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Submission Date	2015/05/07

Correction Number CP-1496
Log Summary: Add Tracking Identifier and UID to Segmentation Instances
Name of Standard PS3.3, PS3.6, PS3.15, PS3.16 2015c
Rationale for Correction: Currently, some measurement related and CAD SR templates include a human readable identifier and a UID for longitudinal tracking of lesions or other findings that may have multiple content items within one SR or occur in multiple SR instances. Often specific occurences of such lesions on an image or at one particular timepoint will be associated with Segmentation instances, and these are referenced from the SR using the Segmentation SOP Instance UID and Segment Number. It is desirable to also be able to identify lesions in the same manner within a segmentation instance, so that the lesion may be identified without the need to consult the SR (or indeed, without the need for there to be an SR, e.g., if no measurements are made, or for there to be an SR at the time of segmentation). This correction incorporates an earlier proposal, CP 757, which addressed the same issue for both Segmentation and RT Structure Set objects, and has been cancelled.
Correction Wording:

Amend DICOM PS 3.3 - as follows:

C.8.20.4.1 Segment Description Macro

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Table C.8.20-4. Segment Description Macro Attributes

Attribute Name	Tag	Type	Attribute Description
Segment Number	(0062,0004)	1	Identification number of the segment. The value of Segment Number (0062,0004) shall be unique within the Segmentation instance in which it is created. See ???.
Segment Label	(0062,0005)	1	User-defined label identifying this segment. This may be the same as Code Meaning (0008,0104) of Segmented Property Type Code Sequence (0062,000F).
...	...	...	...
Tracking ID	**(0062,0020)**	**1C**	**A text label used for tracking a finding or feature, potentially across multiple reporting objects, over time. This label shall be unique within the domain in which it is used.** **Required if Tracking UID (0062,0021) is present.** **Note** 1. **May be used for tracking a finding or feature that is described by this segment, potentially across multiple objects, over time.** 2. **May or may not have the same value as Segment Label (0062,0005).** 3. **Related SR instances may exist, for example, to record measurements related to this segment, but need not exist for this Attribute to be used.** 4. **This Attribute will have the same value as the value of the (112039, DCM, "Tracking Identifier") content item in SR instances that reference this Segment in this Segmentation Instance.**
Tracking UID	**(0062,0021)**	**1C**	**A unique identifier used for tracking a finding or feature, potentially across multiple reporting objects, over time.** **Required if Tracking ID (0062,0020) is present.** **Note** 1. **May be used for tracking a finding or feature that is described by this segment, potentially across multiple objects, over time.** 2. **Related SR instances may exist, for example, to record measurements related to this segment, but need not exist for this Attribute to be used.** 3. **This Attribute will have the same value as the value of the (112040, DCM, "Tracking Unique Identifier") content item in SR instances that reference this Segment in this Segmentation Instance.**

Amend DICOM PS 3.6 - as follows:

6 Registry of DICOM Data Elements

Table 6-1. Registry of DICOM Data Elements

Tag	Name	Keyword	VR	VM	
(0062,0020)	**Tracking ID**	**TrackingID**	**UT**	**1**	
(0062,0021)	**Tracking UID**	**TrackingUID**	**UI**	**1**	

Amend DICOM PS 3.15 - as follows:

E.1.1 De-identifier

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Table E.1-1. Application Level Confidentiality Profile Attributes

Attribute Name	Tag	Retired (from ????)	In Std. Comp. IOD (from ????)	Basic Profile	Retain Safe Private Option	Retain UIDs Option	Retain Device Ident. Option	Retain Patient Chars. Option	Retain Long. Full Dates Option	Retain Long. Modif. Dates Option	Clean Desc. Option	Clean Struct. Cont. Option	Clean Graph. Option
...	...												
Tracking UID	**(0062,0021)**	**N**	**Y**	**U**		**K**							

Amend DICOM PS 3.16 - as follows:

TID 1401 Area Measurement

Type: **Extensible**
Order: **Significant**
Root: **No**

Table TID 1401. Area Measurement

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			NUM	D???	1	M		Value shall be > 0 UNITS = D???
2	>	INFERRED FROM	SCOORD	EV (121056, DCM, "Area Outline")	1	MC	IF concept name of Row 1 is (G-A16A, SRT, "Area of defined region"), and IFF Row 5 or 6 not present.	GRAPHIC TYPE = not {MULTIPOINT}
3	>>	R-SELECTED FROM	IMAGE		1	MC	XOR Row 4	
4	>>	SELECTED FROM	IMAGE		1	MC	XOR Row 3	
5	>	INFERRED FROM	IMAGE	EV (121214, DCM, "Referenced Segmentation Frame")	1	MC	IF concept name of Row 1 is (G-A16A, SRT, "Area of defined region"), and IFF Row 2 or 6 not present.	Reference shall be to a Segmentation Image, with a single value specified in Referenced Frame Number

