

| | | |
|---|---------------------|----------------------------|
| 1 | Status | Final Text |
| 2 | Date of Last Update | 2019/01/21 |
| 3 | Person Assigned | David Clunie |
| 4 | | mailto:dclunie@dclunie.com |
| 5 | Submitter Name | AIM |
| 6 | Submission Date | 2017/12/11 |

| | | |
|----|---|--|
| 7 | Correction Number CP-1779 | |
| 8 | Log Summary: Update AIM to DICOM SR TID 1500 mapping with model revisions | |
| 9 | Name of Standard | |
| 10 | PS3.16, PS3.21 | |
| 11 | Rationale for Correction: | |
| 12 | During the development of Sup 200, several issues were identified with the AIM model that required a model revision. Incorporate revised mappings for the updated model. These include: | |
| 13 | | |
| 14 | <ul style="list-style-type: none"> • add studyInstanceUid, seriesInstanceUid and accessionNumber to AnnotationCollection class (used to identify the annotation itself with study/series context) | |
| 15 | | |
| 16 | <ul style="list-style-type: none"> • add accessionNumber to ImageStudy class (used in references to images, to facilitate human mediated retrieval) | |
| 17 | <ul style="list-style-type: none"> • add new AIM statements (CalculationEntityReferencesSegmentationEntityStatement and CalculationEntityReferencesMarkupEntityStatement) to Image Annotations group (to allow linkage of measurements and ROI definition markup/segmentation) <=== | |
| 18 | [? declarative predicate or just prose]. | |
| 19 | | |
| 20 | <ul style="list-style-type: none"> • add sourcePatientGroupId to Person class (to allow referencing multiple small animals imaged at the same time) | |
| 21 | <ul style="list-style-type: none"> • add trackingUniqueIdentifier to AnnotationEntity class (to allow longitudinal lesion tracking across multiple AIM instances) | |
| 22 | <ul style="list-style-type: none"> • update definition of referencedSopInstanceUid in DicomSegmentationEntityClass to clarify that it references a representative image that can be used for Segmentation display | |
| 23 | | |
| 24 | <ul style="list-style-type: none"> • add studyInstanceUid, seriesInstanceUid to SegmentationEntity (to provide complete hierarchy for reference to segmentation instances) | |
| 25 | | |
| 26 | <ul style="list-style-type: none"> • add mapping of ImageAnnotation/comment as TEXT form of Qualitative Evaluation with code of (121106, DCM, "Comment") | |
| 27 | The mapping of qualitative evaluations was incomplete, since the ImagingObservationCharacteristic within ImagingObservationEntity | |
| 28 | was not specifically mapped and the matter of whether the concept is conveyed in a specific questionTypeCode or inherited from | |
| 29 | the parent ImagingObservationEntity typeCode was not addressed. | |
| 30 | The mapping of some required AIM model elements such as unique identifiers of individual nodes and imageAnnotation/datetime | |
| 31 | was not described. The Observation UID and Observation DateTime DICOM Attributes can be used to encode these. | |
| 32 | Also, update the language coding scheme in TID 1204 to RFC5646 as per CP-1567. | |
| 33 | Also, update the Quantitative Diagnostic Imaging Procedures codes to provide sufficiently generic codes for AIM conversions. | |
| 34 | Correction Wording: | |

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

TID 1602 Image Library Entry Descriptors

This Template contains selected attributes for an image or group of images. The descriptive information may be copied from images or derived.

Type: Extensible
 Order: Non-Significant
 Root: No

Table TID 1602. Image Library Entry Descriptors

| | NL | Rel with Parent | VT | Concept Name | VM | Req Type | Condition | Value Set Constraint |
|-----------|-----|-------------------------------|--------------------|--|-----------------|-----------------|-----------|----------------------|
| 1 | | HAS ACQ CONTEXT | CODE | EV (121139, DCM, "Modality") | 1 | U | | ... |
| 2 | | HAS ACQ CONTEXT | CODE | EV (123014, DCM, "Target Region") | 1 | U | | ... |
| 3 | | HAS ACQ CONTEXT | CODE | EV (111027, DCM, "Image Laterality") | 1 | U | | ... |
| 3b | | <u>HAS ACQ CONTEXT</u> | <u>TEXT</u> | <u>EV (121022, DCM, "Accession Number")</u> | <u>1</u> | <u>U</u> | | |
| 4 | | HAS ACQ CONTEXT | DATE | EV (111060, DCM, "Study Date") | 1 | U | | |
| 5 | | HAS ACQ CONTEXT | TIME | EV (111061, DCM, "Study Time") | 1 | U | | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |

CID 100 Quantitative Diagnostic Imaging Procedures

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
 Type: Extensible
 Version: ~~20141110~~20190121
 UID: 1.2.840.10008.6.1.998

Table CID 100. Quantitative Diagnostic Imaging Procedures

| Coding Scheme Designator | Code Value | Code Meaning | SNOMED-CT Concept ID | UMLS Concept Unique ID |
|--------------------------|------------------------|--|-------------------------|------------------------|
| <u>SRT</u> | <u>P0-0099A</u> | <u>Imaging procedure</u> | <u>363679005</u> | <u>C0011923</u> |
| SRT | P5-09051 | Magnetic resonance imaging guidance | 258177008 | C0442974 |
| DCM | 126020 | Multiparametric MRI | | |
| DCM | 126021 | Multiparametric MRI of prostate | | |
| DCM | 126022 | Multiparametric MRI of whole body | | |
| SRT | P5-0907F | Dynamic magnetic resonance imaging of knee | 433139009 | C2315346 |
| SRT | P5-70694 | Dynamic magnetic resonance imaging of pelvis | 446315002 | C2960816 |
| <u>LN</u> | <u>25045-6</u> | <u>CT unspecified body region</u> | | <u>C0882201</u> |
| <u>LN</u> | <u>25056-3</u> | <u>MRI unspecified body region</u> | | <u>C0882563</u> |
| <u>LN</u> | <u>49118-3</u> | <u>NM unspecified body region</u> | | <u>C1954874</u> |

| Coding Scheme Designator | Code Value | Code Meaning | SNOMED-CT Concept ID | UMLS Concept Unique ID |
|--------------------------|------------------------|---|----------------------|------------------------|
| LN | 44136-0 | PET unspecified body region | | C1715406 |
| LN | 44139-4 | PET whole body | | C1715409 |
| SRT | P5-080FF | PET/CT FDG imaging of whole body | 443271005 | C2732676 |
| SRT | P5-08118 | PET/CT MET imaging of whole body | 443844003 | C2732956 |
| RADLEXLN | RPID9639142-5 | CT perfusion head perfusion with IV contrast IV | | C1543263 |
| RADLEXLN | RPID525839632-5 | NM head perfusion-SPECT brain- SPECT | | C1543694 |
| RADLEX | RPID5427 | NM head perfusion brain PET-CT AV-45 | | |

Amend DICOM PS3.21 as follows (changes to existing text are bold and **underlined** for additions and **struckthrough** for removals):

2 Normative and Informative References

[AIM Model ~~v4-rv48~~**v4.2**] NCI. ~~2013/032018/02~~. *Annotation and Image Markup model version ~~4.2~~*. <https://wiki.nci.nih.gov/display/AIM/Annotation+and+Image+Markup+-+AIM#AnnotationandImageMarkup-AIM-AIMModel> .

A.2 Use Cases

...

Multiple regions of interest, or multiple measurements and categorical statements about a single region of interest, or about the same real world entity (e.g., lesion) identified with different regions of interest (e.g., at different time points or with different modalities), may be encoded in single or multiple AIM or DICOM SR instances. Whether or not a source AIM or DICOM SR implementation encodes more than one region of interest (and their accompanying measurements and categorical statements) in a single instance or in separate instances, and whether the conversion from one form to the other "bundles" multiple instances into a single instance, or "unbundles" a single instance into multiple instances, is not prescribed. The AIM 4.02 model allows for the encoding of multiple marked up regions and multiple measurements in a single annotation instance, **but does not and unlike earlier AIM model versions, provides a mechanism** for identifying which markup is associated with which measurement **using AIM statements; otherwise it is therefore** necessary to assume that all markup applies to all measurements and vice versa.

- For example, for RECIST measurements that involve the long and short axis of a lesion, **though** it is **currently not only** possible to encode in AIM (and map to TID 1500) the **boundaries of and the area** measurements **as** derived from a planar volumetric ROI, **and recognize them by their concept name code**, it is **not** also possible to encode the endpoints of the measured axes of the pair of linear measurements **and their derived values**. **Nor is a reverse mapping of such information encoded in TID 1500 into AIM possible. Some current AIM implementations use private extensions to address this use case, but mapping these is beyond the scope of the Standard.**
- It is expected that a future revision of the AIM 4.0 model will allow for explicit linkage of markup and measurements, probably using statements, e.g., CalculationEntityReferencesMarkupEntityStatement and CalculationEntityReferences SegmentationEntityStatement, at which time the appropriate mappings will be added.**

A.4 Structure of AIM Version 4 Instances

Update AIM model diagram to include new attributes and add the two Annotation Statements used; replace:

A.6.1.1.1 Mapping of DICOM Patient Module

Table A.6.1.1.1-1. Mapping of DICOM Patient Module

| DICOM Attribute | DICOM VR | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|--|-----------|----------|------------------|-----------------|--|---------------|------------------|---------|
| PatientName | PN | 1 | 2 | | ImageAnnotationCollection/person/name/@value | ST | 0..1 | |
| PatientID | LO | 1 | 2 | | ImageAnnotationCollection/person/id/@value | ST | 0..1 | |
| PatientBirthDate | DA | 1 | 2 | | ImageAnnotationCollection/person/birthDate/@value | TS | 0..1 | |
| PatientSex | CS | 1 | 2 | | ImageAnnotationCollection/person/sex/@value | ST | 0..1 | |
| EthnicGroup | SH | 1 | 3 | | ImageAnnotationCollection/person/ethnicGroup/@value | ST | 0..1 | |
| <u>SourcePatientGroupIdentificationSequence>PatientID</u> | <u>SQ</u> | <u>1</u> | <u>3</u> | | <u>ImageAnnotationCollection/person/sourcePatientGroupID</u> | <u>ST</u> | <u>0..1</u> | |

Note

If the annotation concerns a small animal that has been imaged as part of a group of animals in the same image, then the PatientID and other Attributes of this Module will be those of that individual animal, not the group. ~~Currently there is no~~The AIM ~~mechanism to~~4.2 model can optionally identify the group of animals imaged at the same time that corresponds to the DICOM SourcePatientGroupIdentificationSequence.

A.6.1.1.3 Mapping of DICOM General Study Module

The AIM 4.02 model ~~does not~~ provides optional Study identification information ~~per se (i.e., conceptually an AIM instance may exist independent of a Study, but DICOM requires that SR instances be part of a Study). Accordingly, If available, this information shall be used~~ during transformation from AIM to SR, otherwise either a new Study may be generated, or the SR instance derived from the AIM object could be placed in (one of) the Study(ies) referenced by the AIM instance, assuming there are any, which produces a predictable transformation, ~~and is described here.~~

If there is more than one DICOM Study referenced by the AIM object, and explicit Study identification information (ImageAnnotationCollection/studyInstanceId) is absent, duplicates of the converted AIM SR instance may be placed in each of the referenced studies (with different SOP Instance UIDs), in which case the IdenticalDocumentsSequence is required in the SR Document General Module; see PS3.3 C.17.2.2 Identical Documents Sequence.

