calculation of the diffusion attenuation.	
113046	Pixel by pixel division	Values are derived by the pixel by pixel division of two images.	
113047	Pixel by pixel mask	Values are derived by the pixel by pixel masking of one image by another.	
113048	Pixel by pixel Maximum	Values are derived by calculating the pixel by pixel maximum of two or more images.	
113049	Pixel by pixel mean	Values are derived by calculating the pixel by pixel mean of two or more images.	
113050	Metabolite Maps from spectroscopy data	Values are derived by calculating from spectroscopy data pixel values localized in two dimensional space based on the concentration of specific metabolites (i.e, at specific frequencies).	
113051	Pixel by pixel Minimum	Values are derived by calculating the pixel by pixel minimum of two or more images.	
113052	Mean Transit Time	The time required for blood to pass through a region of tissue.	
113053	Pixel by pixel multiplication	Values are derived by the pixel by pixel multiplication of two images.	
113054	Negative Enhancement Integral	Values are derived by calculating negative enhancement integral values.	
113055	Regional Cerebral Blood Flow	The flow rate of blood perfusing a region of the brain as volume per mass per unit of time.	
113056	Regional Cerebral Blood Volume	The volume of blood perfusing a region of brain as as volume per mass.	
113057	R-Coefficient	Correlation Coefficient, r.	
113058	Proton Density	Values are derived by calculating proton density values.	
113059	Signal Change	Values are derived by calculating signal change values.	
113060	Signal to Noise	Values are derived by calculating the signal to noise ratio.	
113061	Standard Deviation	Values are derived by calculating the standard deviation of two or more images.	
113062	Pixel by pixel subtraction	Values are derived by the pixel by pixel subtraction of two images.	
113063	T1	The time constant for the decay of longitudinal magnetization caused by spin-lattice relaxation. The inverse of the longitudinal relaxation rate constant, i.e., $T1 = 1/R1$.	
113064	T2*	The time constant for the decay of transverse magnetization caused by a combination of spin-spin relaxation and magnetic field inhomogeneity. The inverse of the transverse relaxation rate constant, i.e., $T2^* = 1/R2^*$.	
113065	T2	The time constant for the decay of transverse magnetization caused by spin-spin relaxation. The inverse of the transverse relaxation rate constant, i.e., $T2 = 1/R2$.	

Code Value	Code Meaning	Definition	Notes
113066	Time Course of Signal	Values are derived by calculating values based on the time course of signal.	
113067	Temperature encoded	Values are derived by calculating values based on temperature encoding.	
113068	Student's T-Test	Values are derived by calculating the value of the Student's T-Test statistic from multiple image samples.	
113069	Time To Peak	The time from the start of the contrast agent injection to the maximum enhancement value.	
113070	Velocity encoded	Values are derived by calculating values based on velocity encoded. E.g., phase contrast.	
113071	Z-Score	Values are derived by calculating the value of the Z-Score statistic from multiple image samples.	
113072	Multipanar reformatting	Values are derived by reformatting in a flat plane other than that originally acquired.	
113073	Curved multipanar reformatting	Values are derived by reformatting in a curve plane other than that originally acquired.	
113074	Volume rendering	Values are derived by volume rendering of acquired data.	
113075	Surface rendering	Values are derived by surface rendering of acquired data.	
113076	Segmentation	Values are derived by segmentation (classification into tissue types) of acquired data.	
113077	Volume editing	Values are derived by selectively editing acquired data (removing values from the volume), such as in order to remove obscuring structures or noise.	
113078	Maximum intensity projection	Values are derived by maximum intensity projection of acquired data.	
113079	Minimum intensity projection	Values are derived by minimum intensity projection of acquired data.	
113080	Glutamate and glutamine	For single-proton MR spectroscopy, the resonance peak corresponding to glutamate and glutamine.	
113081	Choline/Creatine Ratio	For single-proton MR spectroscopy, the ratio between the Choline and Creatine resonance peaks.	
113082	N-acetylaspartate /Creatine Ratio	For single-proton MR spectroscopy, the ratio between the N-acetylaspartate and Creatine resonance peaks.	
113083	N-acetylaspartate /Choline Ratio	For single-proton MR spectroscopy, the ratio between the N-acetylaspartate and Choline resonance peaks.	
