Digital Imaging and Communications in Medicine (DICOM)

Supplement 164: Contrast Agent Administration Reporting

DICOM Standards Committee, Working Group 6 (Base Standard) Ad Hoc Group

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Scope and Field of Application

This supplement introduces IODs that describe the administration of imaging agents. The supplement applies to all modalities in which imaging agents are introduced into a subject's circulatory system in a controlled fashion (e.g., CT, MR, XA).

The new SOP Classes describe administration events, flows, pressure, timings, physio-chemical attributes and pharmacological attributes of the agent administration and also consumables related to the administration.

- The **Planned Imaging Agent Administration SR** Storage SOP Class represents patient specific plans to deliver the imaging agent. The plan is tuned to the characteristics of a patient and needs of that procedure.
- The **Performed Imaging Agent Administration SR** Storage SOP Class is for reporting the actual administration delivered during a medical imaging study. The operator may program a delivery system with an intended delivery. This program is captured in this object. The delivery system or a user may deviate from the programmed plan based on a variety of factors. The actual delivery is also captured in this object.

These SOP classes do not describe administration of radiopharmaceuticals, which is addressed by R-RDSR.

Changes to NEMA Standards Publication PS 3.2

Digital Imaging and Communications in Medicine (DICOM)

Part 2: Conformance

Item #01: Add new SOP Classes in Table A.1-2

Table A.1-2
UID VALUES

UID Value	UID NAME	Category
…		

1.2.840.10008.5.1.4.1.1.88.74	**Planned Imaging Agent Administration SR Storage SOP Class**	**Transfer**
1.2.840.10008.5.1.4.1.1.88.75	**Performed Imaging Agent Administration SR Storage SOP Class**	**Transfer**

Changes to NEMA Standards Publication PS 3.3

Part 3: Information Object Definitions

Add new SR IOD of PS 3.3 A.35:

A.35.19 Planned Imaging Agent Administration SR Information Object Definition

A.35.19.1 Planned Imaging Agent Administration SR Information Object Description

The Planned Imaging Agent Administration SR IOD is the plan for administering imaging agent material to a specific patient during an imaging study.

A.35.19.2 Planned Imaging Agent Administration SR IOD Entity-Relationship Model

This IOD uses the E-R Model in Section A.1.2, with only the SR Document IE below the Series IE. The Frame Reference IE is not a component of this IOD.

A.35.19.3 Planned Imaging Agent Administration SR IOD Module Table

Table A.35.19-1
PLANNED IMAGING AGENT ADMINISTRATION SR IOD MODULES

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	M
	Clinical Trial Subject	C.7.1.3	U
Study	General Study	C.7.2.1	M
	Patient Study	C.7.2.2	U
	Clinical Trial Study	C.7.2.3	U
Series	SR Document Series	C.17.1	M
	Clinical Trial Series	C.7.3.2	U
Equipment	General Equipment	C.7.5.1	M
	Enhanced General Equipment	C.7.5.2	M
Document	SR Document General	C.17.2	M
	SR Document Content	C.17.3	M
	SOP Common	C.12.1	M

A.35.19.3.1 Planned Imaging Agent Administration SR IOD Content Constraints

A.35.19.3.1.1 Template

The document shall be constructed from TID 11001 Planned Imaging Agent Administration invoked at the root node.

A.35.19.3.1.2 Value Type

Value Type (0040,A040) in the Content Sequence (0040,A730) of the SR Document Content Module is constrained to the following Enumerated Values (see Table C.17.3-7 for Value Type definitions):

TEXT
CODE
NUM
DATETIME
DATE
TIME
UIDREF
PNAME

CONTAINER

A.35.19.3.1.3 Relationship Constraints

Relationships between content items in the content of this IOD shall be conveyed in the by-value mode. Table A.35.19-2 specifies the relationship constraints of this IOD. See Table C.17.3-8 for Relationship Type definitions.

Table A.35.19-2
RELATIONSHIP CONTENT CONSTRAINTS FOR PLANNED IMAGING AGENT ADMINISTRATION SR IOD

Source Value Type	Relationship Type (Enumerated Values)	Target Value Type
CONTAINER	CONTAINS	TEXT, CODE, NUM, DATETIME, DATE, TIME, UIDREF, PNAME, CONTAINER.
TEXT, CODE, NUM, CONTAINER	HAS OBS CONTEXT	TEXT, CODE, NUM, DATETIME, DATE, TIME, UIDREF, PNAME
CONTAINER, NUM	HAS ACQ CONTEXT	TEXT, CODE, NUM, DATETIME, DATE, TIME, UIDREF, PNAME, CONTAINER.
any type	HAS CONCEPT MOD	TEXT, CODE[1]
TEXT, CODE, NUM	HAS PROPERTIES	TEXT, CODE, NUM, DATETIME, DATE, TIME, UIDREF, PNAME, CONTAINER.
PNAME	HAS PROPERTIES	TEXT, CODE, DATETIME, DATE, TIME, UIDREF, PNAME
TEXT, CODE, NUM	INFERRED FROM	TEXT, CODE, NUM, DATETIME, DATE, TIME, UIDREF, PNAME, CONTAINER.

Note:

The HAS CONCEPT MOD relationship is used to modify the meaning of the concept name of a parent node (or Source Content Item), with a modifier or qualifier in a child (target node) to provide a more descriptive explanation, a different coded language translation, or to define a post-coordinated concept.

A.35.20 Performed Imaging Agent Administration SR Information Object Definition

A.35.20.1 Performed Imaging Agent Administration SR Information Object Description

The Performed Imaging Agent Administration SR IOD describes the imaging agent delivery whether manual methods or automated power-injector devices were used. It includes a reference to the Planned Imaging Agent Administration Procedure SR SOP instance if based on a plan.

A.35.20.2 Performed Imaging Agent Administration SR IOD Entity-Relationship Model

This IOD uses the E-R Model in Section A.1.2, with only the SR Document IE below the Series IE.

A.35.20.3 Performed Imaging Agent Administration SR IOD Module Table

Table A.35.20-1
PERFORMED IMAGING AGENT ADMINISTRATION SR IOD MODULES

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	M
	Clinical Trial Subject	C.7.1.3	U
Study	General Study	C.7.2.1	M
	Patient Study	C.7.2.2	U
	Clinical Trial Study	C.7.2.3	U
Series	SR Document Series	C.17.1	M
	Clinical Trial Series	C.7.3.2	U
Frame of Reference	Synchronization	C.7.4.2	M
Equipment	General Equipment	C.7.5.1	M
	Enhanced General Equipment	C.7.5.2	M
Document	SR Document General	C.17.2	M
	SR Document Content	C.17.3	M
	SOP Common	C.12.1	M

A.35.20.3.1 Performed Imaging Agent Administration SR IOD Content Constraints

A.35.20.3.1.1 Template

The document shall be constructed from TID 11020 Performed Imaging Agent Administration invoked at the root node.

A.35.20.3.1.2 Value Type

Value Type (0040,A040) in the Content Sequence (0040,A730) of the SR Document Content Module is constrained to the following Enumerated Values (see Table C.17.3-7 for Value Type definitions):

TEXT
CODE
NUM
DATETIME
DATE

TIME
UIDREF
PNAME
COMPOSITE
IMAGE
WAVEFORM
CONTAINER

A.35.20.3.1.3 Relationship Constraints

Relationships between content items in the content of this IOD shall be conveyed in the by-value mode. Table A.35.20-2 specifies the relationship constraints of this IOD. See Table C.17.3-8 for Relationship Type definitions.

Table A.35.20-2
RELATIONSHIP CONTENT CONSTRAINTS FOR PERFORMED IMAGING AGENT ADMINISTRATION SR IOD

Source Value Type	Relationship Type (Enumerated Values)	Target Value Type
CONTAINER	CONTAINS	TEXT, CODE, NUM, DATETIME, DATE, TIME, UIDREF, PNAME, COMPOSITE[1], IMAGE[1], WAVEFORM[1], CONTAINER.
TEXT, CODE, NUM, CONTAINER	HAS OBS CONTEXT	TEXT, CODE, NUM, DATETIME, DATE, TIME, UIDREF, PNAME, COMPOSITE[1]
CONTAINER, IMAGE[1], WAVEFORM[1], COMPOSITE[1], NUM	HAS ACQ CONTEXT	TEXT, CODE, NUM, DATETIME, DATE, TIME, UIDREF, PNAME, CONTAINER.
any type	HAS CONCEPT MOD	TEXT, CODE[2]
TEXT, CODE, NUM	HAS PROPERTIES	TEXT, CODE, NUM, DATETIME, DATE, TIME, UIDREF, PNAME, IMAGE[1], WAVEFORM[1], COMPOSITE[1], CONTAINER.
PNAME	HAS PROPERTIES	TEXT, CODE, DATETIME, DATE, TIME, UIDREF, PNAME
TEXT, CODE, NUM	INFERRED FROM	TEXT, CODE, NUM, DATETIME, DATE, TIME, UIDREF, PNAME, IMAGE[1], WAVEFORM[1], COMPOSITE[1], CONTAINER.

Notes: 1. The SOP Classes to which an IMAGE or WAVEFORM or COMPOSITE Value Type may refer, is documented in the Conformance Statement for an application (see PS 3.2 and PS 3.4).

2. The HAS CONCEPT MOD relationship is used to modify the meaning of the concept name of a parent node (or Source Content Item), with a modifier or qualifier in a child (target node) to provide a more descriptive explanation, a different coded language translation, or to define a post-coordinated concept.

Changes to NEMA Standards Publication PS 3.4

Digital Imaging and Communications in Medicine (DICOM)

Part 4: Service Class Specifications

Add new SOP Class to PS 3.4 Annex B tables:

B.5 STANDARD SOP CLASSES

The SOP Classes in the Storage Service Class identify the Composite IODs to be stored. Table B.5-1 identifies Standard SOP Classes.