Table A.6.1.1.3-1. Mapping of DICOM General Study Module

| DICOM Attribute | DICOM VR | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | Data Type | Multiplicity | Comment |
|------------------|----------|----------|------------------|--|---|-----------|--------------|---------|
| StudyInstanceUID | UI | 1 | 1 | New <u>or derived from referenced image</u> if not in source | ImageAnnotationCollection/imageAnnotations/ImageAnnotation[1]/imageReferenceEntityCollection/ImageReferenceEntity[1]/imageStudy[1]/instanceUid/@root <u>ImageAnnotationCollection/studyInstanceId/@root</u> | II | 0..1 | |

| DICOM Attribute | DICOM VR | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | Data Type | Multiplicity | Comment |
|------------------------|----------|----------|------------------|-------------------------------|---|-----------|--------------|--------------------|
| StudyDate | UI | 1 | 2 | Empty if not in source | ImageAnnotationCollection/imageAnnotations/ImageAnnotation[1]/imageReferenceEntityCollection/ImageReferenceEntity[1]/imageStudy[1]/startDate/@value | TS | 0..1 | |
| StudyTime | UI | 1 | 2 | Empty if not in source | ImageAnnotationCollection/imageAnnotations/ImageAnnotation[1]/imageReferenceEntityCollection/ImageReferenceEntity[1]/imageStudy[1]/startTime/@value | TS | 0..1 | |
| ReferringPhysicianName | PN | 1 | 2 | Empty | | | | Not in AIM. |
| StudyID | SH | 1 | 2 | Empty | | | | Not in AIM. |
| AccessionNumber | SH | 1 | 2 | <u>Empty if not in source</u> | <u>ImageAnnotationCollection/accessionNumber/@value</u> | <u>ST</u> | <u>0..1</u> | Not in AIM. |

A.6.1.1.6 Mapping of DICOM SR Document Series Module

The AIM 4.02 model ~~does not~~ optionally supports the concept that an annotation itself is part of a series. If available, this information shall be used, otherwise a new Series shall be generated since a converted instance, and it cannot be made part of a referenced image series, if any, because of the rule that all instances of a series are generated on the same equipment.

Table A.6.1.1.6-1. Mapping of DICOM SR Document Series Module

| DICOM Attribute | DICOM VR | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|---|----------|----------|------------------|------------------------------|--|---------------|------------------|--|
| Modality | CS | 1 | 1 | "SR" | | | | |
| SeriesInstance UID | UI | 1 | 1 | <u>New if not in source.</u> | <u>ImageAnnotationCollection/seriesInstanceUid/@root</u> | <u>II</u> | <u>0..1</u> | Using a generated value means that multiple round-trips may produce different values. When mapping multiple AIM instances related to the same study, if the same SeriesInstanceUID is used they will appear in the same Series. |
| SeriesNumber | IS | 1 | 1 | 7291 | | | | A well-known value means that multiple round-trips will use the same value. |
| Referenced Performed ProcedureStep Sequence | SQ | 1 | 2 | Empty | | | | |

A.6.1.1.9 Mapping of DICOM SR Document General Module

Table A.6.1.1.9-1. Mapping of DICOM SR Document General Module

| DICOM Attribute | DICOM VR | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | Data Type | Multiplicity | Comment |
|--|----------|----------|------------------|-----------------|--|-----------|-------------------|---------|
| ... | ... | ... | ... | ... | ... | | | |
| CurrentRequestedProcedureEvidenceSequence | SQ | 1 | 1 | | | | | |
| CurrentRequestedProcedureEvidenceSequence>StudyInstanceUID | UI | 1 | 1 | | ImageAnnotation Collection/image Annotations/image ReferenceEntity Collection/ ImageReferenceEntity/ imageStudy/ instanceUid/@root <u>ImageAnnotation Collection/image Annotations/Image Annotation/ segmentationEntity Collection/ SegmentationEntity/ studyInstanceUid/ @root</u> | II, II | 1..1, <u>0..1</u> | |
| CurrentRequestedProcedureEvidenceSequence>ReferencedSeriesSequence | SQ | 1 | 1 | | | | | |
| CurrentRequestedProcedureEvidenceSequence>ReferencedSeriesSequence>SeriesInstanceUID | UI | 1 | 1 | | ImageAnnotation Collection/image Annotations/image ReferenceEntity Collection/ ImageReferenceEntity/ imageStudy/ imageSeries/ instanceUid/@root <u>ImageAnnotation Collection/image Annotations/Image Annotation/ segmentationEntity Collection/ SegmentationEntity/ seriesInstanceUid/ @root</u> | II, II | 1..1, <u>0..1</u> | |
| CurrentRequestedProcedureEvidenceSequence>ReferencedSeriesSequence>ReferencedSOPSequence | SQ | 1 | 1 | | | | | |

| DICOM Attribute | DICOM VR | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | Data Type | Multiplicity | Comment |
|---|----------|----------|------------------|-----------------|---|-----------|--------------|---|
| CurrentRequestedProcedureEvidenceSequence> ReferencedSeriesSequence> ReferencedSOPSequence> ReferencedSOPClassUID | UI | 1 | 1 | | ImageAnnotation Collection/image Annotations/image ReferenceEntity Collection/ ImageReferenceEntity/ imageStudy/ imageSeries/image Collection/Image/ sopClassUid/@root <u>ImageAnnotation Collection/image Annotations/Image Annotation/ segmentationEntity Collection/ SegmentationEntity/ sopClassUid/@root</u> | II, II | 1..1, 1..1 | If the <u>studyInstanceUid</u> or <u>seriesInstanceUid</u> of a <u>SegmentationEntity</u> are absent, this reference cannot be included for that instance. |
| CurrentRequestedProcedureEvidenceSequence> ReferencedSeriesSequence> ReferencedSOPSequence> ReferencedSOPInstanceUID | UI | 1 | 1 | | ImageAnnotation Collection/image Annotations/image ReferenceEntity Collection/ ImageReferenceEntity/ imageStudy/ imageSeries/image Collection/Image/ sopInstanceUid/@root <u>ImageAnnotation Collection/image Annotations/Image Annotation/ segmentationEntity Collection/ SegmentationEntity/ sopInstanceUid/@root</u> | II, II | 1..1, 1..1 | If the <u>studyInstanceUid</u> or <u>seriesInstanceUid</u> of a <u>SegmentationEntity</u> are absent, this reference cannot be included for that instance. |
| ... | ... | ... | ... | ... | | | | Not in AIM. |

A.6.1.1.10 Mapping of DICOM SR Document Content Module

All the Attributes in the SR Document Content Module are transformed by processing the DICOM SR Content Tree, and accordingly are not described in the same tabular manner as the "header" Attributes, since the mapping depends on the DICOM SR template structure. The Attributes common to each Content Item of the Content Tree are:

- ValueType
- ConceptNameCodeSequence
- ObservationUID
- ContentSequence

Each child Content Item with a "by-value" relationship with its parent also contains:

- RelationshipType

The additional required Attributes in each Content Item depend on the ValueType:

- TEXT - TextValue
- DATETIME - DateTime
- DATE - Date
- TIME - Time
- PNAME - PersonName
- UIDREF - UID
- NUM - MeasuredValueSequence, MeasuredValueSequence>NumericValue, MeasuredValueSequence>MeasurementUnitsCode Sequence
- CODE - ConceptCodeSequence
- COMPOSITE - ReferencedSOPSequence, ReferencedSOPSequence>ReferencedSOPClassUID, ReferencedSOPSequence>ReferencedSOPInstanceUID
- IMAGE - ReferencedSOPSequence, ReferencedSOPSequence>ReferencedSOPClassUID, ReferencedSOPSequence>ReferencedSOPInstanceUID, ReferencedSOPSequence>ReferencedFrameNumber, ReferencedSOPSequence>ReferencedSegmentNumber
- SCOORD - GraphicData, GraphicType
- SCOORD3D - ReferencedFrameOfReferenceUID, GraphicData, GraphicType
- CONTAINER - ContinuityOfContent, ContentTemplateSequence, ContentTemplateSequence>MappingResource, ContentTemplateSequence>TemplateIdentifier

ObservationUID is required for the following Content Items in order to propagate the aim:uniqueIdentifier information:

- **IMAGE - for (121191, DCM, "Referenced Segment") Content Item corresponding to aim:SegmentationEntity**
- **CONTAINER - for (126200, DCM, "Image Library Group") Content Item corresponding to aim:ImageReferenceEntity**
- **CONTAINER - for (125007, DCM, "Measurement Group") Content Item corresponding to aim:ImageAnnotation**
- **NUM - for any Content Item corresponding to aim:CalculationEntity**
- **SCOORD - for any Content Item corresponding to aim:MarkupEntity**

ObservationDateTime is required for the following Content Items in order to propagate the aim:dateTime information:

- **CONTAINER - for (125007, DCM, "Measurement Group") Content Item corresponding to aim:ImageAnnotation**

A.6.1.2 Content Tree

TID 1500 Mapping of Measurement Report

Table TID 1500. Mapping of Measurement Report

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|---|-----------|----------|------------------|-----------------|--------------------------|---------------|------------------|---|
| ... | | | | | | | | <p>The fixed Concept Name code is an appropriate choice selected from "???" in the absence of a "document title" concept in AIM.</p> <p>If out of band information is available, a more appropriate code can be used.</p> |
| (126000, DCM, "Imaging Measurement Report") > (C0034375, UMLS, "Qualitative Evaluations") | CONTAINER | 1 | C | | | | | IFF Imaging ObservationEntity elements are present in the source AIM object |

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|--|----------|----------|------------------|-----------------|---|---------------|------------------|--|
| (126000, DCM, "Imaging Measurement Report") > (C0034375, UMLS, "Qualitative Evaluations") > CODE | CODE | 1-n | U | | <p>NAME = ImageAnnotationCollection/imageAnnotations/ImageAnnotation/imagingObservationEntityCollection/ImagingObservationEntity/imagingObservationCharacteristicCollection/ImagingObservationCharacteristic/questionTypeCode;typeCode</p> <p>or NAME = ImageAnnotationCollection/imageAnnotations/ImageAnnotation/imagingObservationEntityCollection/ImagingObservationEntity/typeCode</p> <p>VALUE = ImageAnnotationCollection/imageAnnotations/ImageAnnotation/imagingObservationEntityCollection/ImagingObservationEntity/imagingObservationCharacteristicCollection/ImagingObservationCharacteristic/typeCode</p> | CD, CD | 1, 0..1 | The concept name may be encoded as a specific question TypeCode for the ImagingObservationCharacteristic or inherited from the typeCode of the parent ImagingObservationEntity. |
| (126000, DCM, "Imaging Measurement Report") > (C0034375, UMLS, "Qualitative Evaluations") > TEXT | TEXT | 1-n | U | | | | | Not used in AIM |

TID 1501 Mapping of Measurement Group

Table TID 1501. Mapping of Measurement Group

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|---|-----------|----------|------------------|----------------------------------|---|---------------|------------------|---|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") | CONTAINER | 1 | M | | <u>Image Annotation Collection/ image Annotations/ Image Annotation</u> | | | <u>The value of aim:unique Identifier/@root is mapped to the ObservationUID Attribute of the CONTAINER.</u> <u>The value of aim:date Time/@root is mapped to the Observation DateTimeAttribute of the CONTAINER.</u> |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (112039, DCM, "Tracking Identifier") | TEXT | 1 | M | | Image Annotation Collection/ image Annotations/ Image Annotation/ name/@value | ST | 1 | |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (112040, DCM, "Tracking Unique Identifier") | UIDREF | 1 | M | | Image Annotation Collection/ image Annotations/ Image Annotation/ <u>tracking Unique Identifier/@root</u> | II | <u>0..1</u> | <u>Using If tracking Unique Identifier is absent, then Image Annotation/unique Identifier may be used as a proxy for Tracking Unique Identifier, but this does not allow longitudinal identification of the same lesion because ImageAnnotation/uniqueIdentifier must be unique to each AIM annotation file; in which case only Image Annotation/name can be used to recognize commonality.</u> |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > | INCLUDE | 1-n | M | TID 300 "Mapping of Measurement" | | | | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|---|----------|----------|------------------|-----------------|--|---------------|------------------|---|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$QualitativeEvaluations | CODE | 1-n | U | | | | | Not used in AIM. |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$QualitativeEvaluations <u>(121106, DCM, "Comment")</u> | TEXT | 1-n | U | | <u>Image Annotation Collection/ image Annotations/ Image Annotation/ comment/ @value</u> | | | <u>The parameter \$Qualitative Evaluations is n</u> Not used in AIM, <u>but this TEXT content item is used to map the AIM comment as if it were a Qualitative Evaluation.</u> |