113084	Tmax	<p>The time delay to the maximum of the residue function after deconvolution.</p> <p>Shih LC, Saver JL, Alger JR, Starkman S, Leary MC, Vinuela F, et al. Perfusion-Weighted Magnetic Resonance Imaging Thresholds Identifying Core, Irreversibly Infarcted Tissue. Stroke. 2003 Jun 1;34(6):1425-30. doi:10.1161/01.STR.0000072998.70087.E9 http://stroke.ahajournals.org/content/34/6/1425.abstract</p> <p>Østergaard L, Weisskoff RM, Chesler DA, Gyldensted C, Rosen BR. High resolution measurement of cerebral blood flow using intravascular tracer bolus passages. Part I: Mathematical approach and statistical analysis. Magnetic Resonance in Medicine. 1996;36(5):715-25. doi:10.1002/mrm.1910360510 http://onlinelibrary.wiley.com/doi/10.1002/mrm.1910360510/abstract</p>	

Code Value	Code Meaning	Definition	Notes
113085	Spatial resampling	Values are derived by spatial resampling of acquired data.	
113086	Edge enhancement	Values are derived by edge enhancement.	
113087	Smoothing	Values are derived by smoothing.	
113088	Gaussian blur	Values are derived by Gaussian blurring.	
113089	Unsharp mask	Values are derived by unsharp masking.	
113090	Image stitching	Values are derived by stitching two or more images together.	
113091	Spatially-related frames extracted from the volume	Spatially-related frames in this image are representative frames from the referenced 3D volume data set.	
113092	Temporally-related frames extracted from the set of volumes	Temporally-related frames in this image are representative frames from the referenced 3D volume data set.	
113093	Polar to Rectangular Scan Conversion	Conversion of a polar coordinate image to rectangular (Cartesian) coordinate image.	
113094	Creatine and Choline	For single-proton MR spectroscopy, the resonance peak corresponding to creatine and choline.	
113095	Lipid and Lactate	For single-proton MR spectroscopy, the resonance peak corresponding to lipid and lactate.	
113096	Creatine+Choline/ Citrate Ratio	For single-proton MR spectroscopy, the ratio between the Choline and Creatine resonance peak and the Citrate resonance peak.	
113097	Multi-energy proportional weighting	Image pixels created through proportional weighting of multiple acquisitions at distinct X-Ray energies.	
113098	Magnetization Transfer Ratio	Magnetization Transfer Ratio (MTR) is the ratio of magnetization transfer, $M_0 - M_s/M_0$, where M_s represents the magnitude of signal of tissues with the saturation pulse used to saturate macromolecular protons on, and M_0 is the magnitude of signal without saturation. See Dousset V, Grossman RI, Ramer KN, Schnall MD, Young LH, Gonzalez-Scarano F, et al. Experimental allergic encephalomyelitis and multiple sclerosis: lesion characterization with magnetization transfer imaging. Radiology. 1992 Feb 1;182(2):483-91. http://dx.doi.org/10.1148/radiology.182.2.1732968	
113130	Predecessor containing group of imaging subjects	Images used as the source for an image processing operation that extracts data for a single subject from an image containing data for multiple subjects (e.g., a group of animals imaged simultaneously).	
113131	Extraction of individual subject from group	An image processing operation that extracts data for a single subject from an image containing data for multiple subjects (e.g., a group of animals imaged simultaneously).	
121301	Simultaneous Doppler	Reference is to a Doppler waveform acquired simultaneously with an image.	
121302	Simultaneous Hemodynamic	Reference is to a Hemodynamic waveform acquired simultaneously with an image.	
121303	Simultaneous ECG	Reference is to a ECG waveform acquired simultaneously with an image.	
121304	Simultaneous Voice Narrative	Reference is to a voice narrative recording acquired simultaneously with an image.	
121305	Simultaneous Respiratory Waveform	A waveform representing chest expansion and contraction due to respiratory activity, measured simultaneously with the acquisition of this Image.	

Code Value	Code Meaning	Definition	Notes
121306	Simultaneous Arterial Pulse Waveform	Arterial pulse waveform obtained simultaneously with acquisition of a referencing image.	
121307	Simultaneous Phonocardiographic Waveform	Phonocardiographic waveform obtained simultaneously with acquisition of a referencing image.	