Table B.5-1
STANDARD SOP CLASSES

SOP Class Name	SOP Class UID	IOD Specification (defined in PS 3.3)
…	…	…
Planned Imaging Agent Administration SR Storage	**1.2.840.10008.5.1.4.1.1.88.74**	**Planned Imaging Agent Administration SR IOD**
Performed Imaging Agent Administration SR Storage	**1.2.840.10008.5.1.4.1.1.88.75**	**Performed Imaging Agent Administration SR IOD**
…	…	…

…

Changes to NEMA Standards Publication PS 3.6

Digital Imaging and Communications in Medicine (DICOM)

Part 6: Data Dictionary

Add new SOP Class to PS 3.6 Table A-1:

…	…	…	...
1.2.840.10008.5.1.4.1.1.88.74	**Planned Imaging Agent Administration SR Storage**	**SOP Class**	**PS 3.4**
1.2.840.10008.5.1.4.1.1.88.75	**Performed Imaging Agent Administration SR Storage**	**SOP Class**	**PS 3.4**
…	…	…	…

Add UIDs for Context groups to PS 3.6 Table A-3:

Table A-3 Context Group UID Values

Context UID	Context Identifier	Context Group Name
1.2.840.10008.6.1.1250	60	Imaging Agent Administration Adverse Events
1.2.840.10008.6.1.1251	61	Time Relative to Procedure
1.2.840.10008.6.1.1252	62	Imaging Agent Administration Phase Type
1.2.840.10008.6.1.1253	63	Imaging Agent Administration Mode
1.2.840.10008.6.1.1254	64	Imaging Agent Administration Patient State
1.2.840.10008.6.1.1255	65	Pre-Medication for Imaging Agent Administration
1.2.840.10008.6.1.1256	66	Medication for Imaging Agent Administration
1.2.840.10008.6.1.1257	67	Imaging Agent Administration Completion Status
1.2.840.10008.6.1.1258	68	Imaging Agent Administration Pharmaceutical Unit of Presentation
1.2.840.10008.6.1.1259	69	Imaging Agent Administration Consumables
1.2.840.10008.6.1.1260	70	Flush
1.2.840.10008.6.1.1261	71	Imaging Agent Administration Injector Event Type

1.2.840.10008.6.1.1262	72	Imaging Agent Administration Step Type
1.2.840.10008.6.1.1263	73	Bolus Shaping Curves
1.2.840.10008.6.1.1264	74	Imaging Agent Administration Consumable Catheter Type
1.2.840.10008.6.1.1265	75	Low-High-Equal
1.2.840.10008.6.1.1266	76	Type of Pre-Medication

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Changes to NEMA Standards Publication PS 3.16

Digital Imaging and Communications in Medicine (DICOM)

Part 16: Content Mapping Resource

Add definition to Section 3 as shown

Imaging Agent A substance administered to improve the imaging of specific organs, tissues, diseases and physiological functions [Adapted from Wikipedia "http://en.wikipedia.org/wiki/Imaging_agent"].

Notes: 1. Imaging agents include iodinated X-Ray and gadolinium-based MR contrast agents.

2. Saline flush is not an imaging agent but may be administered in conjunction with imaging agents.

3. Air used as a negative contrast agent is an imaging agent.

Add new Section to Annex A of PS 3.16:

IMAGING AGENT ADMINISTRATION SR IOD TEMPLATES

PLANNED IMAGING AGENT ADMINISTRATION SR IOD TEMPLATES

The templates that comprise the Planned Imaging Agent Administration are interconnected as in Figure A-19

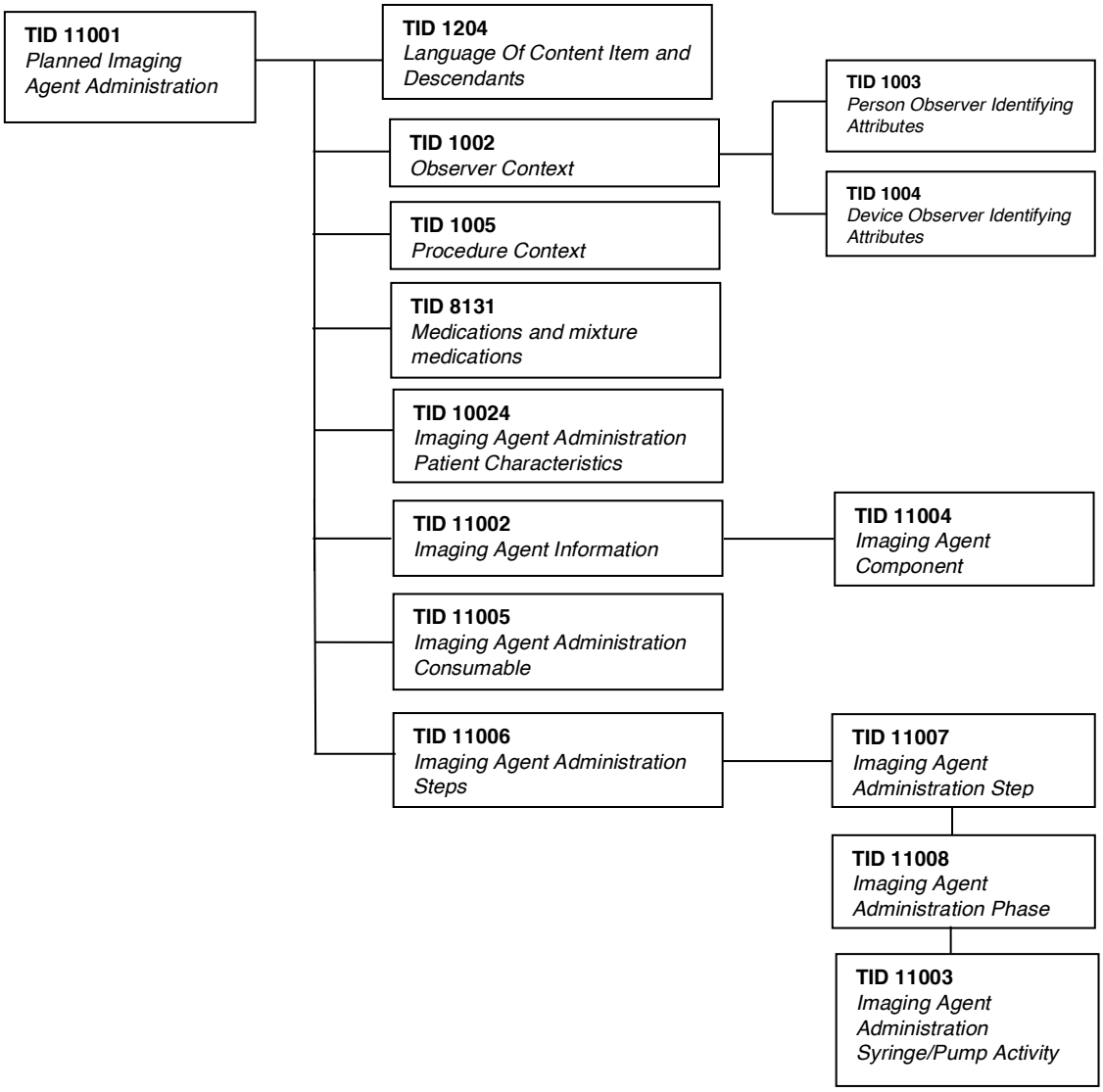

Figure A-19: Planned Imaging Agent Administration SR IOD Template Structure

Add TID 11001 as shown.

TID 11001 Planned Imaging Agent Administration

This template describes single administration plan.

This template defines a container (the root) with subsidiary content items, each of which corresponds to a single Imaging Agent Administration that is planned.

Note: If a planned SR is a modification of a previous planned SR, it can reference the previous plan using the Predecessor Documents Sequence (0040,A360).

TID 11001
Planned Imaging Agent Administration
Type: Extensible Order: Non-Significant Root :Yes

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (130226, DCM, "Planned Imaging Agent Administration")	1	M		
2	>	HAS CONCEPT MOD	INCLUDE	DTID (1204) Language of Content Item and Descendants	1	U		
3	>	HAS OBS CONTEXT	INCLUDE	DTID (1002) Observer Context	1-n	M		
4	>	HAS OBS CONTEXT	INCLUDE	DTID (1005) Procedure Context	1	M		
5	>	CONTAINS	INCLUDE	DTID (8131) "Medications and mixture medications"	1-n	U		$DrugAdministered = DCID 65 Pre-Medication for Imaging Agent Administration
6	>	CONTAINS	INCLUDE	DTID (10024) Imaging Agent Administration Patient Characteristics	1	U		
7	>	CONTAINS	INCLUDE	DTID 11002 Imaging Agent Information	1-n	M		
8	>	CONTAINS	TEXT	EV (121106, DCM, "Comment")	1	U		
9	>	CONTAINS	INCLUDE	DTID 11005 Imaging Agent Administration Consumables	1-n	U		
10	>	CONTAINS	INCLUDE	DTID 11006 Imaging Agent Administration Steps	1	M		

Content Item Descriptions

Row 3	Author of the plan.
Row 5	Describes medications administered prior to the procedure. E.g., for contrast reaction prophylaxis. Not intended for pharmaceutical stress agents.
Row 8	General comments about the planned imaging agent administration. It is intended for such things as a summary of the content of the plan, additional instructions related to administration of the plan, and concepts that cannot be expressed by structured features of the plan.
Row 9	The consumables that would be needed to execute the plan. e.g., a catheter of a particular size.

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Modify TID 8131 as shown

TID 8131 Medications and Mixture Medications

This template encodes a description of medications (including but not limited to anesthetic agents) used during a procedure (e.g.,**pre-medication drugs for a imaging procedure on humans or** anesthesia for imaging of research
290 small animals)

Table TID 8131. Parameters

Parameter Name	Parameter Usage
$DrugAdministered	**Type of drug administered**

Type: Extensible

295 **Order: Significant**

Root: No

Table TID 8131 Medications and Mixture Medications

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (F-04460, SRT, "Medication given")	1	M		
2	>	CONTAINS	DATETIME	EV (122081, DCM, "Drug start")	1	U		
3	>	CONTAINS	DATETIME	EV (122082, DCM, "Drug end")	1	U		
4	>	CONTAINS	CODE	EV (G-C340, SRT, "Route of administration")	1	M		DCID 11 “Route of Administration”
5	>	CONTAINS	CONTAINER	EV (R-40826, SRT, "Mixture")	1-n	M		
6	>>	CONTAINS	CODE	EV (122083, DCM, "Drug administered")	1	MC	XOR Row 7	**$DrugAdministered**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
								~~DCID 623 "Medication for Small Animal Anesthesia"~~
7	>>	CONTAINS	TEXT	EV (122083, DCM, "Drug administered")	1	MC	XOR Row 6	
8	>>	CONTAINS	CODE	EV (111516, DCM, "Medication Type")	1	M		DCID 621 ~~"Medication Type Code Type for Small Animal Anesthesia"~~"Type of Medication for Small Animal Anesthesia" DCID 76 "Type of Pre-Medication"
11	>>	CONTAINS	CODE	EV (113510, DCM, "Drug Product Identifier")	1	U		
12	>>>	HAS PROPERTIES	TEXT	EV (111529, DCM, "Brand Name")	1	U		
13	>>	CONTAINS	NUM	DCID (3410) Numeric Parameters of Drugs/Contrast	1-n	U		

300 **Content Item Descriptions**

Row 1	AQI Medication type and element correspond to (F-04460, SRT, "Medication given") (situation). (See TID 3806 Cath Procedure).
Rows 2-3	AQI DoseStart and DoseEnd elements correspond to (122081, DCM, "Drug start") and (122082, DCM, "Drug end") respectively. (See CID 3409 Administration of Drugs/Contrast). If the medication is delivered as a bolus, the end time is omitted.
Row 4	AQI MedicationRoute corresponds to (G-C340, SRT, "Route of administration"). The existing CID 11 "Route of Administration" contains a relevant subset of concepts for the enumerated values of AQI MedicationRouteCodeType.
Row 5	The AQI schema allows the Medication type not only to describe medications with a single component, but also to add MixtureMedications children, each of which is encoded following a similar pattern to the contents of Medication, though the start and end time and route of administration are shared. This had been modeled by allowing every medication to have one or more mixture children. For medications that are not a mixture, a single instance of this row defines the medication (even though the mixture container is still used).