TID 1410 Mapping of Planar ROI Measurements

Table TID 1410. Mapping of Planar ROI Measurements

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|---|-----------|----------|------------------|-----------------|--|---------------|------------------|---|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") | CONTAINER | 1 | M | | <u>ImageAnnotation Collection/image Annotations/Image Annotation</u> | | | <u>The value of aim:unique Identifier/@root is mapped to the ObservationUID Attribute of the CONTAINER.</u> <u>The value of aim:date Time/@root is mapped to the ObservationDate TimeAttribute of the CONTAINER.</u> |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (112039, DCM, "Tracking Identifier") | TEXT | 1 | M | | ImageAnnotationCollection/ imageAnnotations/Image Annotation/name/@value | ST | 1 | |

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|--|----------|----------|------------------|-----------------|--|---------------|------------------|---|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (112040, DCM, "Tracking Unique Identifier") | UIDREF | 1 | M | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/ tracking UniqueIdentifier/@root | II | <u>0..1</u> | Using <u>if tracking UniqueIdentifier is absent, then ImageAnnotation/uniqueIdentifier may be used</u> as a proxy for Tracking Unique Identifier, <u>but this</u> does not allow longitudinal identification of the same lesion because Image Annotation/uniqueIdentifier must be unique to each AIM annotation file, <u>in which case</u> only ImageAnnotation/ name can be used to recognize commonality. |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (111030, DCM, "Image Region") | SCCOORD | 1 | MC | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/markupEntityCollection/MarkupEntity/twoDimension SpatialCoordinateCollection/TwoDimension SpatialCoordinate | | | A Graphic Type of MULTIPOINT is not permitted in the DICOM template. <u>One or more MarkupEntity instances within an Image Annotation instance may be constrained to be associated with particular NUM measurement(s) in the included TID 1419 by a CalculationEntity References MarkupEntity Statement.</u> |

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|---|----------|----------|------------------|-----------------|--|---------------|------------------|---|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (111030, DCM, "Image Region") > IMAGE | IMAGE | 1 | M | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/markupEntityCollection/MarkupEntity/imageReferenceUid/@root, referencedFrameNumber/@value | II, INT | 1, 0..1 | The Referenced SOP Class UID is obtained from imageReferenceEntityCollection; see Table A.8-5 |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (121214, DCM, "Referenced Segmentation Frame") | IMAGE | 1 | MC | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/segmentationEntityCollection/SegmentationEntity | | | 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. <u>The value of aim:uniqueIdentifier/@root is mapped to the ObservationUID Attribute of the IMAGE.</u> <u>One or more Segmentation references within an Image Annotation instance may be constrained to be associated with particular NUM measurement(s) in the included TID 1419 by a CalculationEntity References Segmentation EntityStatement.</u> |

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|---|----------|----------|------------------|--|---|---------------|------------------|---|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (121233, DCM, "Source image for segmentation") | IMAGE | 1 | MC | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/segmentationEntityCollection/SegmentationEntity/referencedSopInstanceUid/@root | | | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > | INCLUDE | 1 | M | TID 1419 "Mapping of ROI Measurements" | | | | Not used in AIM. |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$Qualitative Evaluations | CODE | 1-n | U | | | | | Not used in AIM. |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > <u>\$Qualitative Evaluations (121106, DCM, "Comment")</u> | TEXT | 1-n | U | | <u>ImageAnnotationCollection/imageAnnotations/ImageAnnotation/comment/@value</u> | | | <u>The parameter \$Qualitative Evaluations is not used in AIM, but this TEXT content item is used to map the AIM comment as if it were a Qualitative Evaluation.</u> |

TID 1411 Mapping of Volumetric ROI Measurements

Table TID 1411. Mapping of Volumetric ROI Measurements

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|--|-----------|----------|------------------|-----------------|---|---------------|------------------|--|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") | CONTAINER | 1 | M | | <u>ImageAnnotationCollection/imageAnnotations/ImageAnnotation</u> | | | <u>The value of aim:uniqueIdentifier/@root is mapped to the ObservationUID Attribute of the CONTAINER.</u> <u>The value of aim:dateTime/@root is mapped to the ObservationDate TimeAttribute of the CONTAINER.</u> |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (112039, DCM, "Tracking Identifier") | TEXT | 1 | M | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/name/@value | ST | 1 | |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (112040, DCM, "Tracking Unique Identifier") | UIDREF | 1 | M | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/ <u>trackingUniqueIdentifier</u> /root | II | <u>0..1</u> | <u>UsingIf trackingUniqueIdentifier is absent, then ImageAnnotation/uniqueIdentifier may be used as a proxy for Tracking Unique Identifier, but this does not allow longitudinal identification of the same lesion because Image Annotation/uniqueIdentifier must be unique to each AIM annotation file; in which case only ImageAnnotation/name can be used to recognize commonality.</u> |

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|--|----------|----------|------------------|-----------------|--|---------------|------------------|--|
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (111030, DCM, "Image Region") | SCoord | 1-n | MC | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/markupEntityCollection/MarkupEntity/twoDimensionSpatialCoordinateCollection/TwoDimensionSpatialCoordinate | REAL | 1..n | <p>A Graphic Type of MULTIPOINT is not permitted in the DICOM template.</p> <p><u>The value of aim: MarkupEntity/aim:unique Identifier/@root is mapped to the ObservationUID Attribute of the SCoord.</u></p> <p><u>One or more MarkupEntity instances within an Image Annotation instance may be constrained to be associated with particular NUM measurement(s) in the included TID 1419 by a CalculationEntity References MarkupEntity Statement.</u></p> |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (111030, DCM, "Image Region") > IMAGE | IMAGE | 1 | M | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/markupEntityCollection/MarkupEntity/imageReferenceUid/@root, referencedFrameNumber/@value | II, INT | 1, 0..1 | The Referenced SOP Class UID is obtained from imageReferenceEntityCollection; see Table A.8-5 |

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|---|----------|----------|------------------|-----------------|---|---------------|------------------|---|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (121191, DCM, "Referenced Segment") | IMAGE | 1 | MC | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/segmentationEntityCollection/SegmentationEntity | INT | 0..1 | Reference shall be to a Segmentation Image or Surface Segmentation object, with a single value specified in Referenced Segment Number. <u>One or more Segmentation references within an Image Annotation instance may be constrained to be associated with particular NUM measurement(s) in the included TID 1419 by a CalculationEntity References Segmentation EntityStatement.</u> |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (121231, DCM, "Volume Surface") | COORD3D | 1 | MC | | | | | Not used in AIM. |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > (121233, DCM, "Source image for segmentation") | IMAGE | 1-n | MC | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/segmentationEntityCollection/SegmentationEntity/referencedSopInstanceUid/@root | | | |
| ... | ... | | | ... | | ... | ... | ... |

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|---|----------|----------|------------------|--|---|---------------|------------------|--|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > | INCLUDE | 1 | M | TID 1419 "Mapping of ROI Measurements" | | | | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$Qualitative Evaluations | CODE | 1-n | U | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/imagingObservationEntityCollection/imagingObservationCharacteristicCollection/ImagingObservationCharacteristic/questionTypeCode,typeCode | CD, CD | 1, 0..1 | |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$Qualitative Evaluations (121106, DCM, "Comment") | TEXT | 1-n | U | | <u>ImageAnnotationCollection/imageAnnotations/ImageAnnotation/comment/@value</u> | | | <u>The parameter \$Qualitative Evaluations is not used in AIM, but this TEXT content item is used to map the AIM comment as if it were a Qualitative Evaluation.</u> |

TID 1419 Mapping of ROI Measurements

Table TID 1419. Mapping of ROI Measurements

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|---------------|----------|----------|------------------|-----------------|--------------------------|---------------|------------------|---------|
| ... | ... | ... | ... | ... | ... | ... | ... | ... |

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|--|----------|----------|------------------|-----------------|---|---------------|------------------|---|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$Measurement | NUM | 1-n | M | | <p>NAME = ImageAnnotationCollection/imageAnnotations/ImageAnnotation/calculationEntityCollection/CalculationEntity/typeCode[1]</p> <p>VALUE = ImageAnnotationCollection/imageAnnotations/ImageAnnotation/calculationEntityCollection/calculationResultCollection/CalculationResult/@value, calculationDataCollection/CalculationData/@value</p> <p>UNITS = ImageAnnotationCollection/imageAnnotations/ImageAnnotation/calculationEntityCollection/CalculationEntity/calculationResultCollection/CalculationResult/unitOfMeasure</p> | CD, ST, CD | 1..n, 0..n, 1 | <p>The first typeCode entry is assumed to be the primary concept. Other typeCode entries may be considered as modifiers.</p> <p>Value may be found in either CompactCalculationResult (i.e., value child of CalculationResult) or first value of ExtendedCalculationResult (i.e., nested within calculationResultCollection).</p> <p>Only mapping of a single value from ExtendedCalculationResult is supported.</p> <p>If no measurement is present in AIM (0..n) then do not include the template in the first place.</p> <p><u>The value of aim:uniqueIdentifier/@root is mapped to the ObservationUID Attribute of the NUM Content Item.</u></p> |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |

TID 300 Mapping of Measurement

Table TID 300. Mapping of Measurement

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|---|----------|----------|------------------|---|---|---------------|------------------|--|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$Measurement | NUM | 1 | M | | <p>NAME = Image AnnotationCollection/ imageAnnotations/ ImageAnnotation/ calculationEntity Collection/ CalculationEntity/ typeCode[1]</p> <p>VALUE = Image AnnotationCollection/ imageAnnotations/ ImageAnnotation/ calculationEntity Collection/ CalculationEntity/ calculationResult Collection/ CalculationResult/ @value, calculationData Collection/ CalculationData/ @value</p> <p>UNITS = Image AnnotationCollection/ imageAnnotations/ ImageAnnotation/ calculationEntity Collection/ CalculationEntity/ calculationResult Collection/ CalculationResult/ unitOfMeasure</p> | CD, ST, CD | 1..n, 0..n, 1 | <p>The first typeCode entry is assumed to be the primary concept. Other typeCode entries may be considered as modifiers.</p> <p>Value may be found in either Compact CalculationResult (i.e., value child of CalculationResult) or first value of Extended CalculationResult (i.e., nested within calculationResult Collection).</p> <p>Only mapping of a single value from ExtendedCalculationResult is supported.</p> <p><u>The value of aim:unique Identifier/@root is mapped to the ObservationUID Attribute of the NUM Content Item.</u></p> |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$Measurement > \$ImagePurpose | INCLUDE | 1-n | U | TID 320 "Mapping of Image or Spatial Coordinates" | | | | |
| ... | ... | ... | ... | ... | | | | ... |

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|--|----------|----------|------------------|---|--------------------------|---------------|------------------|---|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$Measurement > | INCLUDE | 1 | U | TID 4108 "Mapping of Tracking Identifier" | | | | Not mapped at this level for TID 1500, but rather at the Measurement Group level in TID 1501. |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |

TID 320 Mapping of Image or Spatial Coordinates

Table TID 320. Mapping of Image or Spatial Coordinates

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|--|----------|----------|------------------|-----------------|---|---------------|------------------|---|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$Purpose | IMAGE | 1 | MC | | ImageAnnotation Collection/image Annotations/Image Annotation/markupEntity Collection/MarkupEntity/ imageReferenceUid/ @root, referencedFrameNumber/ @value | II, INT | 1, 0..1 | An entire image reference without spatial coordinates The Referenced SOP Class UID is obtained from imageReference EntityCollection; see Table A.8-5 Only the by-value (SELECTED FROM) relationship is used, not the by-reference (R-SELECTED FROM) relationship. |

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|--|----------|----------|------------------|-----------------|--|---------------|------------------|--|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$Purpose | SCoord | 1 | MC | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/markupEntityCollection/MarkupEntity/twoDimensionSpatialCoordinateCollection/TwoDimensionSpatialCoordinate | REAL | 1..n | A reference to coordinates on an image. <u>The value of aim: MarkupEntity/aim: uniqueIdentifier/@root is mapped to the ObservationUID Attribute of the SCoord.</u> <u>One or more MarkupEntity instances within an Image Annotation instance may be constrained to be associated with particular NUM measurement(s) in the included TID 1419 by a CalculationEntity ReferencesMarkupEntityStatement.</u> |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$Purpose > IMAGE | IMAGE | 1 | M | | ImageAnnotationCollection/imageAnnotations/ImageAnnotation/markupEntityCollection/MarkupEntity/imageReferenceUid/@root, referencedFrameNumber/@value | II, INT | 1, 0..1 | The Referenced SOP Class UID is obtained from imageReferenceEntityCollection; see Table A.8-5 Only the by-value (SELECTED FROM) relationship is used, not the by-reference (R-SELECTED FROM) relationship. |

TID 4108 Mapping of Tracking Identifier

...