121310	RT treatment plan for the position being verified	The referenced instance is an RT treatment plan of some type, which contains treatment positioning information, which has been verified using the information in the referencing instance.	The referenced Instance typically will be an RT Plan, RT Ion Plan or RT Radiation Set.
121311	Localizer	Image providing an anatomical reference on the patient under examination, for the purpose of defining the location of the ensuing imaging.	
121312	Biopsy localizer	Image providing an anatomical reference on the patient under examination, for the purpose of planning or documenting a biopsy.	
121313	Other partial views	Image providing a partial view of the target anatomy, when the target anatomy is too large for a single image.	
121314	Other image of biplane pair	Image providing a view of the target anatomy in a different imaging plane, typically from a near perpendicular angle.	
121315	Other image of stereoscopic pair	Image providing a view of the target anatomy in a different imaging plane, typically with a small angular difference.	
121316	Images related to standalone object	Image related to a non-image information object.	
121317	Spectroscopy	Image where signals are identified and separated according to their frequencies. E.g., to identify individual chemicals, or individual nuclei in a chemical compound.	
121318	Spectroscopy Data for Water Phase Correction	MR spectroscopy data acquired to correct the phase of the diagnostic data for the phase signal of the Water.	
121320	Uncompressed predecessor	An image that has not already been lossy compressed that is used as the source for creation of a lossy compressed image.	
121321	Mask image for image processing operation	Image used as the mask for an image processing operation, such as subtraction.	
121322	Source image for image processing operation	Image used as the source for an image processing operation.	
121323	Source series for image processing operation	Series used as the source for an image processing operation.	
121324	Source Image	Image used as the source for a derived or compressed image.	
121325	Lossy compressed image	Image encoded with a lossy compression transfer syntax.	
121326	Alternate SOP Class instance	SOP Instance encoded with a different SOP Class but otherwise equivalent data.	
121327	Full fidelity image	Full fidelity image, uncompressed or lossless compressed.	
121328	Alternate Photometric Interpretation image	Image encoded with a different photometric interpretation.	
121329	Source image for montage	Image used as a source for a montage (stitched) image.	

	Code Value	Code Meaning	Definition	Notes
1				
2	121330	Lossy compressed predecessor	An image that has previously been lossy compressed that is used as the source for creation of another lossy compressed image.	
3				
4	121338	Anatomic image	Image showing structural anatomic features.	
5	121339	Functional image	Image showing physical or chemical activity.	
6	121340	Spectral filtered image	Image providing the same view of the target anatomy acquired using only a specific imaging wavelength, frequency or energy.	
7				
8	121341	Device localizer	Image providing an anatomical reference on the patient under examination, for the purpose of documenting the location of device such as a diagnostic or therapeutic catheter.	
9				
10				
11	121342	Dose Image	Image providing a graphic view of the distribution of radiation dose.	
12				
13	121346	Acquisition frames corresponding to volume	The referenced image is the source of spatially-related frames from which the referencing 3D volume data set was derived.	
14				
15	121347	Volume corresponding to spatially-related acquisition frames	3D Volume containing the spatially-related frames in the referencing instance.	
16				
17	121348	Temporal Predecessor	Instance acquired prior to the referencing instance in a set of consecutively acquired instances.	
18				
19	121349	Temporal Successor	Instance acquired subsequent to the referencing instance in a set of consecutively acquired instances.	
20				
21	121350	Same acquisition at lower resolution	Image of the same target area at lower resolution acquired in the same acquisition process.	
22				
23	121351	Same acquisition at higher resolution	Image of the same target area at higher resolution acquired in the same acquisition process.	
24				
25	121352	Same acquisition at different focal depth	Image of the same target area at different focal depth (Z-plane) acquired in the same acquisition process.	
26				
27	121353	Same acquisition at different spectral band	Image of the same target area at different spectral band acquired in the same acquisition process.	
28				
29	121354	Imaged container label	Image specifically targeting the container label.	
30	121358	For Processing predecessor	Source image from which FOR PRESENTATION images were created.	
31				
32	128180	For RT Workflow	Instances available as input for a general radiotherapeutic workflow.	
33				
34	128184	Pre-Planning Result	Instances created during preparation prior to planning.	
35	128185	RT Prescription Result	Instances created for prescription of a radiotherapeutic treatment.	