Rows 6, 7	AQI MedicationName and MixtureMedicationName elements correspond to (122083, DCM, "Drug administered"). (See TID 3806 Cath Procedure). The medication (e.g., anesthesia agent) can be described with a code or text, e.g., (F-61B0A, SRT, "Isoflurane") or "isoflurane".
Row 9	Both AQI MedDose (or MixtureMedDose) and DoseUnits (or MixtureDoseUnits) elements are combined in one content item. Units are required to be encoded as UCUM but are not otherwise constrained.
Row 10	Both AQI MedConcentration (or MixtureMedConcentration) and MedConcentrationUnit (or MixtureMedConcentrationUnit) elements are combined in one content item. Units are required to be encoded as UCUM but are not otherwise constrained.
Row 11	**Registered drug establishment code for the product. Equivalent codes can be encoded in this item using the Equivalent Code Sequence (0008,0121). See PS 3.3 Section 8.9.**

TID 8130 Anesthesia

Type: Extensible

Order: Non-Significant

Table TID 8130. Anesthesia

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (P1-0512A, SRT, "Administration of anesthesia")	1	M		
…								
17	>>	CONTAINS	INCLUDE	DTID 8131 "Medications and Mixture Medications"	1-n	M		**$DrugAdministered = DCID 623 "Medication for Small Animal Anesthesia"**

Modify TID 10024 as shown and update figure A-17 to use the new name

Note CP-1589 is also making modifications to this table that are relevant.

TID 10024 ~~Radiopharmaceutical~~ Imaging Agent Administration Patient Characteristics

This Template describes the characteristics of the patient related to imaging agent administration that are specific to the current clinical presentation (visit). **In the case of radiopharmaceuticals**, the characteristics noted may affect the activity received, and how dose is calculated for the patient. Patient Characteristic concepts in this Template, which may replicate attributes in the Patient Study Module, are included here as possible targets of by-reference relationships from other Content Items in the SR tree.

Type: Extensible

Order: Significant

Root: No

Table TID 10024 ~~Radiopharmaceutical~~ Imaging Agent Administration Patient Characteristics

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (121118, DCM, "Patient Characteristics")				
2	>	CONTAINS	CODE	EV (109054, DCM, "Patient state")	1-n	U		DCID (10045) "Radiopharmaceutical Patient State" **DCID 64 "Imaging Agent Administration Patient State"**
3	>	CONTAINS	NUM	EV (121033, DCM, "Subject Age")	1	U		UNITS = DCID 7456 "Units of Measure for Age"
…								

TID 11002 Imaging Agent Information

This template describes an imaging agent which may be a single component or a mix of multiple components used in a single syringe or pump.

TID 11002
Imaging Agent Information
Type : Extensible Order : Non-Significant Root : No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (130183, DCM, "Imaging Agent Information")	1	M		
2	>	CONTAINS	TEXT	EV (130254, DCM, "Imaging Agent Identifier")	1	M		
3	>	CONTAINS	CODE	EV (130187, DCM, "Imaging Agent Warmed")	1	M		DCID 230 "Yes-No"

4	>	CONTAINS	CONTAINER	EV (130191, DCM, “Imaging Agent Component Usage”)	1-n	M		
5	>>	CONTAINS	INCLUDE	DTID 11004 Imaging Agent Component	1	M		
6	>>	CONTAINS	NUM	EV (130239, DCM, “Component Volume”)	1	MC	IF 2 or more items of row 4 are present	UNITS = EV (ml, UCUM, “ml”)
7	>	CONTAINS	NUM	EV (130228, DCM, “Contrast Volume Limit”)	1	UC	IFF root Concept Name Code Sequence (130226, DCM, “Planned Imaging Agent Administration”)	UNITS EV (ml, UCUM, “ml”)

Content Item Descriptions

Row 2	Uniquely, within the scope of the root container, identifies the imaging agent contained in a syringe or pump.
Row 4	A single imaging agent component, or a mixture of multiple imaging agent components, used to build a custom mixture of contrast agent, filled in a single syringe or pump. For imaging agents that are not a mixture, a single instance of this row defines the imaging agent component.
Row 6	Estimated volume of the imaging agent component.

335 **Add TID 11003 as shown.**

TID 11003 Imaging Agent Administration Syringe/Pump Phase Activity

This template describes a single Syringe/Pump activity as part of the single imaging administration phase. A phase activity is the lowest level of the imaging agent delivery model.

TID 11003

340 **Imaging Agent Administration Syringe/Pump Phase Activity**

Type : Extensible Order : Non-Significant Root : No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (130237, DCM, “Imaging Agent Administration Syringe/Pump Phase Activity”)	1	M		
2	>	CONTAINS	TEXT	EV (130255, DCM, “Referenced Imaging Agent Identifier”)	1	M		Shall be a value of Row 2 in TID 11002.
3	>	CONTAINS	NUM	EV (122091, DCM, “Volume Administered”	1	M		UNITS = EV (ml, UCUM, “ml”)
4	>	CONTAINS	NUM	EV (130208, DCM, “Starting Flow Rate of administration”)	1	M		UNITS = EV (ml/s, UCUM “ml/s”)
5	>	CONTAINS	NUM	EV (130209, DCM, “Ending Flow Rate of administration”)	1	MC	IF Row 7 = EV (130253, DCM, “Linear Curve”)	UNITS = EV (ml/s, UCUM “ml/s”)

6	>	CONTAINS	NUM	EV (130207, DCM, “Rise Time”)	1	UC	IF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	UNITS = EV (s, UCUM, “s”)
7	>	CONTAINS	CODE	EV (130210, DCM, “Bolus Shaping Curve”)	1	U		DCID 73 “Bolus Shaping Curves”
8	>>	HAS PROPERTIES	TEXT	EV (111002, DCM, “Algorithm Parameters”)	1-n	U		
9	>	CONTAINS	NUM	EV (130244, DCM, “Peak Flow Rate in Phase Activity”)	1	MC	IF TID 11007 Row 4 = EV (130173, DCM, “Automated Administration”) AND IFF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	UNITS = EV (ml/s, UCUM “ml/s”)
10	>	CONTAINS	NUM	EV (130245, DCM, “Peak Pressure in Phase Activity”)	1	MC	IF TID 11007 Row 4 = EV (130173, DCM, “Automated Administration”) AND IFF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	UNITS = EV (kPa, UCUM “kPa”)
11	>	CONTAINS	NUM	EV (130205, DCM, “Initial Volume of Imaging Agent in Container”)	1	UC	IFF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	UNITS = EV (ml, UCUM, “ml”)
12	>	CONTAINS	NUM	EV (130206, DCM, “Residual Volume of Imaging Agent in Container”)	1	UC	IFF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	UNITS = EV (ml, UCUM, “ml”)
13	>	CONTAINS	DATETIME	EV (111526, DCM, “DateTime Started”	1	MC	IFF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	
14	>	CONTAINS	NUM	EV (C0449238, UMLS, “Duration”)	1	MC	IF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	UNITS = EV (s, UCUM, “s”)

Content Item Descriptions

Row 3	Volume administered by this syringe or pump.
Row 7	Shape of the flow rate from the beginning rate to the end rate of the administration. This will typically be a vendor specific code. The code meaning of the concept name should describe the type and intent of the curve.
Row 8	Any parameters used to generate the curve defined in Row 7.
Row 9	Peak value of the flow rate of this syringe or pump activity.
Row 10	Peak value of the pressure of this syringe or pump activity.
Row 13	Datetime this individual syringe or pump activity actually started.
Row 14	Duration of this individual syringe or pump activity.

Add TID 11004 as shown.

TID 11004 Imaging Agent Component

This template describes the Imaging Agent component. The brand and packaging information can be referenced under TID 11005 consumables.

TID 11004
Imaging Agent Component
Type : Extensible Order : Non-Significant Root : No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (130238, DCM, “Imaging Agent Component”)	1	M		
2	>	CONTAINS	CODE	EV (122083, DCM, "Drug administered”)	1	M		DCID (12) Radiographic Contrast Agent OR DCID (3204) Stress Agents OR DCID 70 Flush OR DCID 66 Medication for Imaging Agent Administration
3	>	CONTAINS	CODE	EV (G-C52F, SRT, “Active Ingredient”)	1	U		DCID (13) Radiographic Contrast Agent Ingredient
4	>	CONTAINS	CODE	EV (113510, DCM, “Drug Product Identifier”)	1	U		
5	>	CONTAINS	NUM	EV (122093, “DCM”, “Concentration”)	1	U		
6	>	CONTAINS	NUM	EV (282258000, SRT, “Molarity”)	1	U		UNITS = EV (mmol/l, UCUM, “mmol/l”)
7	>	CONTAINS	CODE	EV (56953008, SRT, “Osmolality”)	1	U		DCID 75 Low-High-Equal
8	>	CONTAINS	NUM	EV (126380, DCM, “Contrast Longitudinal Relaxivity”)	1	U		UNITS = EV (l/mmol/s, UCUM, “l/mmol/s”)

9	>	CONTAINS	NUM	EV (130188, DCM, “Contrast Transverse Relaxivity”)	1	U		UNITS = EV (l/mmol/s, UCUM, “l/mmol/s”)
10	>	CONTAINS	NUM	EV (130184, DCM, “Osmolality at 37C”)	1	U		UNITS = EV (mosm/kg, UCUM, “mosm/kg”)
11	>	CONTAINS	NUM	EV (130185, DCM, “Osmolarity at 37C”)	1	U		UNITS = EV (mmol/l UCUM, “mmol/l”)
12	>	CONTAINS	NUM	EV (130186, DCM, “Viscosity at 37C”)	1	U		
13	>	CONTAINS	CODE	EV (130189, DCM, “Is Ionic”)	1	U		DCID (231) “Yes-No Only”
14	>	CONTAINS	NUM	EV (130190, 99SU164, “Dosing Factor”)	1	U		
15	>	CONTAINS	CODE	EV (732935002, SCT, “Unit of Presentation”)	1	M		DCID 68 Imaging Agent Administration Pharmaceutical Unit of Presentation
16	>	CONTAINS	NUM	EV (130221, DCM, “Imaging Agent Volume Per Unit of Presentation”)	1	U		UNITS = EV (ml, UCUM, “ml”)
17	>	CONTAINS	TEXT	EV (121147, DCM, “Billing Code”)	1	U		
18	>	CONTAINS	TEXT	EV (121145, DCM, “Description of Material”)	1	U		
19	>	CONTAINS	DATE	EV (C70854, NCIt, “Medical Product Expiration Date”)	1	U		
20	>	CONTAINS	TEXT	EV (C0947322, UMLS, “Manufacturer Name”)	1	U		
21	>	CONTAINS	TEXT	EV (111529, DCM, “Brand Name”)	1	U		
22	>	CONTAINS	TEXT	EV (130231, DCM, “Barcode Value“)	1-n	UC	IFF root Concept Name Code Sequence = (130226, DCM, “Planned Imaging Agen Administration”)	
23	>	CONTAINS	TEXT	EV (130231, DCM, “Barcode Value”)	1	UC	IFF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	
24	>	CONTAINS	TEXT	EV (121148, DCM, “Unit Serial Identifier”)	1	U		
25	>	CONTAINS	TEXT	EV (121149, DCM, “Lot Identifier”)	1	U		
26	>	CONTAINS	CODE	EV (128739, DCM, "UDI")	1	U		

Content Item Descriptions

Row 3	The drug administered includes contrast agents, stress agents, flush and medication agents.
Row 5	Concentration of the active ingredient (Row 3). The units are not constrained but shall be represented as usual using UCUM.