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
6	>	R- INFERRED FROM	IMAGE		1	MC	IF concept name of Row 1 is (G-A16A, SRT, "Area of defined region"), and IFF Row 2 or 5 not present.	Reference shall be to a Segmentation Image, with a single value specified in Referenced Frame Number
7	>	HAS PROPERTIES	CODE	EV (G-C036, SRT, "Measurement Method")	1	U		D???
8	>	HAS OBS CONTEXT	INCLUDE	DTID 4108 “Tracking Identifier”	1	U		

Content Item Descriptions

Row 2 "Area Outline"	A Graphic Type of POINT implies that the object is a single pixel and the object's area is the area of the pixel. Otherwise the type shall be a closed POLYLINE (start and end point the same) or a CIRCLE or an ELLIPSE.
Rows 5, 6	Referenced Frame Number (0008,1160) is an attribute of the IMAGE Content Item. If the Referenced Segmentation SOP Instance has Segmentation Type (0062,0001) value BINARY, it identifies the area of defined (measured) region by pixel values in the referenced frame with value 1. For Segmentation Type value FRACTIONAL, the area is computed by an implementation dependent method. Frame number shall be specified even if the Segmentation SOP Instance has only a single frame.
Row 8	**The values of (112039, DCM, "Tracking Identifier") and (112040, DCM, "Tracking Unique Identifier"), if present, shall match the corresponding values of Tracking ID (0062,0020) and Tracking UID (0062,0021), if present, in the corresponding Segment of any Segmentation instance referenced in Row 5.**

TID 1402 Volume Measurement

Type: **Extensible**
Order: **Significant**
Root: **No**

Table TID 1402. Volume Measurement

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			NUM	D???	1	M		Value shall be > 0 UNITS = D???
2	>	INFERRED FROM	SCOORD	EV (121057, DCM, "Perimeter Outline")	1-n	UC	XOR row 5, 6	GRAPHIC TYPE = not {MULTIPOINT}
3	>>	R-SELECTED FROM	IMAGE		1	MC	XOR Row 4	
4	>>	SELECTED FROM	IMAGE		1	MC	XOR Row 3	
5	>	INFERRED FROM	IMAGE	EV (121191, DCM, "Referenced Segment")	1	UC	XOR row 2, 6	Reference shall be to a Segmentation Image, with a value specified in Referenced Segment Number

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
6	>	R- INFERRED FROM	IMAGE		1	UC	XOR row 2, 5	Reference shall be to a Segmentation Image, with a value specified in Referenced Segment Number
7	>	HAS PROPERTIES	CODE	EV (G-C036, SRT, "Measurement Method")	1	U		D???
8	>	HAS OBS CONTEXT	INCLUDE	DTID 4108 “Tracking Identifier”	1	U		

Content Item Descriptions

Row 2 "Perimeter Outline"	The two dimensional perimeter of the volume's intersection with or projection into the image. A Graphic Type of POINT implies that the volume's intersection or projection in a plane is a single pixel. A single pixel projection perimeter cannot cause a volume calculation to become 0. Otherwise the type shall be a closed POLYLINE (start and end point the same) or a CIRCLE or an ELLIPSE.
Rows 5, 6	Referenced Segment Number (0062,000B) is an attribute of the IMAGE Content Item. If the Referenced Segmentation SOP Instance has Segmentation Type (0062,0001) value BINARY, it identifies the defined (measured) volume by pixel/voxel values in the frames of the referenced segment with value 1. For Segmentation Type value FRACTIONAL, the volume is computed by an implementation dependent method. Segment number shall be specified even if the Segmentation SOP Instance has only a single segment.
Row 8	**The values of (112039, DCM, "Tracking Identifier") and (112040, DCM, "Tracking Unique Identifier"), if present, shall match the corresponding values of Tracking ID (0062,0020) and Tracking UID (0062,0021), if present, in the corresponding Segment of any Segmentation instance referenced in Row 5.**

TID 1410 Planar ROI Measurements

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Table TID 1410. Planar ROI Measurements

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (125007, DCM, "Measurement Group")	1	M		
2	>	HAS OBS CONTEXT	TEXT	DT (112039, DCM, "Tracking Identifier")	1	M		
3	>	HAS OBS CONTEXT	UIDREF	EV (112040, DCM, "Tracking Unique Identifier")	1	M		
...	...	...	...	...	...	...		
7	>	CONTAINS	IMAGE	EV (121214, DCM, "Referenced Segmentation Frame")	1	MC	XOR Row 5	Reference shall be to a Segmentation Image, with a single value specified in Referenced Frame Number, and with a single value specified in Referenced Segment Number

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
...	...	...	...	...	...	...	...	...