36	128186	Dose Calculation Image Series	Image instances that represent an image series that is intended to be the primary input for the dose calculation. Any parameters required for dose calculation (such as electron density) is derived from this series.	
37				
38				
39				
40	128187	Coordinate Alignment Image Series	Image instances that represent an image series from which the display coordinate system for a radiotherapeutic treatment planning is derived. Typically this series does not provide the parameters required for the dose calculation.	
41				
42				
43				
44	128188	RT Treatment Simulation Result	Instances created during the simulation of a radiotherapeutic treatment delivery session. May also include input objects actually used.	
45				
46				
47	128189	RT Planning Result	Instances created during the planning of a radiotherapeutic treatment. May also include input objects actually used.	
48				

Code Value	Code Meaning	Definition	Notes
128190	Dosimetric Result	Instances created during the creation of the dosimetric result of a radiotherapeutic treatment plan. May also include input objects actually used.	
128191	Patient Setup Verification Result	Instances created during the verification of the patient's treatment position. May also include input objects actually used.	
128192	RT Treatment Session Result	Instances created during the treatment session. May also include input objects actually used.	
128193	RT Treatment Course Summary	Instances created during a treatment course. May also include input objects actually used.	
128194	RT Treatment QA Result	Instances created during evaluation of the treatment delivery quality. May also include input objects actually used.	
128195	For Diagnosis	Instances available to make a diagnosis.	
128196	For Segmentation	Instances available for segmentation.	
128197	For RT Prescription	Instances available for prescribing a radiotherapeutic treatment delivery.	
128198	For RT Treatment Planning	Instances available for creating a radiotherapeutic treatment plan.	
128199	For Plan Comparison	Instances available for comparing plans.	
128200	For RT Plan Summation	Instances available to combine radiotherapeutic plans or doses.	
128201	For Physician Review	Instances available for review by a physician.	
128202	For Physicist Review	Instances available for review by a physicist.	
128203	For Tumor Board	Instances available for review of a tumor board.	
128204	For Plan Quality Assurance	Instances available to perform quality assurance of a radiotherapeutic treatment delivery plan.	
128205	For Machine Quality Assurance	Instances available to perform quality assurance of one of the hardware or software components involved in a radiotherapeutic treatment delivery.	
128206	For Patient Setup Verification	Instances available for verification of the patient treatment position.	
128207	For Clinical Trial Submission	Instances available for submission for a clinical trial study.	
128208	For Tumor Registry	Instances available for submission to a tumor registry.	
128209	RT Workflow Input Used	Instances used as an input of a general radiotherapeutic workflow.	
128210	RT Prescription Input Used	Instances used for prescribing a radiotherapeutic treatment delivery.	
128211	RT Treatment Planning Input Used	Instances used to create a radiotherapeutic treatment plan.	
128212	RT Plan Summation Input Used	Instances used to combine radiotherapeutic plans or doses.	
128213	Physician Review Input Used	Instances used for review by a physician.	
128214	Physicist Review Input Used	Instances used for review by a physicist.	
128215	Plan Quality Assurance Input Used	Instances used to perform quality assurance of a radiotherapeutic treatment delivery plan.	
128216	Machine Quality Assurance Input Used	Instances used to perform quality assurance of one of the hardware or software components involved in a radiotherapeutic treatment delivery.	
128217	Patient Setup Verification Input Used	Instances used during verification of the patient treatment position.	
128218	Diagnosis Input Used	Instances used to make a diagnosis.	
128219	Contouring Input Used	Instances used for segmentation.	
128220	Plan Comparison Input Used	Instances used for comparing plans.	

Code Value	Code Meaning	Definition	Notes
128221	Tumor Board Input Used	Instances used for review of a tumor board.	
128222	Tumor Registry Input Used	Instances submitted to a tumor registry.	
128223	Clinical Trial Submission Input Used	Instances submitted to a clinical trial study.	
128224	Source measurement	Measurement used as the source for derivation.	
128225	Source report	Report used as the source for derivation.	
128226	Source raw data	Raw Data used as the source for derivation.	
<u>ddd001</u>	<u>Source real world value map</u>	<u>Real world value map used as the source for derivation. E.g., the map applied to source images before processing them, such as for a threshold based segmentation operation.</u>	