Row 7	Osmolality relative to blood.
Row 8	Relaxivity at 37C at B0 field strength.
Row 9	Relaxivity at 37C at B0 field strength.
Row 12	The units are not constrained but shall be represented using UCUM.
Row 17	The billing codes for material used for imaging agent administration procedure. It does not include performance and interpretation of the imaging.
Row 20	Name of the manufacturer of the pharmaceutical.
Row 22,23	The number from the barcode associated with the unit of presentation e.g., the individual bottle. Some examples for type of codes are UPC, EAN, GTIN, PZN, PPN. Multiple items are permitted for planned imaging agent administration since multiple container sizes may be allowed.

Add TID 11005 as shown.

TID 11005 Imaging Agent Administration Consumable

This template describes a material or supply used in the course of an Imaging Agent administration procedure, other than the imaging agents themselves and the unit of presentation of the imaging agents if pre-filled. This includes such supplies as needles, tubing, cannulas, catheters, empty syringes. This template may describe reusable or disposable materials.

For the planned administration, these are the expected consumables. For the performed administration, this template describes what was actually used.

TID 11005
Imaging Agent Administration Consumable
Type : Extensible Order : Non-Significant Root : No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (130222, DCM, “Imaging Agent Administration Consumable”)	1	M		
2	>	CONTAINS	CODE	EV (130223, DCM, “Imaging Agent Administration Consumable Type”)	1	M		DCID 69 Imaging Agent Administration Consumables
3	>	CONTAINS	NUM	EV (121146, DCM, “Quantity of Material”)	1	U		
4	>>	CONTAINS	CODE	EV (130224, DCM, “Consumable is New”	1	M		DCID (230) Yes-No
5	>	CONTAINS	TEXT	EV (121147, DCM, “Billing Code”)	1	U		
6	>	CONTAINS	TEXT	EV (121145, DCM, “Description of Material”)	1	U		
7	>	CONTAINS	DATE	EV (C70854, NCIt, “Medical Product Expiration Date”)	1	U		
8	>	CONTAINS	NUM	EV (111467, DCM, “Needle Length”)	1	U	IF Row 2 = EV (A-26800, SRT, “Catheter”)	UNITS = EV (mm, UCUM, “mm”)

9	>	CONTAINS	NUM	EV (122319, DCM, “Catheter Size”)	1	MC	IF Row 2 = EV (A-26800, SRT, “Catheter”) AND If Row 10 = EV (A-26836, SRT, “Peripheral intravenous catheter”)	UNITS = DCID (3510) Catheter Size Units
10	>	CONTAINS	CODE	EV (130257, DCM, “Consumable Catheter Type”)	1	MC	IF Row 2 = EV (A-26800, SRT, “Catheter”)	DCID 74 Imaging Agent Administration Consumable Catheter Type
11	>	CONTAINS	TEXT	EV (C0947322, UMLS, “Manufacturer Name”)	1	U		
12	>	CONTAINS	TEXT	EV (111529, DCM, “Brand Name”)	1	U		
13	>	CONTAINS	TEXT	EV (130231, DCM, “Barcode Value”)	1-n	UC	IFF root Concept Name Code Sequence = (130226, DCM, “Planned Imaging Agent Administration”)	
14	>	CONTAINS	TEXT	EV (130231, DCM, “Barcode Value”)	1	UC	IFF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	
15	>	CONTAINS	TEXT	EV (121148, DCM, “Unit Serial Identifier”)	1	U		
16	>	CONTAINS	TEXT	EV (121149, DCM, “Lot Identifier”)	1	U		
17	>	CONTAINS	CODE	EV (128739, DCM, "UDI")	1	U		

Content Item Descriptions

Row 3	Quantity of the imaging agent consumed or quantity of accessories or other consumables used.
Row 5	The billing codes for material used for imaging agent administration procedure. It does not include performance and interpretation of the imaging.
Row 11	Name of the manufacturer of the consumable.
Row 13,14	The number from the barcode associated with the unit of presentation e.g., the individual blister package. Some examples for type of codes are UPC, EAN, GTIN. Multiple items are permitted for planned imaging agent administration since multiple container sizes may be allowed.

Add TID 11006 as shown.

370 **TID 11006 Imaging Agent Administration Steps**

This template provides detailed information on Imaging Agent Administration Steps. It consists of multiple administration steps; a step in turn consists of multiple administration phases.

TID 11006

Imaging Agent Administration Steps

Type: Extensible Order: Non-Significant Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (130192, DCM, “Imaging Agent Administration Steps”)	1	M		
2	>	CONTAINS	TEXT	EV (130200, DCM, “Imaging Agent Administration Steps Name”)	1	M		
3	>	CONTAINS	TEXT	EV (130199, DCM, “Imaging Agent Administration Steps Description”)	1	U		
4	>	CONTAINS	INCLUDE	DTID 11007 Imaging Agent Administration Step	1-n	U		

Add TID 11007 as shown.

TID 11007 Imaging Agent Administration Step

This template provides detailed information on an Imaging Agent Administration step. A step is part of a plan. Steps are usually distinguished from other steps because an operator’s intervention is required between steps. Steps are also distinguished when they have different routes of administration. A step may consist of multiple phases.

TID 11007

Imaging Agent Administration Step

Type: Extensible Order: Non-Significant Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (130195, DCM, “Imaging Agent Administration Step”)	1	M		
2	>	CONTAINS	TEXT	EV (130196, DCM, “Imaging Agent Administration Step Identifier”)	1	M		
3	>	CONTAINS	UIDREF	EV (130246, DCM, “Imaging Agent Administration Performed Step UID”)	1	MC	IFF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	
4	>	CONTAINS	CODE	EV (130181, DCM, “Administration Mode”)	1	M		DCID 63 Imaging Agent Administration Mode

5	>	CONTAINS	CODE	EV (113874, DCM, “Person Role in Organization”)	1-n	MC	IF Row 4 = EV (130174 DCM, “Manual Administration”	DCID 7450 “Person Roles”
6	>	CONTAINS	CODE	EV (130250, DCM, “Administration Step Type”)	1	M		DCID 72 Imaging Agent Administration Step Type
7	>	CONTAINS	NUM	EV (130197, DCM, “Administration Delay”)	1	U		UNITS = EV (s, UCUM, “s”)
8	>	CONTAINS	NUM	EV (130198, DCM, "Scan Delay")	1	U		UNITS = EV (s, UCUM, “s”)
9	>	CONTAINS	NUM	EV (130193, DCM, “Pressure Limit”)	1	UC	IFF Row 4 = EV (130173, DCM, “Automated Administration”)	UNITS = EV (kPa, UCUM, “kPa“)
10	>	CONTAINS	CODE	EV (G-C340, SRT, "Route of Administration")	1	M		DCID (11) Route of Administration
11	>>	HAS PROPERTIES	CODE	EV (G-C581, SRT, “Site of”)	1	MC	IF Row 10 equals (G-D101, SRT, “Intravenous route”) Or (G-D109, SRT, “Intra-articular route”)	DCID 3746 “Percutaneous Entry Site”
12	>>>	HAS CONCEPT MOD	CODE	EV (G-C171,SRT, “Laterality”)	1	MC	IF Row 11 has laterality	DCID 244 Laterality
13	>	CONTAINS	INCLUDE	DTID 11008 Imaging Agent Administration Phase	1-n	M		
14	>	CONTAINS	INCLUDE	DTID 11023 Imaging Agent Administration Graph	1-n	UC	IFF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	
15	>	CONTAINS	NUM	EV (130219, DCM, “Number of Injector Heads”)	1	U		
16	>	CONTAINS	CODE	EV (130218, DCM, “Programmable Device”)	1	U		DCID (231) “Yes – No Only”
17	>	CONTAINS	CONTAINER	EV (130172, DCM, “Manually triggered injection information”)	1	UC	IF Row 4 = EV (130173, DCM, “Automated Administration”) AND IFF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	

18	>>	CONTAINS	NUM	EV (130241, DCM, “Total Step Volume Administered”)	1	M		UNITS = EV (ml, UCUM, “ml”)
19	>>	CONTAINS	NUM	EV (130242, DCM, “Total number of manually triggered injections”)	1	M		

Content Item Descriptions

Row 14	For a multi- syringe/pump injector there will be one graph per syringe/pump system. This is only included in the performed administration because it is descriptive not prescriptive.

390

Add TID 11008 as shown.

TID 11008 Imaging Agent Administration Phase

This template provides detailed information on Imaging Agent Administration Phase. A phase is part of the administration step and is not interrupted except under abnormal conditions.

395

TID 11008
Imaging Agent Administration Phase
Type: Extensible Order: Non-Significant Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (130202, DCM, “Imaging Agent Administration Phase”)	1	M		
2	>	CONTAINS	TEXT	EV (130203, DCM, “Imaging Agent Administration Phase Identifier”)	1	M		
3	>	CONTAINS	UIDREF	EV (130261, DCM, “Imaging Agent Administration Performed Phase UID”)	1	MC	IFF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	
4	>	CONTAINS	CODE	EV (130204, DCM, “Imaging Agent Administration Phase Type”)	1	MC	IF TID 11007 Row 4 = EV (130173, DCM, “Automated Administration”)	DCID 62 Imaging Agent Administration Phase Type
5	>	CONTAINS	INCLUDE	DTID 11003 Imaging Agent Administration Syringe/Pump Phase Activity	1-n	MC	IF TID 11007 Row 4 = EV (130173, DCM, “Automated Administration”))	
6	>	CONTAINS	NUM	EV (130240, DCM, “Total Phase Volume Administered”)	1	M		UNITS = EV (ml, UCUM, “ml”)

7	>	CONTAINS	DATETIME	EV (111526, DCM, “DateTime Started”	1	MC	IFF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	
8	>	CONTAINS	NUM	EV (C0449238, UMLS, “Duration”)	1	MC	IF root Concept Name Code Sequence = (130227, DCM, “Performed Imaging Agent Administration”)	UNITS = EV (s, UCUM, “s”)

Content Item Descriptions

Row 2	Imaging Agent Administration Phase Identifier is specified as numeric text string, and shall be treated as the ordinal of the recorded administration phase within an administration step (i.e., “1” for the first phase, “2” for the second, etc.).
Row 5	There will be one item for each syringe / pump activity that is administering an agent during this phase.
Row 7	Datetime that the earliest syringe/pump starts administering.
Row 8	Total duration of this phase starting from where the earliest syringe/pump starts administering until the last syringe/pump ends administering.