For the purpose of this mapping, this template is not used to track individual measurements; rather, the corresponding content items defined in Section TID 1501 "Mapping of Measurement Group" are mapped at the Measurement Group level instead.

Table TID 4108. Mapping of Tracking Identifier

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|--|----------|----------|------------------|-----------------|--------------------------|---------------|------------------|--|
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$Measurement > (112039, DCM, "Tracking Identifier") | TEXT | 1 | U | | | | | MC but U in parent TID 300. Not mapped at this level for TID 1500, but rather at the Measurement Group level in TID 1501. |
| (126000, DCM, "Imaging Measurement Report") > (126010, DCM, "Imaging Measurements") > (125007, DCM, "Measurement Group") > \$Measurement > (112040, DCM, "Tracking Unique Identifier") | UIDREF | 1 | U | | | | | MC but U in parent TID 300. Not mapped at this level for TID 1500, but rather at the Measurement Group level in TID 1501. |

TID 1204 Mapping of Language of Content Item and Descendants

This section describes the mapping of ????.

Table TID 1204. Mapping of Language of Content Item and Descendants

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|--|----------|----------|------------------|---|--------------------------|---------------|------------------|---|
| (126000, DCM, "Imaging Measurement Report") > (121049, DCM, "Language of Content Item and Descendants") | CODE | 1 | M | (eng, RFC3066 <u>RFC5646</u> ,"English") | | | | Not used in AIM; discarded if present in DICOM SR. ???? |
| (126000, DCM, "Imaging Measurement Report") > (121049, DCM, "Language of Content Item and Descendants") > (121046, DCM, "Country of Language") | CODE | 1 | U | (US,ISO3166_1,"United States") | | | | Not used in AIM; discarded if present in DICOM SR. ???? |

TID 1600 Mapping of Image Library

This section describes the mapping of ????.

Table TID 1600. Mapping of Image Library

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|---|-----------|----------|------------------|-----------------|--|---------------|------------------|---|
| (126000, DCM, "Imaging Measurement Report") > (111028, DCM, "Image Library") | CONTAINER | 1 | M | | | | | |
| (126000, DCM, "Imaging Measurement Report") > (111028, DCM, "Image Library") > (126200, DCM, "Image Library Group") | CONTAINER | 1-n | U | | <u>/ImageAnnotationCollection/imageAnnotations/ImageAnnotation/imageReferenceEntityCollection/ImageReferenceEntity</u> | | | <u>The value of aim:uniqueIdentifier/@root is mapped to the Observation UID Attribute of the CONTAINER.</u> |
| ... | ... | ... | ... | ... | | | | ... |

TID 1602 Mapping of Image Library Entry Descriptors

Table TID 1602. Mapping of Image Library Entry Descriptors

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|---|----------|----------|------------------|-----------------|---|---------------|------------------|--|
| (126000, DCM, "Imaging Measurement Report") > (111028, DCM, "Image Library") > (126200, DCM, "Image Library Group") > (121139, DCM, "Modality") | CODE | 1 | U | | /ImageAnnotationCollection/imageAnnotations/ImageAnnotation/imageReferenceEntityCollection/ImageReferenceEntity/imageStudy/imageSeries/modality/@code | CD | 1..1 | ... |
| (126000, DCM, "Imaging Measurement Report") > (111028, DCM, "Image Library") > (126200, DCM, "Image Library Group") > (123014, DCM, "Target Region") | CODE | 1 | U | | | | | Not used in AIM; discarded if present in DICOM SR. |
| (126000, DCM, "Imaging Measurement Report") > (111028, DCM, "Image Library") > (126200, DCM, "Image Library Group") > (111027, DCM, "Image Laterality") | CODE | 1 | U | | | | | Not used in AIM; discarded if present in DICOM SR. |

| DICOM SR Path | DICOM VT | DICOM VM | DICOM Usage Type | Generated Value | AIM Element or Attribute | AIM Data Type | AIM Multiplicity | Comment |
|--|-------------|----------|------------------|-----------------|---|---------------|------------------|--|
| <u>126000, DCM, "Imaging Measurement Report") > (111028, DCM, "Image Library") > (126200, DCM, "Image Library Group") > (121022, DCM, "Accession Number")</u> | <u>TEXT</u> | <u>1</u> | <u>U</u> | | <u>/ImageAnnotationCollection/imageAnnotations/ImageAnnotation/imageReferenceEntityCollection/ImageReferenceEntity/imageStudy/ accessionNumber/@value</u> | <u>ST</u> | <u>0..1</u> | |
| (126000, DCM, "Imaging Measurement Report") > (111028, DCM, "Image Library") > (126200, DCM, "Image Library Group") > (111060, DCM, "Study Date") | DATE | 1 | U | | /ImageAnnotationCollection/imageAnnotations/ImageAnnotation/imageReferenceEntityCollection/ImageReferenceEntity/imageStudy/startDate/@value | TS | 1..1 | |
| (126000, DCM, "Imaging Measurement Report") > (111028, DCM, "Image Library") > (126200, DCM, "Image Library Group") > (111061, DCM, "Study Time") | TIME | 1 | U | | /ImageAnnotationCollection/imageAnnotations/ImageAnnotation/imageReferenceEntityCollection/ImageReferenceEntity/imageStudy/startTime/@value | TS | 1..1 | |
| (126000, DCM, "Imaging Measurement Report") > (111028, DCM, "Image Library") > (126200, DCM, "Image Library Group") > (111018, DCM, "Content Date") | DATE | 1 | U | | | | | Not used in AIM; discarded if present in DICOM SR. |
| (126000, DCM, "Imaging Measurement Report") > (111028, DCM, "Image Library") > (126200, DCM, "Image Library Group") > (111019, DCM, "Content Time") | TIME | 1 | U | | | | | Not used in AIM; discarded if present in DICOM SR. |
| (126000, DCM, "Imaging Measurement Report") > (111028, DCM, "Image Library") > (126200, DCM, "Image Library Group") > (126201, DCM, "Acquisition Date") | DATE | 1 | U | | | | | Not used in AIM; discarded if present in DICOM SR. |
| (126000, DCM, "Imaging Measurement Report") > (111028, DCM, "Image Library") > (126200, DCM, "Image Library Group") > (126202, DCM, "Acquisition Time") | TIME | 1 | U | | | | | Not used in AIM; discarded if present in DICOM SR. |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |

Amend DICOM PS3.21 as follows replacing entire sample section with the following:

A.7 Sample Documents

This section describes a sample AIM v4.2 instance and the same content transformed into a DICOM SR TID 1500 instance.

A.7.1 Source AIM v4 Instance

```

4 <?xml version="1.0" encoding="UTF-8"?>
5 <ImageAnnotationCollection xmlns="gme://caCORE.caCORE/4.4/edu.northwestern.radiology.AIM" xmlns:rdf="http://www.w3.org/1999/02/22-
6   <uniqueIdentifier root="2.25.224793923339609181243139195858254344686"/>
7   <studyInstanceUid root="2.25.80159168229010751652502576830057032194"/>
8   <seriesInstanceUid root="2.25.323817225444021135415209334192751441320"/>
9   <accessionNumber value="AN5678AIM"/>
10  <dateTime value="20170201180043"/>
11  <user>
12    <name value="Doe^Jane"/>
13    <loginName value="jdoe"/>
14    <roleInTrial/>
15  </user>
16  <equipment>
17    <manufacturerName value="Acme Medical Systems"/>
18    <manufacturerModelName value=""/>
19    <softwareVersion value="36.00"/>
20  </equipment>
21  <person>
22    <name value="CM-1-111-000000"/>
23    <id value="293761767066931586407385203810190772174"/>
24    <birthDate value="19600101000000"/>
25    <sex value="M"/>
26    <ethnicGroup/>
27  </person>
28  <imageAnnotations>
29    <ImageAnnotation>
30      <uniqueIdentifier root="2.25.56002466128627498886935079903172938041"/>
31      <typeCode code="M-01100" codeSystemName="SRT">
32        <iso:displayName xmlns:iso="uri:iso.org:21090" value="Lesion"/>
33      </typeCode>
34      <dateTime value="20170201180043"/>
35      <name value="Lesion1"/>
36      <comment value="PT / WB NAC P600 / 0"/>
37      <trackingUniqueIdentifier root="2.25.165294254063588909770717555738008800301"/>
38      <calculationEntityCollection>
39        <CalculationEntity>
40          <uniqueIdentifier root="2.25.51420968257530981243824658943871973198"/>
41          <typeCode code="126401" codeSystemName="DCM">
42            <iso:displayName xmlns:iso="uri:iso.org:21090" value="SUVbw"/>
43          </typeCode>
44          <typeCode code="R-404FB" codeSystemName="SRT">
45            <iso:displayName xmlns:iso="uri:iso.org:21090" value="Minimum"/>
46          </typeCode>
47          <description value="SUVbw Minimum"/>
48          <mathML/>
49          <calculationResultCollection>
50            <CalculationResult type="Scalar" xsi:type="CompactCalculationResult">
51              <unitOfMeasure value="g/ml{SUVbw}"/>
52              <dataType code="C48870" codeSystemName="NCI">
53                <iso:displayName xmlns:iso="uri:iso.org:21090" value="Double"/>
54              </dataType>
55              <dimensionCollection>
56                <Dimension>

```

```

1         <index value="0"/>
2         <size value="1"/>
3         <label value="Minimum"/>
4     </Dimension>
5 </dimensionCollection>
6     <value value="1.98024"/>
7 </CalculationResult>
8 </calculationResultCollection>
9
10 </CalculationEntity>
11 <CalculationEntity>
12     <uniqueIdentifier root="2.25.205292243885258032428819330909580896146"/>
13     <typeCode code="126401" codeSystemName="DCM">
14         <iso:displayName xmlns:iso="uri:iso.org:21090" value="SUVbw"/>
15     </typeCode>
16     <typeCode code="G-A437" codeSystemName="SRT">
17         <iso:displayName xmlns:iso="uri:iso.org:21090" value="Maximum"/>
18     </typeCode>
19     <description value="SUVbw Maximum"/>
20     <mathML/>
21     <calculationResultCollection>
22         <CalculationResult type="Scalar" xsi:type="CompactCalculationResult">
23             <unitOfMeasure value="g/ml{SUVbw}"/>
24             <dataType code="C48870" codeSystemName="NCI">
25                 <iso:displayName xmlns:iso="uri:iso.org:21090" value="Double"/>
26             </dataType>
27             <dimensionCollection>
28                 <Dimension>
29                     <index value="0"/>
30                     <size value="1"/>
31                     <label value="Maximum"/>
32                 </Dimension>
33             </dimensionCollection>
34             <value value="5.68816"/>
35         </CalculationResult>
36     </calculationResultCollection>
37
38 </CalculationEntity>
39 <CalculationEntity>
40     <uniqueIdentifier root="2.25.70160252080234577167847509948368893276"/>
41     <typeCode code="126401" codeSystemName="DCM">
42         <iso:displayName xmlns:iso="uri:iso.org:21090" value="SUVbw"/>
43     </typeCode>
44     <typeCode code="R-00317" codeSystemName="SRT">
45         <iso:displayName xmlns:iso="uri:iso.org:21090" value="Mean"/>
46     </typeCode>
47     <description value="SUVbw Mean"/>
48     <mathML/>
49     <calculationResultCollection>
50         <CalculationResult type="Scalar" xsi:type="CompactCalculationResult">
51             <unitOfMeasure value="g/ml{SUVbw}"/>
52             <dataType code="C48870" codeSystemName="NCI">
53                 <iso:displayName xmlns:iso="uri:iso.org:21090" value="Double"/>
54             </dataType>
55             <dimensionCollection>
56                 <Dimension>
57                     <index value="0"/>
58                     <size value="1"/>
59                     <label value="Mean"/>
60                 </Dimension>