Content Item Descriptions

Rows 2, 3	The Tracking Identifier and Tracking Unique Identifier are defined as a text label or unique identifier (respectively) used for tracking a finding or feature, potentially across multiple reporting objects, over time. As such, they are distinct from the Observation UID (0040,A171), which is unique identifier of the specific Content Item and its subsidiary Content Items that constitute an individual observation, and would be different for different observations on different occasions of the same finding or feature. **The values of these content items shall match the corresponding values of Tracking ID (0062,0020) and Tracking UID (0062,0021), if present, in the corresponding Segment of any Segmentation instance referenced in Row 7.**
Rows 6, 7	Referenced Frame Number (0008,1160) is an attribute of the IMAGE Content Item, and shall be present with a single value. If the Referenced Segmentation SOP Instance has Segmentation Type (0062,0001) value BINARY, it identifies the area of defined (measured) region of interest by pixel values in the referenced frame with value 1. For Segmentation Type value FRACTIONAL, the area is computed by an implementation dependent method. Frame number shall be specified even if the Segmentation SOP Instance has only a single frame.
...	...

TID 1411 Volumetric ROI Measurements

...

Table TID 1411. Volumetric ROI Measurements

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (125007, DCM, "Measurement Group")	1	M		
2	>	HAS OBS CONTEXT	TEXT	DT (112039, DCM, "Tracking Identifier")	1	M		
3	>	HAS OBS CONTEXT	UIDREF	EV (112040, DCM, "Tracking Unique Identifier")	1	M		
...	...	...	...	...	...	...		
7	>	CONTAINS	IMAGE	EV (121191, DCM, "Referenced Segment")	1	MC	XOR Rows 5, 10	Reference shall be to a Segmentation Image or Surface Segmentation object, with a single value specified in Referenced Segment Number
...	...	...	...	...	...	...	....	...

Content Item Descriptions

Rows 2, 3	The Tracking Identifier and Tracking Unique Identifier are defined as a text label or unique identifier (respectively) used for tracking a finding or feature, potentially across multiple reporting objects, over time. As such, they are distinct from the Observation UID (0040,A171), which is unique identifier of the specific Content Item and its subsidiary Content Items that constitute an individual observation, and would be different for different observations on different occasions of the same finding or feature.**The values of these content items shall match the corresponding values of Tracking ID (0062,0020) and Tracking UID (0062,0021), if present, in the corresponding Segment of any Segmentation instance referenced in Row 7.**
Rows 6, 7	Referenced Segment Number (0062,000B) is an attribute of the IMAGE Content Item, and shall be present with a single value. If the Referenced SOP Instance is a Segmentation Image, it shall have a defined Frame of Reference. If it has Segmentation Type (0062,0001) value BINARY, it identifies the volume of defined (measured) region of interest by voxel values in the referenced segment with value 1. If it has Segmentation Type value FRACTIONAL, the volume is defined by an implementation dependent method. If the referenced SOP Instance is a Surface Segmentation, the referenced segment shall constitute a finite volume. It identifies the volume of the defined (measured) region of interest by the interior of the finite volume. Segment number shall be specified even if the Segmentation SOP Instance has only a single segment.
...	...

TID 4108 Tracking Identifier

This Template provides a means to identify an object for longitudinal tracking, potentially across multiple Structured Reports, over time.

Type: **Non-Extensible**
Order: **Significant**
Root: **No**

Table TID 4108. Tracking Identifier

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			TEXT	EV (112039, DCM, "Tracking Identifier")	1	MC	At least one of row 1 or 2 shall be present.	A string of characters with case being non-significant. Leading and trailing spaces and control characters are forbidden.
2			UIDREF	EV (112040, DCM, "Tracking Unique Identifier")	1	MC	At least one of row 1 or 2 shall be present.	

Content Item Descriptions

Tracking Identifier	A human readable identifier for longitudinal tracking, e.g., "Watchlist Nodule 1".
Tracking Unique Identifier	This is distinct from the Observation UID (0040,A171) that may be present in the data set for each Content Item, which identifies only a specific observation, not an object tracked over time, and each tracked object may have many observations.

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
112039	Tracking Identifier	A text label used for tracking a finding or feature, potentially across multiple reporting objects, over time. This label shall be unique within the domain in which it is used. **Corresponds to Tracking ID (0062,0020).**	
112040	Tracking Unique Identifier	A unique identifier used for tracking a finding or feature, potentially across multiple reporting objects, over time. **Corresponds to Tracking UID (0062,0021).**	