400

PERFORMED IMAGING AGENT ADMINISTRATION SR IOD TEMPLATES

The templates that comprise the Performed Imaging Agent Administration are interconnected as in Figure A-20.

405 **TID 11020 Performed Imaging Agent Administration**

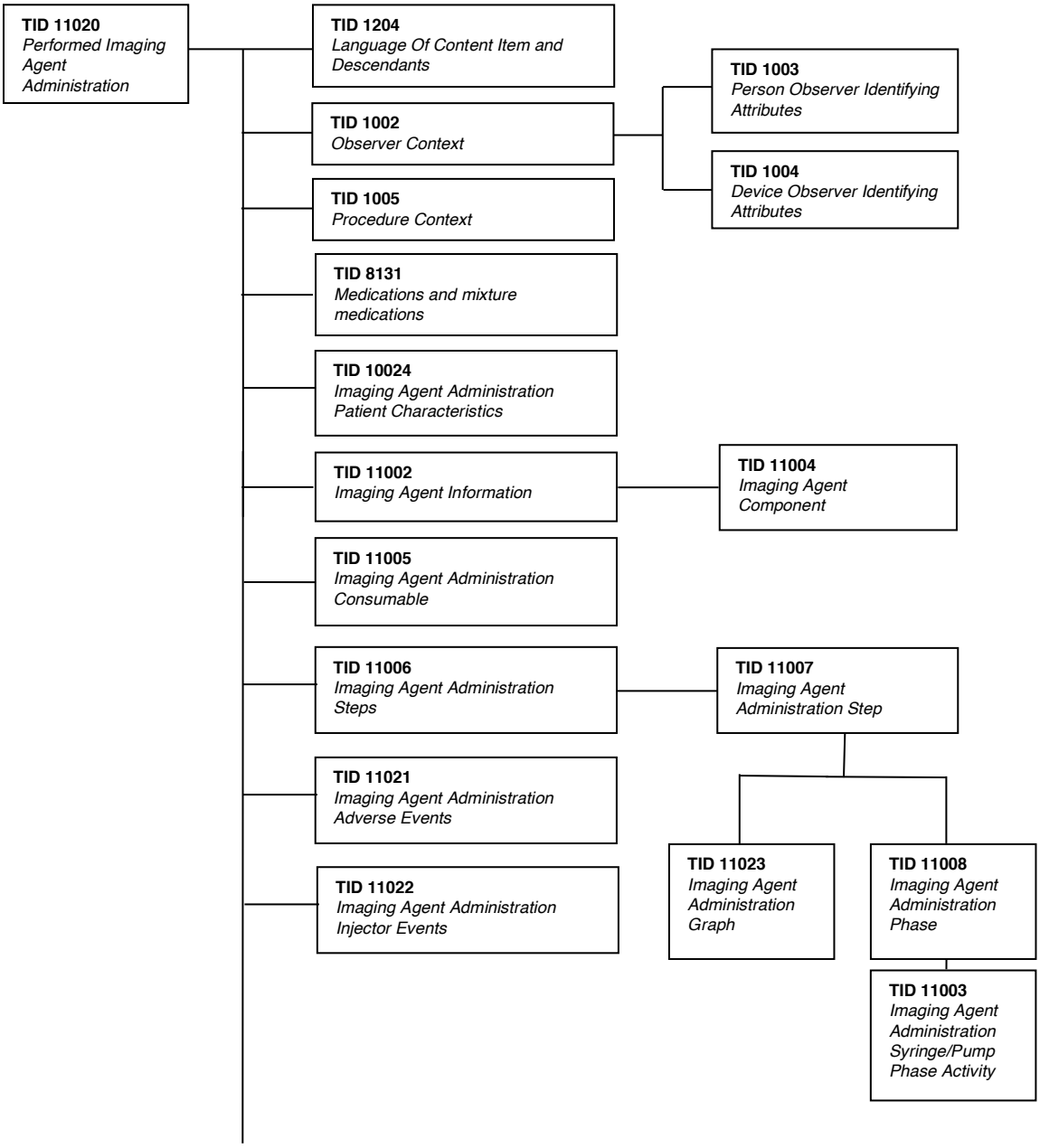


Figure A-20: Performed Imaging Agent Administration SR IOD Template Structure

This template defines a container (the root) with subsidiary content items, each of which corresponds to a single Imaging Agent Administration delivered. There is a defined recording observer (the system or person responsible for performing the plan).

Note: A performed SR may document a whole planned SR or only a single part of it. A planned SR can be documented by several performed SRs. It is allowed to aggregate several performed SRs of different performing devices on one patient with the same Study Instance UID for a total description of the administration. The aggregated performed SR should reference the previous Performed Imaging Agent Administrations using the Predecessor Documents Sequence (0040,A360). The individual Performed Administrations can be identified by the (130246, DCM, "Imaging Agent Administration Performed Step UID") of TID 11007 Imaging Agent Administration Step.

Add TID 11020 as shown.

TID 11020

Performed Imaging Agent Administration

Type : Extensible Order : Non-Significant Root: Yes

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (130227, DCM, "Performed Imaging Agent Administration")	1	M		
2	>	HAS CONCEPT MOD	INCLUDE	DTID (1204) Language Of Content Item and Descendants	1	U		
3	>	HAS OBS CONTEXT	INCLUDE	DTID (1002) Observer Context	1-n	M		
4	>	HAS OBS CONTEXT	INCLUDE	DTID (1005) Procedure Context	1	U		
5	>	CONTAINS	INCLUDE	DTID (8131) "Medications and mixture medications"	1-n	U		$DrugAdministered = DCID 65 Pre-Medication for Imaging Agent Administration
6	>	CONTAINS	INCLUDE	DTID (10024) Imaging Agent Administration Patient Characteristics	1	U		
7	>	CONTAINS	INCLUDE	DTID 11002 Imaging Agent Information	1-n	M		
8	>	CONTAINS	TEXT	EV (55112-7, LN, "Summary")	1	U		
9	>	CONTAINS	INCLUDE	DTID 11005 Imaging Agent Administration Consumable	1-n	U		
10	>	CONTAINS	INCLUDE	DTID 11006 Imaging Agent Administration Steps	1	M		

11	>	CONTAINS	COMPOSITE	EV (130236, DCM, "Planned Imaging Agent Administration SOP Instance")	1	MC	IF this administration was based on a Planned Imaging Agent Administration SOP Instance.	
12	>	CONTAINS	CODE	EV (130211, DCM, "Imaging Agent Administration Completion Status")	1	M		DCID 67 Imaging Agent Administration Completion Status
13	>	CONTAINS	INCLUDE	DTID 11021 Imaging Agent Administration Adverse Events	1	U		
14	>	CONTAINS	INCLUDE	DTID 11022 Imaging Agent Administration Injector Events	1	U		
15	>	CONTAINS	NUM	EV (130165, DCM, "Total Keep Vein Open Volume Administered"	1	U		UNITS = EV (ml, UCUM, "ml")

Content Item Descriptions

Row 3	Persons and devices responsible for administering the imaging agent. If an automated injector was used, it is recorded here.
Row 7	Describes all imaging agents used.
Row 8	Summary of individual performed injections. e.g., "Administered 30ml of Ultravist using guage22 via LeftAC."
Row 10	Describes what was delivered.
Row 11	This reference will be to the plan that was actually used. Note: If the operator modified a previously stored plan before use, then the modified plan shall be referenced. Stored plans may reference their predecessors using the Predecessor Documents Sequence (0040,A360).

Add TID 11021 as shown.

TID 11021 Imaging Agent Administration Adverse Events

This template provides information on adverse events occurring to a patient as a result of administration of an imaging agent.

TID 11021
Imaging Agent Administration Adverse Events
Type : Extensible Order : Non-Significant Root : No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (130212, DCM, "Imaging Agent Administration Adverse Events")	1	M		

2	>	CONTAINS	CODE	EV (130220, DCM, “Administration discontinued”)	1	U		DCID (231) “Yes-No Only”
3	>	CONTAINS	CODE	EV (C41331, NCIt, “Adverse Event”)	1-n	M		DCID 60 Imaging Agent Administration Adverse Events
4	>>	CONTAINS	CODE	EV (G-C197, SRT, “Severity”)	1	U		BCID (3716) Severity
5	>>	CONTAINS	CODE	EV (G-D709, SRT, “Relative Time”)	1	U		DCID 61 Time Relative To Procedure
6	>>	HAS PROPERTIES	DATETIME	EV (130215, DCM, “Adverse Event Detection Date Time”)	1	M		
7	>>	HAS PROPERTIES	NUM	EV (130214, DCM, “Estimated Extravasation Volume”)	1	UC	IF Row 3 is EV (D0-B0330, SRT, “Injection Site Extravasation”)	Units = EV (ml, UCUM, “ml”)
8	>>	CONTAINS	UIDREF	EV (130216, DCM, “Referenced Imaging Agent Administration Step UID”)	1	U		
9	>>	CONTAINS	UIDREF	EV (130262, DCM, “Referenced Imaging Agent Administration Phase UID”)	1	U		
10	>>	CONTAINS	TEXT	EV (121106, DCM, “Comment”)	1	U		

Content Item Descriptions

Row 2	Indicates whether the administration is discontinued due to the adverse event. There is no indication of which adverse event if any contributed to the decision to discontinue the administration.
Row 3	Note that presence of this row means the injector was informed about the adverse event by the operating clinician.
Row 6	Date and time when the adverse event was noted by the observer.
Row 8	UID of the performed step (as recorded in row 3 of TID 11007) in which the adverse event occurred.
Row 9	UID of the performed phase (as recorded in row 3 of TID 11008) in which the adverse event occurred.

Add TID 11022 as shown.

TID 11022 Imaging Agent Administration Injector Events

This template describes events occurring during the administration that are detected by an automated power injector.

TID 11022
Imaging Agent Administration Injector Events
Type: Extensible Order: Non-Significant Root : No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (130233, DCM, "Imaging Agent Administration Injector Events")	1	M		
2	>	CONTAINS	CODE	EV (130220, DCM, "Administration discontinued")	1	U		DCID (231) "Yes-No Only"
3	>	CONTAINS	CODE	EV (130234, DCM, "Imaging Agent Administration Injector Event Type")	1-n	M		DCID 71 "Imaging Agent Administration Injector Event Type"
4	>>	HAS PROPERTIES	DATETIME	EV (130235, DCM, "Injector Event Detection Date Time")	1	M		
5	>>	HAS PROPERTIES	UIDREF	EV (130216, DCM, "Referenced Imaging Agent Administration Step UID")	1	U		
6	>>	HAS PROPERTIES	UIDREF	EV (130262, DCM, "Referenced Imaging Agent Administration Phase UID")	1	U		
7	>>	HAS PROPERTIES	TEXT	EV (130255, DCM, "Referenced Imaging Agent Identifier")	1	U		Shall be as defined in (130254, DCM, "Imaging Agent Identifier") Row 2 of TID 11002.