```

```

1         </dimensionCollection>
2         <value value="2.329186593407"/>
3     </CalculationResult>
4 </calculationResultCollection>
5
6 </CalculationEntity>
7 <CalculationEntity>
8     <uniqueIdentifier root="2.25.140657026119469861895824082767088344984"/>
9     <typeCode code="126401" codeSystemName="DCM">
10         <iso:displayName xmlns:iso="uri:iso.org:21090" value="SUVbw"/>
11     </typeCode>
12     <typeCode code="R-10047" codeSystemName="SRT">
13         <iso:displayName xmlns:iso="uri:iso.org:21090" value="Standard Deviation"/>
14     </typeCode>
15     <description value="SUVbw Standard Deviation"/>
16     <mathML/>
17     <calculationResultCollection>
18         <CalculationResult type="Scalar" xsi:type="CompactCalculationResult">
19             <unitOfMeasure value="g/ml{SUVbw}"/>
20             <dataType code="C48870" codeSystemName="NCI">
21                 <iso:displayName xmlns:iso="uri:iso.org:21090" value="Double"/>
22             </dataType>
23             <dimensionCollection>
24                 <Dimension>
25                     <index value="0"/>
26                     <size value="1"/>
27                     <label value="Standard Deviation"/>
28                 </Dimension>
29             </dimensionCollection>
30             <value value="1.8828952323684"/>
31         </CalculationResult>
32     </calculationResultCollection>
33
34 </CalculationEntity>
35 </calculationEntityCollection>
36 <segmentationEntityCollection>
37     <SegmentationEntity xsi:type="DicomSegmentationEntity">
38         <uniqueIdentifier root="2.25.318310842062810077214341266367812728264"/>
39         <sopInstanceUid root="2.25.134884066033959077306435705240550195701"/>
40         <studyInstanceUid root="2.25.19202292006231006756726546749423641172"/>
41         <seriesInstanceUid root="2.25.225493840038502954753967211679094249480"/>
42         <sopClassUid root="1.2.840.10008.5.1.4.1.1.66.4"/>
43         <referencedSopInstanceUid root="2.25.319214308104243787945491694789635628411"/>
44         <segmentNumber value="1"/>
45     </SegmentationEntity>
46 </segmentationEntityCollection>
47 <imageReferenceEntityCollection>
48     <ImageReferenceEntity xsi:type="DicomImageReferenceEntity">
49         <uniqueIdentifier root="2.25.239108061065263370785162033783811931375"/>
50         <imageStudy>
51             <instanceUid root="2.25.52186905385055707830834793159643714079"/>
52             <startDate value="20170113"/>
53             <startTime value="070844"/>
54             <accessionNumber value="AN1234IMG"/>
55         <imageSeries>
56             <instanceUid root="2.25.263500776851326986665835510707132143772"/>
57             <modality code="PT" codeSystemName="DCM">
58                 <iso:displayName xmlns:iso="uri:iso.org:21090" value="Positron emission tomography"/>
59             </modality>
60         </imageSeries>

```

```

1         <Image>
2             <sopClassUid root="1.2.840.10008.5.1.4.1.1.128"/>
3             <sopInstanceUid root="2.25.319214308104243787945491694789635628411"/>
4         </Image>
5     </imageCollection>
6 </imageSeries>
7 </imageStudy>
8 </ImageReferenceEntity>
9 </imageReferenceEntityCollection>
10 </ImageAnnotation>
11 </imageAnnotations>
12 </ImageAnnotationCollection>

```

A.7.2 Target DICOM SR "Measurement Report" (TID 1500)

A compact representation of the semantic content of the transformed DICOM SR tree is shown here:

```

15 1: : CONTAINER: (126000,DCM,"Imaging Measurement Report") [SEPARATE] (DCMR,1500)
16 >1.1: HAS CONCEPT MOD: CODE: (121049,DCM,"Language of Content Item and Descendants") = (eng,RFC5646,"English")
17 >>1.1.1: HAS CONCEPT MOD: CODE: (121046,DCM,"Country of Language") = (US,ISO3166_1,"United States")
18 >1.2: HAS OBS CONTEXT: PNAME: (121008,DCM,"Person Observer Name") = "Doe^Jane"
19 >1.3: HAS OBS CONTEXT: TEXT: (128774,DCM,"Person Observer's Login Name") = "jdoe"
20 >1.4: HAS CONCEPT MOD: CODE: (121058,DCM,"Procedure reported") = (44136-0,LN,"PET unspecified body region")
21 >1.5: CONTAINS: CONTAINER: (111028,DCM,"Image Library") [SEPARATE]
22 >>>1.5.1: CONTAINS: CONTAINER: (126200,DCM,"Image Library Group") [SEPARATE] (,2.25.2391080610652633707851620337838119)
23 >>>>1.5.1.1: CONTAINS: IMAGE: = (1.2.840.10008.5.1.4.1.1.128,2.25.319214308104243787945491694789635628411)
24 >>>>>1.5.1.1.1: HAS ACQ CONTEXT: CODE: (121139,DCM,"Modality") = (PT,DCM,"Positron emission tomography")
25 >>>>>1.5.1.1.2: HAS ACQ CONTEXT: TEXT: (121022,DCM,"Accession Number") = "AN1234IMG"
26 >>>>>1.5.1.1.3: HAS ACQ CONTEXT: DATE: (111060,DCM,"Study Date") = "20170113"
27 >>>>>1.5.1.1.4: HAS ACQ CONTEXT: TIME: (111061,DCM,"Study Time") = "070844"
28 >1.6: CONTAINS: CONTAINER: (126010,DCM,"Imaging Measurements") [SEPARATE]
29 >>1.6.1: CONTAINS: CONTAINER: (125007,DCM,"Measurement Group") [SEPARATE] (20170201180043,2.25.56002466128627498886)
30 >>>1.6.1.1: HAS OBS CONTEXT: TEXT: (112039,DCM,"Tracking Identifier") = "Lesion1"
31 >>>1.6.1.2: HAS OBS CONTEXT: UIDREF: (112040,DCM,"Tracking Unique Identifier") = "2.25.165294254063588909770717555738008"
32 >>>1.6.1.3: CONTAINS: CODE: (121071,DCM,"Finding") = (M-01100,SRT,"Lesion")
33 >>>1.6.1.4: CONTAINS: IMAGE: (121191,DCM,"Referenced Segment") = (1.2.840.10008.5.1.4.1.1.66.4,2.25.1348840660339590773064)
34 >>>1.6.1.5: CONTAINS: IMAGE: (121233,DCM,"Source image for segmentation") = (1.2.840.10008.5.1.4.1.1.128,2.25.319214308104243)
35 >>>1.6.1.6: CONTAINS: NUM: (126401,DCM,"SUVbw") = 1.98024 (g/ml{SUVbw},UCUM,"g/ml{SUVbw}") (,2.25.51420968257530981243)
36 >>>>1.6.1.6.1: HAS CONCEPT MOD: CODE: (121401,DCM,"Derivation") = (R-404FB,SRT,"Minimum")
37 >>>1.6.1.7: CONTAINS: NUM: (126401,DCM,"SUVbw") = 5.68816 (g/ml{SUVbw},UCUM,"g/ml{SUVbw}") (,2.25.20529224388525803242)
38 >>>>1.6.1.7.1: HAS CONCEPT MOD: CODE: (121401,DCM,"Derivation") = (G-A437,SRT,"Maximum")
39 >>>1.6.1.8: CONTAINS: NUM: (126401,DCM,"SUVbw") = 2.329186593407 (g/ml{SUVbw},UCUM,"g/ml{SUVbw}") (,2.25.7016025208023)
40 >>>>1.6.1.8.1: HAS CONCEPT MOD: CODE: (121401,DCM,"Derivation") = (R-00317,SRT,"Mean")
41 >>>1.6.1.9: CONTAINS: NUM: (126401,DCM,"SUVbw") = 1.8828952323684 (g/ml{SUVbw},UCUM,"g/ml{SUVbw}") (,2.25.140657026119)
42 >>>>1.6.1.9.1: HAS CONCEPT MOD: CODE: (121401,DCM,"Derivation") = (R-10047,SRT,"Standard Deviation")
43 >>>>1.6.1.10: CONTAINS: TEXT: (121106,DCM,"Comment") = "PT / WB NAC P600 / 0"

```

The AIM sample transformed into SR illustrated at the Attribute encoding level shown in Table A.7.2-1 includes information on the SR document body tree depth (column 1: SR Tree Depth), nesting level for nested artifacts such as sequences and sequence items (column 2: Nesting), DICOM attribute names (column 3: Attribute), DICOM tag (column 4: Tag), the DICOM attribute value representation (Column 5: VR as specified in ???), the hexadecimal value of value length (column 6: VL (hex)) and the sample document attribute values (column 7: Value).

Table A.7.2-1. Transformed SR document encoding at the Attribute level

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|---------|--|-------------|----|----------|--|
| | | File Meta Information Group Length | (0002,0000) | UL | 0004 | 0x000000ba |
| | | File Meta Information Version | (0002,0001) | OB | 0002 | 0x00,0x01 |
| | | Media Storage SOP Class UID | (0002,0002) | UI | 001e | 1.2.840.10008.5.1.4.1.1.88.22 |
| | | Media Storage SOP Instance UID | (0002,0003) | UI | 002c | 2.25.224793923339609181243139195858254344686 |
| | | Transfer Syntax UID | (0002,0010) | UI | 0014 | 1.2.840.10008.1.2.1 |
| | | Implementation Class UID | (0002,0012) | UI | 0016 | 1.3.6.1.4.1.5962.99.2 |
| | | Implementation Version Name | (0002,0013) | SH | 0010 | PIXELMEDJAVA001 |
| | | SOP Class UID | (0008,0016) | UI | 001e | 1.2.840.10008.5.1.4.1.1.88.22 |
| | | SOP Instance UID | (0008,0018) | UI | 002c | 2.25.224793923339609181243139195858254344686 |
| | | Study Date | (0008,0020) | DA | 0000 | |
| | | Content Date | (0008,0023) | DA | 0008 | 20170201 |
| | | Study Time | (0008,0030) | TM | 0000 | |
| | | Content Time | (0008,0033) | TM | 0006 | 180043 |
| | | Accession Number | (0008,0050) | SH | 000a | AN5678AIM |
| | | Modality | (0008,0060) | CS | 0002 | SR |
| | | Manufacturer | (0008,0070) | LO | 0014 | Acme Medical Systems |
| | | Referring Physician's Name | (0008,0090) | PN | 0000 | |
| | | Manufacturer's Model Name | (0008,1090) | LO | 0000 | |
| | | Referenced Performed Procedure Step Sequence | (0008,1111) | SQ | ffffff | |
| | %endseq | | | | | |
| | | Patient's Name | (0010,0010) | PN | 0010 | CM-1-111-000000 |
| | | Patient ID | (0010,0020) | LO | 0028 | 293761767066931586407385203810190772174 |
| | | Patient's Birth Date | (0010,0030) | DA | 0008 | 19601000 |
| | | Patient's Sex | (0010,0040) | CS | 0002 | M |
| | | Ethnic Group | (0010,2160) | SH | 0000 | |
| | | Software Version(s) | (0018,1020) | LO | 0006 | 36.00 |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|---|-------------|----|----------|--|
| | | Study Instance UID | (0020,000d) | UI | 002c | 2.25.80159168229010751652502576830057032194 |
| | | Series Instance UID | (0020,000e) | UI | 002c | 2.25.323817225444021135415209334192751441320 |
| | | Study ID | (0020,0010) | SH | 0000 | |
| | | Series Number | (0020,0011) | IS | 0004 | 7291 |
| | | Instance Number | (0020,0013) | IS | 0002 | 1 |
| 1 | | Value Type | (0040,a040) | CS | 000a | CONTAINER |
| 1 | | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| | > | Code Value | (0008,0100) | SH | 0006 | 126000 |
| | > | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| | > | Code Meaning | (0008,0104) | LO | 001a | Imaging Measurement Report |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1 | | Continuity Of Content | (0040,a050) | CS | 0008 | SEPARATE |
| | | Author Observer Sequence | (0040,a078) | SQ | ffffff | |
| | %item | | | | | |
| | > | Institution Name | (0008,0080) | LO | 0000 | |
| | > | Institution Code Sequence | (0008,0082) | SQ | ffffff | |
| | %endseq | | | | | |
| | > | Person Identification Code Sequence | (0040,1101) | SQ | ffffff | |
| | %endseq | | | | | |
| | > | Observer Type | (0040,a084) | CS | 0004 | PSN |
| | > | Person Name | (0040,a123) | PN | 0008 | Doe^Jane |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | | Performed Procedure Code Sequence | (0040,a372) | SQ | ffffff | |
| | %endseq | | | | | |
| | | Current Requested Procedure Evidence Sequence | (0040,a375) | SQ | ffffff | |
| | %item | | | | | |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|-----------------------------|-------------|----|----------|--|
| | > | Referenced Series Sequence | (0008,1115) | SQ | ffffff | |
| | %item | | | | | |
| | >> | Referenced SOP Sequence | (0008,1199) | SQ | ffffff | |
| | %item | | | | | |
| | >>> | Referenced SOP Class UID | (0008,1150) | UI | 001c | 1.2.840.10008.5.1.4.1.1.128 |
| | >>> | Referenced SOP Instance UID | (0008,1155) | UI | 002c | 2.25.319214308104243787945491694789635628411 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | >> | Series Instance UID | (0020,000e) | UI | 002c | 2.25.263500776851326986665835510707132143772 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | > | Study Instance UID | (0020,000d) | UI | 002c | 2.25.52186905385055707830834793159643714079 |
| | %enditem | | | | | |
| | %item | | | | | |
| | > | Referenced Series Sequence | (0008,1115) | SQ | ffffff | |
| | %item | | | | | |
| | >> | Referenced SOP Sequence | (0008,1199) | SQ | ffffff | |
| | %item | | | | | |
| | >>> | Referenced SOP Class UID | (0008,1150) | UI | 001c | 1.2.840.10008.5.1.4.1.1.66.4 |
| | >>> | Referenced SOP Instance UID | (0008,1155) | UI | 002c | 2.25.134884066033959077306435705240550195701 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | >> | Series Instance UID | (0020,000e) | UI | 002c | 2.25.225493840038502954753967211679094249480 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | > | Study Instance UID | (0020,000d) | UI | 002c | 2.25.19202292006231006756726546749423641172 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | | Completion Flag | (0040,a491) | CS | 0008 | COMPLETE |
| | | Verification Flag | (0040,a493) | CS | 000a | UNVERIFIED |
| | | Content Template Sequence | (0040,a504) | SQ | ffffff | |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|----------------------------|-------------|----|----------|--|
| | %item | | | | | |
| | > | Mapping Resource | (0008,0105) | CS | 0004 | DCMR |
| | > | Template Identifier | (0040,db00) | CS | 0004 | 1500 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1 | | Content Sequence | (0040,a730) | SQ | fffffff | |
| | %item | | | | | |
| 1.1 | > | Relationship Type | (0040,a010) | CS | 0010 | HAS CONCEPT MOD |
| 1.1 | > | Value Type | (0040,a040) | CS | 0004 | CODE |
| 1.1 | > | Concept Name Code Sequence | (0040,a043) | SQ | fffffff | |
| | %item | | | | | |
| 1.1 | >> | Code Value | (0008,0100) | SH | 0006 | 121049 |
| 1.1 | >> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.1 | >> | Code Meaning | (0008,0104) | LO | 0028 | Language of Content Item and Descendants |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.1 | > | Concept Code Sequence | (0040,a168) | SQ | fffffff | |
| | %item | | | | | |
| 1.1 | >> | Code Value | (0008,0100) | SH | 0004 | eng |
| 1.1 | >> | Coding Scheme Designator | (0008,0102) | SH | 0008 | RFC5646 |
| 1.1 | >> | Code Meaning | (0008,0104) | LO | 0008 | English |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.1 | > | Content Sequence | (0040,a730) | SQ | fffffff | |
| | %item | | | | | |
| 1.1.1 | >> | Relationship Type | (0040,a010) | CS | 0010 | HAS CONCEPT MOD |
| 1.1.1 | >> | Value Type | (0040,a040) | CS | 0004 | CODE |
| 1.1.1 | >> | Concept Name Code Sequence | (0040,a043) | SQ | fffffff | |
| | %item | | | | | |
| 1.1.1 | >>> | Code Value | (0008,0100) | SH | 0006 | 121046 |
| 1.1.1 | >>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.1.1 | >>> | Code Meaning | (0008,0104) | LO | 0014 | Country of Language |
| | %enditem | | | | | |
| | %endseq | | | | | |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|----------------------------|-------------|----|----------|------------------------------|
| 1.1.1 | >> | Concept Code Sequence | (0040,a168) | SQ | ffffff | |
| | %item | | | | | |
| 1.1.1 | >>> | Code Value | (0008,0100) | SH | 0002 | US |
| 1.1.1 | >>> | Coding Scheme Designator | (0008,0102) | SH | 000a | ISO3166_1 |
| 1.1.1 | >>> | Code Meaning | (0008,0104) | LO | 000e | United States |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.2 | > | Relationship Type | (0040,a010) | CS | 0010 | HAS OBS CONTEXT |
| 1.2 | > | Value Type | (0040,a040) | CS | 0006 | PNAME |
| 1.2 | > | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| 1.2 | >> | Code Value | (0008,0100) | SH | 0006 | 121008 |
| 1.2 | >> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.2 | >> | Code Meaning | (0008,0104) | LO | 0014 | Person Observer Name |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.2 | > | Person Name | (0040,a123) | PN | 0008 | Doe^Jane |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.3 | > | Relationship Type | (0040,a010) | CS | 0010 | HAS OBS CONTEXT |
| 1.3 | > | Value Type | (0040,a040) | CS | 0004 | TEXT |
| 1.3 | > | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| 1.3 | >> | Code Value | (0008,0100) | SH | 0006 | 128774 |
| 1.3 | >> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.3 | >> | Code Meaning | (0008,0104) | LO | 001c | Person Observer's Login Name |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.3 | > | Text Value | (0040,a160) | UT | 0004 | jdoe |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.4 | > | Relationship Type | (0040,a010) | CS | 0010 | HAS CONCEPT MOD |
| 1.4 | > | Value Type | (0040,a040) | CS | 0004 | CODE |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|----------------------------|-------------|----|----------|-----------------------------|
| 1.4 | > | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| 1.4 | >> | Code Value | (0008,0100) | SH | 0006 | 121058 |
| 1.4 | >> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.4 | >> | Code Meaning | (0008,0104) | LO | 0012 | Procedure reported |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.4 | > | Concept Code Sequence | (0040,a168) | SQ | ffffff | |
| | %item | | | | | |
| 1.4 | >> | Code Value | (0008,0100) | SH | 0008 | 44136-0 |
| 1.4 | >> | Coding Scheme Designator | (0008,0102) | SH | 0002 | LN |
| 1.4 | >> | Code Meaning | (0008,0104) | LO | 001c | PET unspecified body region |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.5 | > | Relationship Type | (0040,a010) | CS | 0008 | CONTAINS |
| 1.5 | > | Value Type | (0040,a040) | CS | 000a | CONTAINER |
| 1.5 | > | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| 1.5 | >> | Code Value | (0008,0100) | SH | 0006 | 111028 |
| 1.5 | >> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.5 | >> | Code Meaning | (0008,0104) | LO | 000e | Image Library |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.5 | > | Continuity Of Content | (0040,a050) | CS | 0008 | SEPARATE |
| 1.5 | > | Content Sequence | (0040,a730) | SQ | ffffff | |
| | %item | | | | | |
| 1.5.1 | >> | Relationship Type | (0040,a010) | CS | 0008 | CONTAINS |
| 1.5.1 | >> | Value Type | (0040,a040) | CS | 000a | CONTAINER |
| 1.5.1 | >> | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| 1.5.1 | >>> | Code Value | (0008,0100) | SH | 0006 | 126200 |
| 1.5.1 | >>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|-----------------------------|-------------|----|----------|--|
| 1.5.1 | >>> | Code Meaning | (0008,0104) | LO | 0014 | Image Library Group |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.5.1 | >> | Continuity Of Content | (0040,a050) | CS | 0008 | SEPARATE |
| 1.5.1 | >> | Observation UID | (0040,a171) | UI | 002c | 2.25.239108061065263370785162033783811931375 |
| 1.5.1 | >> | Content Sequence | (0040,a730) | SQ | fffffff | |
| | %item | | | | | |
| 1.5.1.1 | >>> | Referenced SOP Sequence | (0008,1199) | SQ | fffffff | |
| | %item | | | | | |
| 1.5.1.1 | >>>> | Referenced SOP Class UID | (0008,1150) | UI | 001c | 1.2.840.10008.5.1.4.1.1.128 |
| 1.5.1.1 | >>>> | Referenced SOP Instance UID | (0008,1155) | UI | 002c | 2.25.319214308104243787945491694789635628411 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.5.1.1 | >>> | Relationship Type | (0040,a010) | CS | 0008 | CONTAINS |
| 1.5.1.1 | >>> | Value Type | (0040,a040) | CS | 0006 | IMAGE |
| 1.5.1.1 | >>> | Content Sequence | (0040,a730) | SQ | fffffff | |
| | %item | | | | | |
| 1.5.1.1.1 | >>>> | Relationship Type | (0040,a010) | CS | 0010 | HAS ACQ CONTEXT |
| 1.5.1.1.1 | >>>> | Value Type | (0040,a040) | CS | 0004 | CODE |
| 1.5.1.1.1 | >>>> | Concept Name Code Sequence | (0040,a043) | SQ | fffffff | |
| | %item | | | | | |
| 1.5.1.1.1 | >>>>> | Code Value | (0008,0100) | SH | 0006 | 121139 |
| 1.5.1.1.1 | >>>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.5.1.1.1 | >>>>> | Code Meaning | (0008,0104) | LO | 0008 | Modality |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.5.1.1.1 | >>>> | Concept Code Sequence | (0040,a168) | SQ | fffffff | |
| | %item | | | | | |
| 1.5.1.1.1 | >>>>> | Code Value | (0008,0100) | SH | 0002 | PT |
| 1.5.1.1.1 | >>>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.5.1.1.1 | >>>>> | Code Meaning | (0008,0104) | LO | 001c | Positron emission tomography |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|----------------------------|-------------|----|----------|------------------|
| | %item | | | | | |
| 1.5.1.1.2 | >>>> | Relationship Type | (0040,a010) | CS | 0010 | HAS ACQ CONTEXT |
| 1.5.1.1.2 | >>>> | Value Type | (0040,a040) | CS | 0004 | TEXT |
| 1.5.1.1.2 | >>>> | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| 1.5.1.1.2 | >>>>> | Code Value | (0008,0100) | SH | 0006 | 121022 |
| 1.5.1.1.2 | >>>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.5.1.1.2 | >>>>> | Code Meaning | (0008,0104) | LO | 0010 | Accession Number |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.5.1.1.2 | >>>> | Text Value | (0040,a160) | UT | 000a | AN1234IMG |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.5.1.1.3 | >>>> | Relationship Type | (0040,a010) | CS | 0010 | HAS ACQ CONTEXT |
| 1.5.1.1.3 | >>>> | Value Type | (0040,a040) | CS | 0004 | DATE |
| 1.5.1.1.3 | >>>> | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| 1.5.1.1.3 | >>>>> | Code Value | (0008,0100) | SH | 0006 | 111060 |
| 1.5.1.1.3 | >>>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.5.1.1.3 | >>>>> | Code Meaning | (0008,0104) | LO | 000a | Study Date |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.5.1.1.3 | >>>> | Date | (0040,a121) | DA | 0008 | 20170113 |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.5.1.1.4 | >>>> | Relationship Type | (0040,a010) | CS | 0010 | HAS ACQ CONTEXT |
| 1.5.1.1.4 | >>>> | Value Type | (0040,a040) | CS | 0004 | TIME |
| 1.5.1.1.4 | >>>> | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| 1.5.1.1.4 | >>>>> | Code Value | (0008,0100) | SH | 0006 | 111061 |
| 1.5.1.1.4 | >>>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.5.1.1.4 | >>>>> | Code Meaning | (0008,0104) | LO | 000a | Study Time |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.5.1.1.4 | >>>> | Time | (0040,a122) | TM | 0006 | 070844 |
| | %enditem | | | | | |
| | %endseq | | | | | |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|----------------------------|-------------|----|----------|---|
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.6 | > | Relationship Type | (0040,a010) | CS | 0008 | CONTAINS |
| 1.6 | > | Value Type | (0040,a040) | CS | 000a | CONTAINER |
| 1.6 | > | Concept Name Code Sequence | (0040,a043) | SQ | fffffff | |
| | %item | | | | | |
| 1.6 | >> | Code Value | (0008,0100) | SH | 0006 | 126010 |
| 1.6 | >> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6 | >> | Code Meaning | (0008,0104) | LO | 0014 | Imaging Measurements |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6 | > | Continuity Of Content | (0040,a050) | CS | 0008 | SEPARATE |
| 1.6 | > | Content Sequence | (0040,a730) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1 | >> | Relationship Type | (0040,a010) | CS | 0008 | CONTAINS |
| 1.6.1 | >> | Observation DateTime | (0040,a032) | DT | 000e | 20170201180043 |
| 1.6.1 | >> | Value Type | (0040,a040) | CS | 000a | CONTAINER |
| 1.6.1 | >> | Concept Name Code Sequence | (0040,a043) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1 | >>> | Code Value | (0008,0100) | SH | 0006 | 125007 |
| 1.6.1 | >>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1 | >>> | Code Meaning | (0008,0104) | LO | 0012 | Measurement Group |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1 | >> | Continuity Of Content | (0040,a050) | CS | 0008 | SEPARATE |
| 1.6.1 | >> | Observation UID | (0040,a171) | UI | 002c | 2.25.56002466128627498886935079903172938041 |
| 1.6.1 | >> | Content Sequence | (0040,a730) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.1 | >>> | Relationship Type | (0040,a010) | CS | 0010 | HAS OBS CONTEXT |
| 1.6.1.1 | >>> | Value Type | (0040,a040) | CS | 0004 | TEXT |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|----------------------------|-------------|----|----------|--|
| 1.6.1.1 | >>> | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| 1.6.1.1 | >>>> | Code Value | (0008,0100) | SH | 0006 | 112039 |
| 1.6.1.1 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.1 | >>>> | Code Meaning | (0008,0104) | LO | 0014 | Tracking Identifier |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.1 | >>> | Text Value | (0040,a160) | UT | 0008 | Lesion1 |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.6.1.2 | >>> | Relationship Type | (0040,a010) | CS | 0010 | HAS OBS CONTEXT |
| 1.6.1.2 | >>> | Value Type | (0040,a040) | CS | 0006 | UIDREF |
| 1.6.1.2 | >>> | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| 1.6.1.2 | >>>> | Code Value | (0008,0100) | SH | 0006 | 112040 |
| 1.6.1.2 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.2 | >>>> | Code Meaning | (0008,0104) | LO | 001a | Tracking Unique Identifier |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.2 | >>> | UID | (0040,a124) | UI | 002c | 2.25.165294254063588909770717555738008800301 |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.6.1.3 | >>> | Relationship Type | (0040,a010) | CS | 0008 | CONTAINS |
| 1.6.1.3 | >>> | Value Type | (0040,a040) | CS | 0004 | CODE |
| 1.6.1.3 | >>> | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| 1.6.1.3 | >>>> | Code Value | (0008,0100) | SH | 0006 | 121071 |
| 1.6.1.3 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.3 | >>>> | Code Meaning | (0008,0104) | LO | 0008 | Finding |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.3 | >>> | Concept Code Sequence | (0040,a168) | SQ | ffffff | |
| | %item | | | | | |
| 1.6.1.3 | >>>> | Code Value | (0008,0100) | SH | 0008 | M-01100 |
| 1.6.1.3 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | SRT |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|-----------------------------|-------------|----|----------|--|
| 1.6.1.3 | >>>> | Code Meaning | (0008,0104) | LO | 0006 | Lesion |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.6.1.4 | >>> | Referenced SOP Sequence | (0008,1199) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.4 | >>>> | Referenced SOP Class UID | (0008,1150) | UI | 001c | 1.2.840.10008.5.1.4.1.1.66.4 |
| 1.6.1.4 | >>>> | Referenced SOP Instance UID | (0008,1155) | UI | 002c | 2.25.134884066033959077306435705240550195701 |
| 1.6.1.4 | >>>> | Referenced Segment Number | (0062,000b) | US | 0002 | 0x0001 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.4 | >>> | Relationship Type | (0040,a010) | CS | 0008 | CONTAINS |
| 1.6.1.4 | >>> | Value Type | (0040,a040) | CS | 0006 | IMAGE |
| 1.6.1.4 | >>> | Concept Name Code Sequence | (0040,a043) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.4 | >>>> | Code Value | (0008,0100) | SH | 0006 | 121191 |
| 1.6.1.4 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.4 | >>>> | Code Meaning | (0008,0104) | LO | 0012 | Referenced Segment |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.4 | >>> | Observation UID | (0040,a171) | UI | 002c | 2.25.318310842062810077214341266367812728264 |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.6.1.5 | >>> | Referenced SOP Sequence | (0008,1199) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.5 | >>>> | Referenced SOP Class UID | (0008,1150) | UI | 001c | 1.2.840.10008.5.1.4.1.1.128 |
| 1.6.1.5 | >>>> | Referenced SOP Instance UID | (0008,1155) | UI | 002c | 2.25.319214308104243787945491694789635628411 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.5 | >>> | Relationship Type | (0040,a010) | CS | 0008 | CONTAINS |
| 1.6.1.5 | >>> | Value Type | (0040,a040) | CS | 0006 | IMAGE |
| 1.6.1.5 | >>> | Concept Name Code Sequence | (0040,a043) | SQ | fffffff | |
| | %item | | | | | |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|---------------------------------|-------------|----|----------|---|
| 1.6.1.5 | >>>> | Code Value | (0008,0100) | SH | 0006 | 121233 |
| 1.6.1.5 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.5 | >>>> | Code Meaning | (0008,0104) | LO | 001e | Source image for segmentation |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.6.1.6 | >>> | Relationship Type | (0040,a010) | CS | 0008 | CONTAINS |
| 1.6.1.6 | >>> | Value Type | (0040,a040) | CS | 0004 | NUM |
| 1.6.1.6 | >>> | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| 1.6.1.6 | >>>> | Code Value | (0008,0100) | SH | 0006 | 126401 |
| 1.6.1.6 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.6 | >>>> | Code Meaning | (0008,0104) | LO | 0006 | SUVbw |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.6 | >>> | Observation UID | (0040,a171) | UI | 002c | 2.25.51420968257530981243824658943871973198 |
| 1.6.1.6 | >>> | Measured Value Sequence | (0040,a300) | SQ | ffffff | |
| | %item | | | | | |
| 1.6.1.6 | >>>> | Measurement Units Code Sequence | (0040,08ea) | SQ | ffffff | |
| | %item | | | | | |
| 1.6.1.6 | >>>>> | Code Value | (0008,0100) | SH | 000c | g/ml{SUVbw} |
| 1.6.1.6 | >>>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | UCUM |
| 1.6.1.6 | >>>>> | Code Meaning | (0008,0104) | LO | 000c | g/ml{SUVbw} |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.6 | >>>> | Numeric Value | (0040,a30a) | DS | 0008 | 1.98024 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.6 | >>> | Content Sequence | (0040,a730) | SQ | ffffff | |
| | %item | | | | | |
| 1.6.1.6.1 | >>>> | Relationship Type | (0040,a010) | CS | 0010 | HAS CONCEPT MOD |
| 1.6.1.6.1 | >>>> | Value Type | (0040,a040) | CS | 0004 | CODE |
| 1.6.1.6.1 | >>>> | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|---------------------------------|-------------|----|----------|--|
| | %item | | | | | |
| 1.6.1.6.1 | >>>> | Code Value | (0008,0100) | SH | 0006 | 121401 |
| 1.6.1.6.1 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.6.1 | >>>> | Code Meaning | (0008,0104) | LO | 000a | Derivation |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.6.1 | >>>> | Concept Code Sequence | (0040,a168) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.6.1 | >>>> | Code Value | (0008,0100) | SH | 0008 | R-404FB |
| 1.6.1.6.1 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | SRT |
| 1.6.1.6.1 | >>>> | Code Meaning | (0008,0104) | LO | 0008 | Minimum |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.6.1.7 | >>> | Relationship Type | (0040,a010) | CS | 0008 | CONTAINS |
| 1.6.1.7 | >>> | Value Type | (0040,a040) | CS | 0004 | NUM |
| 1.6.1.7 | >>> | Concept Name Code Sequence | (0040,a043) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.7 | >>>> | Code Value | (0008,0100) | SH | 0006 | 126401 |
| 1.6.1.7 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.7 | >>>> | Code Meaning | (0008,0104) | LO | 0006 | SUVbw |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.7 | >>> | Observation UID | (0040,a171) | UI | 002c | 2.25.205292243885258032428819330909580896146 |
| 1.6.1.7 | >>> | Measured Value Sequence | (0040,a300) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.7 | >>>> | Measurement Units Code Sequence | (0040,08ea) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.7 | >>>> | Code Value | (0008,0100) | SH | 000c | g/ml{SUVbw} |
| 1.6.1.7 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | UCUM |
| 1.6.1.7 | >>>> | Code Meaning | (0008,0104) | LO | 000c | g/ml{SUVbw} |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|----------------------------|-------------|----|----------|-----------------|
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.7 | >>>> | Numeric Value | (0040,a30a) | DS | 0008 | 5.68816 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.7 | >>> | Content Sequence | (0040,a730) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.7.1 | >>>> | Relationship Type | (0040,a010) | CS | 0010 | HAS CONCEPT MOD |
| 1.6.1.7.1 | >>>> | Value Type | (0040,a040) | CS | 0004 | CODE |
| 1.6.1.7.1 | >>>> | Concept Name Code Sequence | (0040,a043) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.7.1 | >>>>> | Code Value | (0008,0100) | SH | 0006 | 121401 |
| 1.6.1.7.1 | >>>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.7.1 | >>>>> | Code Meaning | (0008,0104) | LO | 000a | Derivation |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.7.1 | >>>> | Concept Code Sequence | (0040,a168) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.7.1 | >>>>> | Code Value | (0008,0100) | SH | 0006 | G-A437 |
| 1.6.1.7.1 | >>>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | SRT |
| 1.6.1.7.1 | >>>>> | Code Meaning | (0008,0104) | LO | 0008 | Maximum |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.6.1.8 | >>> | Relationship Type | (0040,a010) | CS | 0008 | CONTAINS |
| 1.6.1.8 | >>> | Value Type | (0040,a040) | CS | 0004 | NUM |
| 1.6.1.8 | >>> | Concept Name Code Sequence | (0040,a043) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.8 | >>>> | Code Value | (0008,0100) | SH | 0006 | 126401 |
| 1.6.1.8 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.8 | >>>> | Code Meaning | (0008,0104) | LO | 0006 | SUVbw |
| | %enditem | | | | | |
| | %endseq | | | | | |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|---------------------------------|-------------|----|----------|---|
| 1.6.1.8 | >>> | Observation UID | (0040,a171) | UI | 002c | 2.25.70160252080234577167847509948368893276 |
| 1.6.1.8 | >>> | Measured Value Sequence | (0040,a300) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.8 | >>>> | Measurement Units Code Sequence | (0040,08ea) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.8 | >>>>> | Code Value | (0008,0100) | SH | 000c | g/ml{SUVbw} |
| 1.6.1.8 | >>>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | UCUM |
| 1.6.1.8 | >>>>> | Code Meaning | (0008,0104) | LO | 000c | g/ml{SUVbw} |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.8 | >>>> | Numeric Value | (0040,a30a) | DS | 000e | 2.329186593407 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.8 | >>> | Content Sequence | (0040,a730) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.8.1 | >>>> | Relationship Type | (0040,a010) | CS | 0010 | HAS CONCEPT MOD |
| 1.6.1.8.1 | >>>> | Value Type | (0040,a040) | CS | 0004 | CODE |
| 1.6.1.8.1 | >>>> | Concept Name Code Sequence | (0040,a043) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.8.1 | >>>>> | Code Value | (0008,0100) | SH | 0006 | 121401 |
| 1.6.1.8.1 | >>>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.8.1 | >>>>> | Code Meaning | (0008,0104) | LO | 000a | Derivation |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.8.1 | >>>> | Concept Code Sequence | (0040,a168) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.8.1 | >>>>> | Code Value | (0008,0100) | SH | 0008 | R-00317 |
| 1.6.1.8.1 | >>>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | SRT |
| 1.6.1.8.1 | >>>>> | Code Meaning | (0008,0104) | LO | 0004 | Mean |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|---------------------------------|-------------|----|----------|--|
| | %item | | | | | |
| 1.6.1.9 | >>> | Relationship Type | (0040,a010) | CS | 0008 | CONTAINS |
| 1.6.1.9 | >>> | Value Type | (0040,a040) | CS | 0004 | NUM |
| 1.6.1.9 | >>> | Concept Name Code Sequence | (0040,a043) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.9 | >>>> | Code Value | (0008,0100) | SH | 0006 | 126401 |
| 1.6.1.9 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.9 | >>>> | Code Meaning | (0008,0104) | LO | 0006 | SUVbw |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.9 | >>> | Observation UID | (0040,a171) | UI | 002c | 2.25.140657026119469861895824082767088344984 |
| 1.6.1.9 | >>> | Measured Value Sequence | (0040,a300) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.9 | >>>> | Measurement Units Code Sequence | (0040,08ea) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.9 | >>>>> | Code Value | (0008,0100) | SH | 000c | g/ml{SUVbw} |
| 1.6.1.9 | >>>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | UCUM |
| 1.6.1.9 | >>>>> | Code Meaning | (0008,0104) | LO | 000c | g/ml{SUVbw} |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.9 | >>>> | Numeric Value | (0040,a30a) | DS | 0010 | 1.8828952323684 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.9 | >>> | Content Sequence | (0040,a730) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.9.1 | >>>> | Relationship Type | (0040,a010) | CS | 0010 | HAS CONCEPT MOD |
| 1.6.1.9.1 | >>>> | Value Type | (0040,a040) | CS | 0004 | CODE |
| 1.6.1.9.1 | >>>> | Concept Name Code Sequence | (0040,a043) | SQ | fffffff | |
| | %item | | | | | |
| 1.6.1.9.1 | >>>>> | Code Value | (0008,0100) | SH | 0006 | 121401 |
| 1.6.1.9.1 | >>>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.9.1 | >>>>> | Code Meaning | (0008,0104) | LO | 000a | Derivation |
| | %enditem | | | | | |
| | %endseq | | | | | |