Content Item Descriptions

Row 4	Date and time of occurrence of the injector event.
Row 5	UID of the performed step (as recorded in row 3 of TID 11007) in which the injector event occurred.
Row 6	UID of the performed phase (as recorded in row 3 of TID 11008) in which the injector event occurred.
Row 7	The imaging agent being administered when the event was detected.

TID 11023 Imaging Agent Administration Graph

This template describes two-dimensional graph data for a syringe or pump.

TID 11023
Imaging Agent Administration Graph
Type: Extensible Order: Non-Significant Root : No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (130232, DCM, “Imaging Agent Administration Graph”)	1	M		
2	>	CONTAINS	TEXT	EV (130255, DCM, “Referenced Imaging Agent Identifier”)	1	M		EV (130254, DCM, “Imaging Agent Identifier”)
3	>	CONTAINS	INCLUDE	DTID (3990) Two dimensional measurement graph	1	M		$MeasurementGraph = EV (130229, DCM, "Flow Rate vs time") $X-Concept = EV (130194, DCM,"Time after the start of injection") $Y-Concept = EV (122094, DCM, "Rate of administration") $X-AxisUnit = DT (ms, UCUM,"ms") $Y-AxisUnit = DT (ml/s, UCUM,"ml/s")
4	>	CONTAINS	INCLUDE	DTID (3990) Two dimensional measurement graph	1	U		$MeasurementGraph = EV (130230, DCM, "Pressure vs Time") $X-Concept = EV (130194, DCM,"Time after the start of injection") $Y-Concept = EV (R0-010AC, SRT, "Pressure") $X-AxisUnit = DT (ms, UCUM,"ms") $Y-AxisUnit = DT (kPa, UCUM,"kPa")

460

Content Item Descriptions

Row 2	Identifies the imaging agent represented in the graph. Will be as defined in TID 11002.

Update the following context group with additional codes in Part16 Annex B.

CID 9300 Procedure Discontinuation Reasons

Context ID 9300
Procedure Discontinuation Reasons
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
DCM	110526	Resource pre-empted
DCM	110527	Resource inadequate
DCM	110528	Discontinued Procedure Step rescheduled
DCM	110529	Discontinued Procedure Step rescheduling recommended
Include CID 9301 "Modality PPS Discontinuation Reasons"		
Include CID 9302 "Media Import PPS Discontinuation Reasons"		
Include CID 60 "Imaging Agent Administration Adverse Events"		

Add the following new context groups to Part 16 Annex B:

CID 60 Imaging Agent Administration Adverse Events

This Context Group includes contrast reactions listed in the ACR Manual of Contrast Media.

Context ID 60
Imaging Agent Administration Adverse Events
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	F-0499A	Drug induced Nausea and vomiting		
SRT	F-5005E	Taste and sense altered		
SRT	F-400A9	Sweating		
SRT	F-24100	Cough		
SRT	F-A21A7	Itching		
SRT	D0-71000	Drug Rash		
SCT	724232004	Sensation of being warm (finding)		
SRT	F-037AB	Pallor (Pale Complexion)		

SRT	F-24442	Nasal Congestion		
SRT	F-A2700	Headache		
SRT	D0-3002F	Drug induced Flushing		
SRT	F-017C0	Facial Swelling		
SRT	DF-1147C	Drug Induced Dizziness		
SRT	F-03261	Chills and fever		
SRT	F-0B320	Anxiety		
SRT	F-A4600	Shaking		
SRT	D3-31121	Tachycardia-bradycardia		
SRT	F-20250	Bronchospasm	4386001	
SRT	D3-02000	Hypertension		
SRT	D2-04460	Laryngeal edema		
SRT	D0-2202B	Diffuse inflammatory erythema		
SRT	D3-04006	Drug-induced hypotension		
SRT	F-201B3	Dyspnea		
SRT	D2-04460	Laryngeal edema (severe or rapidly progressing)		
SRT	DA-30000	Epileptic convulsions		
SRT	D3-04000	Hypotension		
SRT	F-100EC	No motor response to command		
SRT	R-FAE6C	Cardiac Arrhythmia	698247007	
SRT	D2-60262	Cardiorespiratory arrest	410430005	
SRT	D0-B0330	Injection Site Extravasation		
DCM	110515	Patient condition prevented continuing		
Include CID 10043 "Intravenous Extravasation Symptoms"				

CID 61 Time Relative To Procedure

480 **Context ID 61**
Time Relative To Procedure
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	R-422A4	After Procedure		
SRT	R-40FBA	During Procedure		
SRT	R-40FB9	Before Procedure		

CID 62 Imaging Agent Administration Phase Type

Context ID 62
Imaging Agent Administration Phase Type
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
DCM	130168	Automatic Administration Phase
DCM	130169	Automatic Programmed Hold Phase
DCM	130170	Automatic with Manual Hold Phase
DCM	130171	Automatic with Manual Inject Phase

CID 63 Imaging Agent Administration Mode

Context ID 63
Imaging Agent Administration Mode
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
DCM	130173	Automated Administration
DCM	130174	Manual Administration

CID 64 Imaging Agent Administration Patient State

Context ID 64
Imaging Agent Administration Patient State
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	F-70102	Abnormal Renal Function		
DCM	113560	Acute unilateral renal blockage		
DCM	113561	Low Thyroid Uptake		
DCM	113562	High Thyroid Uptake		

DCM	113563	Severely Jaundiced		
SRT	R-102B6	History of renal failure		
SRT	G-023F	History of diabetes mellitus		
SRT	D2-00036	Asthma (disorder)		
SRT	D3-29021	Aortic stenosis		
SRT	D3-13012	Angina pectoris		
SRT	G-026D	History of congestive heart failure		
SRT	G-0269	History of Hypertension		
SRT	D3-40300	Pulmonary hypertension		
SRT	D3-20000	Cardiomyopathy		
SRT	F-0B320	Anxiety		
SRT	M-97651	Paraproteinemia		
SRT	M-97323	Myeloma		
SRT	P0-099F5	History of Beta-blocking agents therapy		
SRT	DF-00BEA	Malignant epithelial neoplasm of thyroid	448216007	
DCM	110503	Patient allergic to media/contrast		

500

CID 65 Pre-Medication for Imaging Agent Administration

The following list of pre-medication agents was obtained from the ACR Manual of Contrast Media.

Context ID 65

505 **Pre-Medication for Imaging Agent Administration**

Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-CT Concept ID	UMLS Concept Unique ID	Trade Name (Informative)
SRT	C-37138	Prednisone			
SRT	C-51450	Diphenhydramine			Benadryl
SRT	C-37128	Methylprednisolone			
SRT	C-A01D1	Methylprednisolone sodium succinate			Solu-Medrol
SRT	C-A0173	Hydrocortisone sodium succinate			Solu-Cortef

SRT	C-913A4	Dexamethasone sodium sulfate			Decadron
SRT	C-51071	H-1 Antihistamine			
SRT	C-68050	Ephedrine			
SRT	R-F2989	Papaverine			
Include CID 66 "Medication for Imaging Agent Administration"					

CID 66 Medication for Imaging Agent Administration

510 **Context ID 66**
Medication for Imaging Agent Administration
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	F-61B48	Propofol	387423006	C0033487
SRT	F-6183C	Midazolam	373476007	C0026056
SRT	49998007	Sufentanil		
SRT	386839004	Remifentanil		
SRT	F-61C65	Alfentanil	387560008	

CID 67 Imaging Agent Administration Completion Status

515 **Context ID 67**
Imaging Agent Administration Completion Status
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	R-404F1	Complete		
DCM	130156	Terminated due to pressure above termination limit		
DCM	130157	Terminated due to flow rate above termination limit		
DCM	130176	Terminated due to air detected		
DCM	130158	Terminated due to excessive duration pause		

DCM	130154	Terminated due to request from operator		
DCM	130159	Terminated due to injector communication loss		
DCM	130160	Terminated due to unspecified injector failure		
DCM	130177	Terminated by scanner		
DCM	130178	Terminated due to critical battery level		
DCM	130179	Terminated due to consumable removal		

CID 68 Imaging Agent Administration Pharmaceutical Unit of Presentation

Context ID 68
Imaging Agent Administration Pharmaceutical Unit of Presentation
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-CT Concept ID	UMLS Concept Unique ID
SCT	733020007	Syringe	733020007	
SRT	R-FEEFF	Cartridge	706440002	
SRT	R-FCBB8	Parenteral/enteral solution bag	464557001	
SRT	A-27500	Bottle	68276009	

Note: The concept for syringe (unit of presentation) is used in this context group as distinct from syringe (physical object), which is used in CID 69. This is intended for pre-filled syringes.

CID 69 Imaging Agent Administration Consumables

Context ID 69
Imaging Agent Administration Consumables
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	A-10150	Syringe	61968008	
SRT	A-26800	Catheter		

SRT	R-FDF5C	Contrast medium injection system manifold kit		
SRT	A-26400	Tube, device (physical object)		
SRT	A-30360	Needle	79068005	
SRT	A-27500	Bottle	68276009	

Note: The concept for syringe (physical object) is used in this context group as distinct from syringe (unit of presentation), which is used in CID 68. The concept for bottle is used in the context of consumable used during an oral administration of contrast.

535

CID 70 Flush

Context ID 70
Flush
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	C-A7220	Dextran		
SRT	C-70841	Saline		
SRT	C-70434	Lactated Ringer's		

540

CID 71 Imaging Agent Administration Injector Event Type

Context ID 71
Imaging Agent Administration Injector Event Type
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
DCM	130150	Pressure above warning limit
DCM	130151	Pressure above adjustment limit
DCM	130152	Flow rate above warning limit
DCM	130153	Flow rate above adjustment limit
DCM	130161	Keep vein open started

DCM	130162	Keep vein open ended
DCM	130175	Air detected
DCM	130155	Fixed duration pause ended
DCM	130163	Syringe attached
DCM	130164	Syringe detached
DCM	110501	Equipment failure
DCM	110527	Resource inadequate
DCM	130156	Terminated due to pressure above termination limit
DCM	130157	Terminated due to flow rate above termination limit
DCM	130176	Terminated due to air detected
DCM	130158	Terminated due to excessive duration pause
DCM	130154	Terminated due to request from operator
DCM	130159	Terminated due to injector communication loss
DCM	130160	Terminated due to unspecified injector failure
DCM	130177	Terminated by scanner
DCM	130178	Terminated due to critical battery level
DCM	130179	Terminated due to consumable removal

CID 72 Imaging Agent Administration Step Type

Context ID 72
Imaging Agent Administration Step Type
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
DCM	130247	Patency Test Injection
DCM	130248	Transit Time Test Injection
DCM	130249	Diagnostic Administration
DCM	130251	Flush Administration

Modify PS 3.16 CID 3850 to change name at the request of David to suit the way it is being used in the Intravascular OCT image IOD.

CID 3850 ~~Intravascular OCT Flush Agent~~ Contrast Bolus Substance

Type: Extensible

Version: 20181115

Table CID 3850. ~~Intravascular OCT Flush Agent~~ Contrast Bolus Substance

Add the following new context groups

CID 73 Bolus Shaping Curves

Context ID 73
Bolus Shaping Curves
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
DCM	130252	Negative exponential
DCM	130253	Linear Curve

CID 74 Imaging Agent Administration Consumable Catheter Type

Context ID 74
Imaging Agent Administration Consumable Catheter Type
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	A-26836	Peripheral intravenous catheter	82449006	
SRT	A-26810	Central venous catheter	52124006	
SRT	A-1450B	Implantable venous access port		
SRT	A-26810	Peripherally inserted central catheter		
SRT	R-FEAEC	Rectal Catheter		

CID 75 Low-High-Equal

Context ID 75
Low-High-Equal
Type: Non-Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	G-A374	Low	62482003	
SRT	G-A373	High	75540009	
SRT	G-A214	Equal	9726003	

CID 76 Type of Pre-Medication

Context ID 76
Type of Pre-Medication
Type: Extensible Version: 20181115

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-CT Concept ID	UMLS Concept Unique ID
DCM	123012	Pre-Medication		
DCM	130259	Contrast Reaction Prophylactic Agent		
SRT	F-6171D	Sedative	372614000	
SRT	C-85800	Antiemetic	52017007	

Add to PS 3.16 Annex D

Annex D DICOM Controlled Terminology Definitions (Normative)

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

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

Code Value	Code Meaning	Definition	Notes
130150	Pressure above warning limit	The injector device detected a pressure above the warning threshold, generated a warning and did not automatically terminate the administration.	
130151	Pressure above adjustment limit	The injector device detected a pressure above the adjustment limit, took compensating action and did not automatically terminate the administration.	
130152	Flow rate above warning limit	The injector device detected a flow rate above the warning threshold, generated a warning and did not automatically terminate the administration.	
130153	Flow rate above adjustment limit	The injector device detected a flow rate above the adjustment limit, took compensating action and did not automatically terminate the administration.	
130154	Terminated due to request from operator	The injector device terminated the administration due to detection of an abort request by the operator.	
130155	Fixed duration pause ended	The device detected that a pause duration has been reached and the device resumed automatically.	
130156	Terminated due to pressure above termination limit	The injector device detected a pressure above the termination limit and automatically terminated the administration.	
130157	Terminated due to flow	The injector device detected a flow	

	rate above termination limit	rate above the termination limit and automatically terminated the administration.	
130158	Terminated due to excessive duration pause	The Injector device detected that a pause duration has exceeded limit and the injector device terminated the administration.	
130159	Terminated due to injector communication loss	The injector device detected a communication loss and automatically terminated the administration.	
130160	Terminated due to unspecified injector failure	The injector device detected an unspecified failure and automatically terminated the administration.	
130161	Keep vein open started	The injector device started saline flow for the purpose of keeping vein open.	
130162	Keep vein open ended	The injector device ended saline flow for the purpose of keeping vein open.	
130163	Syringe attached	The injector device detected that a syringe was attached to the injector.	
130164	Syringe detached	The injector device detected that a syringe was detached from the injector.	
130165	Total Keep Vein Open Volume Administered	Total volume of flush delivered by the keep vein open function of the injector.	
130168	Automatic Administration Phase	An administration phase where fluid is being delivered by an injector system according to the programmed instructions.	
130169	Automatic Programmed Hold Phase	An administration phase where fluid delivery is stopped by the injector system until a programmed time elapses.	
130170	Automatic with Manual Hold Phase	An administration phase where the fluid is delivered automatically by an injector system and stopped under manual control by the operator.	
130171	Automatic with Manual Inject Phase	An administration phase where the fluid is delivered by the injector system under manual control by the operator. E.g., Cardiac Cath.	
130172	Manually Triggered Injection Information	Information only available if injection was triggered manually.	
130173	Automated Administration	An administration mode where the fluid is delivered by a mechanical injector system.	
130174	Manual Administration	An administration mode where the substance is delivered manually E.g., Clinician manual injection of an imaging agent or oral consumption by a patient.	

130175	Air detected	The injector device detected air in the tubing or syringe before or during the imaging agent administration and did not automatically terminate the administration.	
130176	Terminated due to air detected	The injector device detected air in the tubing or syringe and terminated the administration.	
130177	Terminated by scanner	The injector device received instruction from scanner to terminate the administration and terminated the administration.	
130178	Terminated due to critical battery level	The injector device detected critical battery level and terminated the administration.	
130179	Terminated due to consumable removal	The injector device detected removal of a consumable from the injector device and terminated the administration.	
130181	Administration Mode	A code that specifies how the imaging agent is administered to the patient.	
130182	Planned Imaging Agent Administration Procedure Report	A report of the planned patient-specific imaging agent administration steps.	
130183	Imaging Agent Information	Description of a specific imaging agent that was planned or was administered.	
130184	Osmolality at 37C	Number of osmoles of solute per kilogram of solvent at 37C.	
130185	Osmolarity at 37C	Number of osmoles of solute per liter (L) at 37C.	
130186	Viscosity at 37C	A measure of a resistance of a fluid to gradual deformation by stress, measured at 37C.	
130187	Imaging Agent Warmed	Indicates if an imaging agent was warmed prior to the administration procedure.	
130188	Contrast Transverse Relaxivity	The degree to which a paramagnetic contrast agent can enhance the proton transverse relaxation rate constant (R2, 1/T2), normalized to the concentration of the contrast agent. Also referred to as r2. Typically expressed in units l/mmol/s.	
130189	Is Ionic	Indicates whether the imaging agent is Ionic or non-ionic.	
130190	Dosing Factor	Indicates normalized dose of imaging	

		agent per kg of patient weight. Typically recommended by the vendor. For e.g,. grams Iodine per Kg (gI / Kg).	
130191	Imaging Agent Component Usage	Information about use of imaging agent component(s).	
130192	Imaging Agent Administration Steps	Information about list of administration steps for administering imaging agent.	
130193	Pressure Limit	A limit set at the power injector device indicating the maximum allowed pressure planned for administering the imaging agent.	
130194	Time after the start of injection	Time after the start of injection of a delivered imaging agent administration.	
130195	Imaging Agent Administration Step	An individual administration step in the imaging agent administration plan.	
130196	Imaging Agent Administration Step Identifier	Identifies a step in an imaging agent administration plan.	
130197	Imaging Agent Administration Delay	Time difference between the nominal start of the administration step and the actual start of imaging agent administration.	
130198	Scan Delay	Time delay for start of image acquisition after start of imaging agent administration.	
130199	Imaging Agent Administration Steps Description	Description of imaging agent administration plan.	
130200	Imaging Agent Administration Protocol Name	Protocol name for imaging agent administration.	
130202	Imaging Agent Administration Phase	Information about a delivery phase of an imaging agent administration step.	
130203	Imaging Agent Administration Phase Identifier	Identifies a phase in an imaging agent administration step.	
130204	Imaging Agent Administration Phase Type	Type of phase in an imaging agent administration step.	

130205	Initial Volume of Imaging Agent in Container	The volume of the imaging agent in an imaging agent container before administration.	
130206	Residual Volume of Imaging Agent in Container	The volume of the imaging agent remaining in the imaging agent container after administration.	
130207	Rise Time	Time for the injector to build up from zero to the set pressure.	
130208	Starting Flow Rate of administration	Flow rate at the start of an administration of the imaging agent.	
130209	Ending Flow Rate of administration	Flow rate at the end of an administration of the imaging agent.	
130210	Bolus Shaping Curve	A vendor-specific code indicating the shape of the flow rate curve within an administration phase.	
130211	Imaging Agent Administration Completion Status	The status of the imaging agent administration procedure at completion as reported by the automated injector or by the administering person.	
130212	Imaging Agent Administration Adverse Events	Information about adverse events occurring during administration of an imaging agent.	
130214	Estimated Extravasation Volume	The estimated volume lost at the injection site. The estimation includes extravasation, paravenous administration and leakage at the injection site.	
130215	Adverse Event Detection Date Time	Date and Time when an adverse event was noticed by the observer.	
130216	Referenced Imaging Agent Administration Step UID	The unique identifier of the imaging agent administration step being referenced.	
130217	Referenced Imaging Agent Administration Phase Identifier	The identifier an imaging agent administration phase being referenced.	
130218	Programmable Device	Can be configured to execute a series of steps automatically.	
130219	Number of Injector Heads	Number of injector heads or pumps (single, dual or many) in an injector device.	
130220	Administration discontinued	Whether the agent administration was discontinued.	
130221	Imaging Agent Volume per Unit of	The volume of imaging agent in one unit of presentation. The capacity of	

	Presentation	the unit of presentation may be larger than this.	
130222	Imaging Agent Administration Consumable	Information about the imaging agent accessory or consumable used for performing the imaging agent administration.	
130223	Imaging Agent Administration Consumable Type	Type of consumable used for performing the imaging agent administration.	
130224	Consumable is New	If the consumable is installed newly during the preparation process for this Imaging Agent Administration.	
130226	Planned Imaging Agent Administration	Information about the imaging agent administration steps that is patient-specific.	
130227	Performed Imaging Agent Administration	Information about the imaging agent administration steps that were delivered to a patient.	
130228	Contrast Volume Limit	The maximum volume of contrast agent allowed to be administered. This is typically specified by the prescribing health care professional for patient safety and quality purposes.	
130229	Flow Rate vs Time	Graph depicting the measurement of flow rate of fluid against time.	
130230	Pressure vs Time	Graph depicting the measurement of pressure of fluid against time.	
130231	Barcode Value	The alphanumeric string from reading a barcode.	
130232	Imaging Agent Administration Graph	Information about two-dimensional graph data for a syringe or pump.	
130233	Imaging Agent Administration Injector Events	Information about events that occurred at an injector during an imaging agent administration.	
130234	Imaging Agent Administration Injector Event Type	Type of event that occurred at an injector during an imaging agent administration.	
130235	Injector Event Detection Date Time	Date and time when an injector event was detected.	
130236	Planned Imaging Agent Administration SOP Instance	Reference to a Planned Imaging Agent Administration SOP instance.	
130237	Imaging Agent Administration	Information about the activity of one of the pump or syringe units used in an	

	Syringe/Pump Phase Activity	imaging agent administration phase.	
130238	Imaging Agent Component	Information about a component of an imaging agent.	
130239	Component Volume	Volume of one agent component in a mixture of multiple components.	
130240	Total Phase Volume Administered	Total volume administered by all syringes/pump actions during a single phase.	
130241	Total Step Volume Administered	Total volume administered by all syringes/pump actions within all phases during a single Step.	
130242	Total number of manually triggered injections	Total number of times that an injection was triggered manually.	
130244	Peak Flow Rate in Phase Activity	Peak flow rate value detected at a specific location (syringe or pump) during a specific activity of an administration phase.	
130245	Peak Pressure in Phase Activity	Peak pressure value detected at a location (syringe or pump) during a single administration phase activity.	
130246	Imaging Agent Administration Performed Step UID	Unique identification of a single performed imaging agent administration step actually delivered on a specific occasion	
130247	Patency Test Injection	An injection of an inactive agent to test for blockages or leakages in the delivery path, usually performed prior to an administration of an imaging or therapeutic agent.	
130248	Transit Time Test Injection	An injection of a bolus of imaging agent to determine the appropriate delay time for a diagnostic administration.	
130249	Diagnostic Administration	Administration of an imaging agent for the purpose of enhancing contrast in an image.	
130250	Administration Step Type	Type of step in an imaging agent administration. For example, a test administration or a diagnostic administration.	
130251	Flush Administration	Injection of an inactive fluid to clear the administration path of an active agent.	