| SR Tree Depth | Nesting | Attribute | Tag | VR | VL (hex) | Value |
|---------------|----------|----------------------------|-------------|----|----------|----------------------|
| 1.6.1.9.1 | >>>> | Concept Code Sequence | (0040,a168) | SQ | ffffff | |
| | %item | | | | | |
| 1.6.1.9.1 | >>>> | Code Value | (0008,0100) | SH | 0008 | R-10047 |
| 1.6.1.9.1 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | SRT |
| 1.6.1.9.1 | >>>> | Code Meaning | (0008,0104) | LO | 0012 | Standard Deviation |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %item | | | | | |
| 1.6.1.10 | >>> | Relationship Type | (0040,a010) | CS | 0008 | CONTAINS |
| 1.6.1.10 | >>> | Value Type | (0040,a040) | CS | 0004 | TEXT |
| 1.6.1.10 | >>> | Concept Name Code Sequence | (0040,a043) | SQ | ffffff | |
| | %item | | | | | |
| 1.6.1.10 | >>>> | Code Value | (0008,0100) | SH | 0006 | 121106 |
| 1.6.1.10 | >>>> | Coding Scheme Designator | (0008,0102) | SH | 0004 | DCM |
| 1.6.1.10 | >>>> | Code Meaning | (0008,0104) | LO | 0008 | Comment |
| | %enditem | | | | | |
| | %endseq | | | | | |
| 1.6.1.10 | >>> | Text Value | (0040,a160) | UT | 0014 | PT / WB NAC P600 / 0 |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %endseq | | | | | |
| | %enditem | | | | | |
| | %endseq | | | | | |

Amend DICOM PS3.21 as follows (changes to existing text are bold and underlined for additions and ~~struckthrough~~ for removals):

A.8 Overview of Data Types

a. Numeric Measurements

DICOM Numeric Measurement value types shall be mapped from the ??? data types as specified in Table A.8-4.

Table A.8-4. Mapping between DICOM Numeric Measurement Value Types and ISO 21090 Data Types

| DICOM ?????, ????? and ?????: Numeric Measurement (NUM) Value Type | | AIM Path and ISO 21090 Data Type | |
|--|---------------------|--|----|
| Measured Value Sequence (0040,A300) > Concept Name Code Sequence (0040,A043) | Code Sequence Macro | CalculationEntity/typeCode[1] | CD |
| Measured Value Sequence (0040,A300) > Numeric Value (0040,A30A) | DS | CalculationEntity/calculationResultCollection/ CalculationResult/@value CalculationEntity/calculationResultCollection/ CalculationResult/calculationDataCollection/ CalculationData/@value | ST |
| Measured Value Sequence (0040,A300) > Measurement Units Code Sequence (0040,08EA) | Code Sequence Macro | CalculationEntity/calculationResultCollection/ CalculationResult/unitOfMeasure | ST |
| Numeric Value Qualifier Code Sequence (0040,A301) | Code Sequence Macro | CalculationEntity/calculationResultCollection/ CalculationResult/calculationDataCollection/ CalculationData/@value | ST |

The ??? PQ data type is not used in AIM.

The Concept Name of the measurement is usually pre-coordinated in a single CalculationEntity/typeCode entry. If there is more than one CalculationEntity/typeCode, the first is assumed to be the primary concept and the others may be modifiers that, if recognized as such, may be mapped to method and derivation, or if otherwise recognized and name-value pair of concepts can be constructed can be encoded as generic modifiers, but otherwise have to be ignored.

The Numeric Value may be found as the single value of a CompactCalculationResult (i.e., value child of CalculationResult) or the first value of an ExtendedCalculationResult (i.e., nested within calculationResultCollection). This can give rise to a difference in representation in a round trip conversion.

Units of measurement shall be converted from a text string (ST) to a Coded Sequence entry using the UCUM Code Values and "UCUM" as the Coding Scheme Designator (in AIM, CalculationResult/unitOfMeasure is defined as "A string representation of UCUM unit for the value of the calculation").

The AIM CalculationData/@value shall be assumed to be in the US English locale (i.e., periods are used as the decimal point, not commas, etc.).

The length of the AIM CalculationData/@value ST is not limited, but the DICOM DS value representation is limited to 16 characters. Values of CalculationData/@value that are too long shall be truncated or rounded to fit in an implementation-dependent manner.

The CalculationResult/dataType (e.g., Double, Integer) is not encoded in the DICOM mapping, since all DICOM SR numeric values are encoded as a Decimal String (DS), so in a round trip from AIM to DICOM and back to AIM will not be recovered (i.e., will always be encoded as Double). For the use cases for this mapping, it is likely that all measurements will be Double anyway.

DICOM allows the Measured Value Sequence (0040,A300) to be sent zero length (empty) if there is no value. In such cases the Numeric Value Qualifier Code Sequence (0040,A301) may be used in DICOM to send a code indicating why, either because of an invalid floating point result (e.g., (114000, DCM, "Not a number") corresponding to ??? NaN), or for more general reasons (e.g., (114006, DCM, "Measurement failure")). See ????? Table A.8-4 indicates that a non-numeric CalculationData/@value may be mapped to Numeric Value Qualifier Code Sequence (0040,A301). Various possible mappings of AIM string values to a subset of DICOM codes corresponding to ??? are defined in Table A.8-5. These are based on the:

- Java Double.toString(double) definition (see <https://docs.oracle.com/javase/8/docs/api/java/lang/Double.html#toString-double->)
- ???
- ???

No similar standard C or C++ mapping is known to exist (e.g., for libc dtostr() or sprintf()). Other languages offer some flexibility (e.g., Python supports case insensitive variants of "NaN" and "Infinity", the latter with or without a sign; see <http://docs.python.org/>)

3/library/functions.html#float). For JavaScript, see <https://tc39.github.io/ecma262/#sec-tostring-applied-to-the-number-type>, <https://tc39.github.io/ecma262/#sec-parsefloat-string> and <https://tc39.github.io/ecma262/#sec-number.parsefloat>. The table describes a subset of possible values, the mapping may not be exact (e.g., the definitions of NaN may differ), the mapping is ambiguous (since AIM does not define which string source to use), and the mapping of other values is undefined.

Table A.8-5. Mapping between DICOM Numeric Value Qualifier Code Sequence and AIM ST

| DICOM Code | Java String | XML Schema | ISO 21090 Null Flavor |
|------------------------------------|-------------|------------|-----------------------|
| (114000, DCM, "Not a number") | NaN | NaN | |
| (114001, DCM, "Negative Infinity") | -Infinity | -INF | NINF |
| (114002, DCM, "Positive Infinity") | Infinity | INF | PINF |

b. Image and segmentation references

DICOM image references may be mapped as specified in Table A.8-6.

Table A.8-6. DICOM Image references to AIM Path

| DICOM ????, ????, and ????: Image Reference (IMAGE) Value Type | | AIM Path and ISO 21090 Data Type | |
|--|----|--|-----|
| Referenced SOP Sequence > Referenced SOP Class UID | UI | /ImageAnnotationCollection/imageAnnotations/ImageAnnotation/imageReferenceEntityCollection/ImageReferenceEntity/imageStudy/imageSeries/imageCollection/Image[sopInstanceUid/@root=imageReferenceUid/@root]/sopClassUid/@root | II |
| Referenced SOP Sequence > Referenced SOP Instance UID | UI | imageReferenceUid/@root | II |
| Referenced SOP Sequence > Referenced Frame Number | IS | referencedFrameNumber/@value | INT |

An image reference in the AIM tree locally consists of the SOP Instance UID only, without SOP Class, which is described elsewhere in the tree in the imageReferenceEntityCollection (which, similar to the DICOM Current Requested Procedure Evidence Sequence or Pertinent Other Evidence Sequence, also contains the Study and Series level information). Hence the use of the predicate "sopInstanceUid/@root=\$sopInstanceUID" in the path in the table.

The AIM version 4.2 model includes an optional AccessionNumber in the imageStudy class used in the imageReferenceEntityCollection. This may be preserved in a DICOM SR instance in the ImageLibrary.

DICOM segmentation references may be mapped as specified in Table A.8-7.

Table A.8-7. DICOM Segmentation references to AIM Path

| DICOM ????, ????, and ????: Image Reference (IMAGE) Value Type | | AIM Path and ISO 21090 Data Type | |
|--|----|---|-----|
| Referenced SOP Sequence > Referenced SOP Class UID | UI | SegmentationEntity/sopClassUid/@root | II |
| Referenced SOP Sequence > Referenced SOP Instance UID | UI | SegmentationEntity/sopInstanceUid/@root | II |
| Referenced SOP Sequence > Referenced Segment Number | US | SegmentationEntity/segmentNumber/@value | INT |

The SOP Class UID is included locally in the AIM tree with the reference, rather than being factored out into the imageReferenceEntityCollection, in which it is not present.

Ideally, all segmentation references would be included in either Current Requested Procedure Evidence Sequence or Pertinent Other Evidence Sequence as appropriate; ~~however, there is insufficient optional~~ information in the AIM 4.02 model to support

1 **this; i.e., identify the Study and Series, but if** the Study and Series Instance UIDs are absent, **and they** cannot **safely** be assumed
2 to be those of any related images.

3 The reference to the original image that was segmented **or a representative image on which the segmentation may be dis-**
4 **played**, which may be **encoded present** in SegmentationEntity/referencedSopInstanceUid/@root, may be encoded in a separate
5 Content Item if supported by the template (e.g., TID 1410, TID 1411) in (121233, DCM, "Source image for segmentation").