130252	Negative exponential	A curve that decays exponentially from a specified start value, at a specified decay rate.	
130253	Linear Curve	A curve that changes linearly from a specified start value to a specified end value. Note: The start value and the end value may be the same, indicating a flat curve.	
130254	Imaging Agent Identifier	Identifies an imaging agent uniquely within a set of imaging agents. The imaging agent may be a single component or a mix of multiple components.	
130255	Referenced Imaging Agent Identifier	The identifier of an imaging agent being referenced.	
130257	Consumable Catheter Type	Type of catheter used for imaging agent administration.	
130259	Contrast Reaction Prophylactic Agent	A pharmaceutical agent administered as a pre-medication to prevent contrast reactions.	
130261	Imaging Agent Administration Performed Phase UID	Unique identification of a single imaging agent administration performed phase.	
130262	Referenced Imaging Agent Administration Phase UID	The unique identifier of the imaging agent administration performed phase being referenced	

Changes to NEMA Standards Publication PS 3.17

Digital Imaging and Communications in Medicine (DICOM)

Part 17: Explanatory Information

Add new Section to Annex LLLL of PS 3.17:

Annex LLLL Imaging Agent Administration Report Template (Informative)

LLLL.1 PURPOSE OF THIS ANNEX

This Annex describes some use cases of the contrast agent administration reporting. The contrast agent administration report object records the planned and performed delivery of contrast agents.

A Planned Imaging Agent Administration SR object is intended for representing the plan or program to deliver contrast agent to the patient for a contrast study. It could be prepared and customized for a patient by the radiologist, prior to the study. The plan may also be altered by the operating technologist prior to the study. For example, the injection plan might be adjusted for patient's condition such as weight. The plan is then loaded into the injector system to be performed.

A Performed Imaging Agent Administration SR object is for reporting the actual program that was used to deliver the contrast agent during the study. During the study, the contrast-delivery system may alter the original delivery plan as a result of events that occur during the delivery of imaging agent such as limiting the flow rate due to high pressure, aborting the injection due to adverse events etc. The Performed Image Agent Administration SR is then saved.

The infusion manager sends the Performed Imaging Agent Administration SR to the PACS and optionally to other destinations like acquisition modality, RIS, reporting system.

Figure LLLL-1 illustrates possible consumers of the Performed Imaging Agent Administration SR object (referred as "Imaging Agent Administration SR" in figure below) post administration.

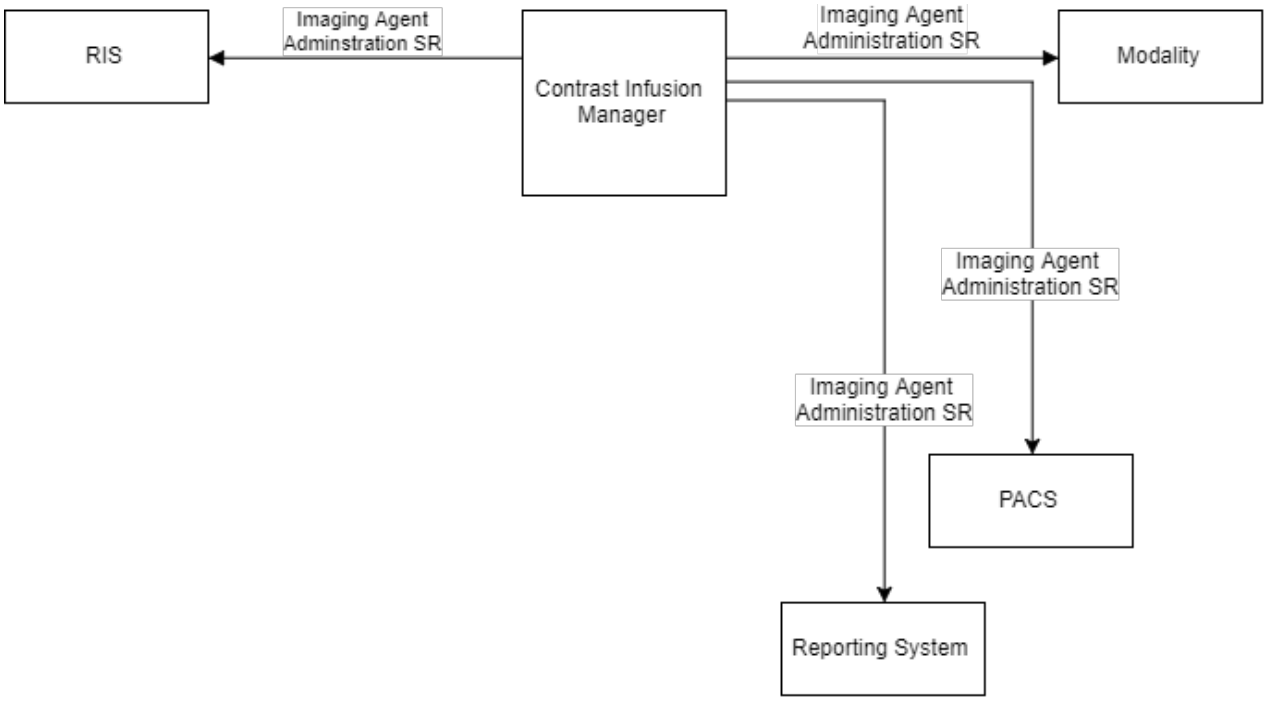


Figure LLLL-1

LLLL.2 Use Cases

Note: In the following use cases, the word event means a combination of injector and adverse events.

Use Case 1 – Manual Bolus Injection

The use case shown in figure LLLL-2 is an example of how a performed object can capture a manual contrast infusion. The operator performs a manual administration of contrast for a study. The operator selects the patient from the contrast infusion manager (available through modality worklist) and reports the minimum parameters about the injection. The contrast infusion manager then generates a Performed Imaging Administration SR object and sends to the Contrast Usage Consumer such as PACS.

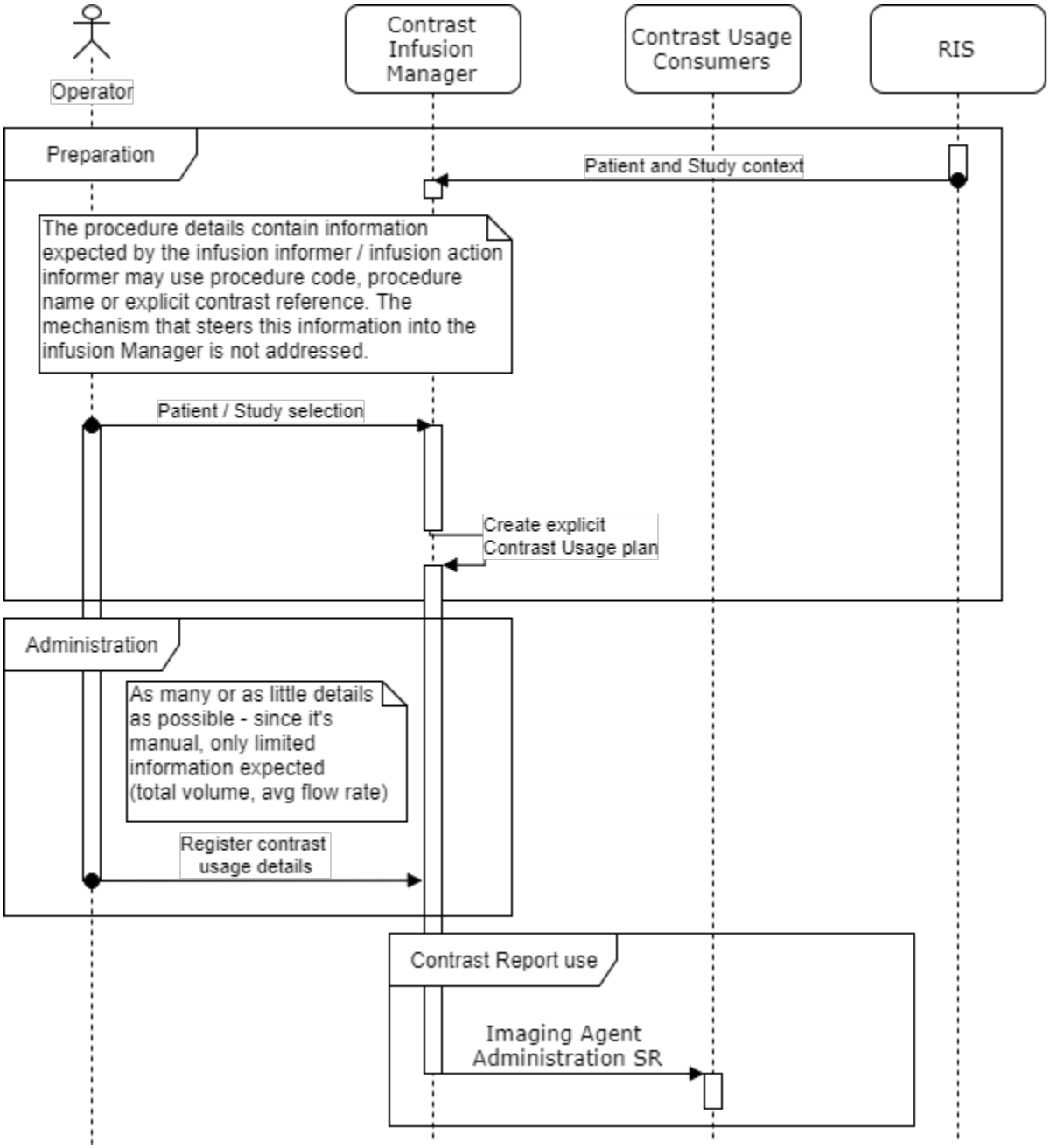
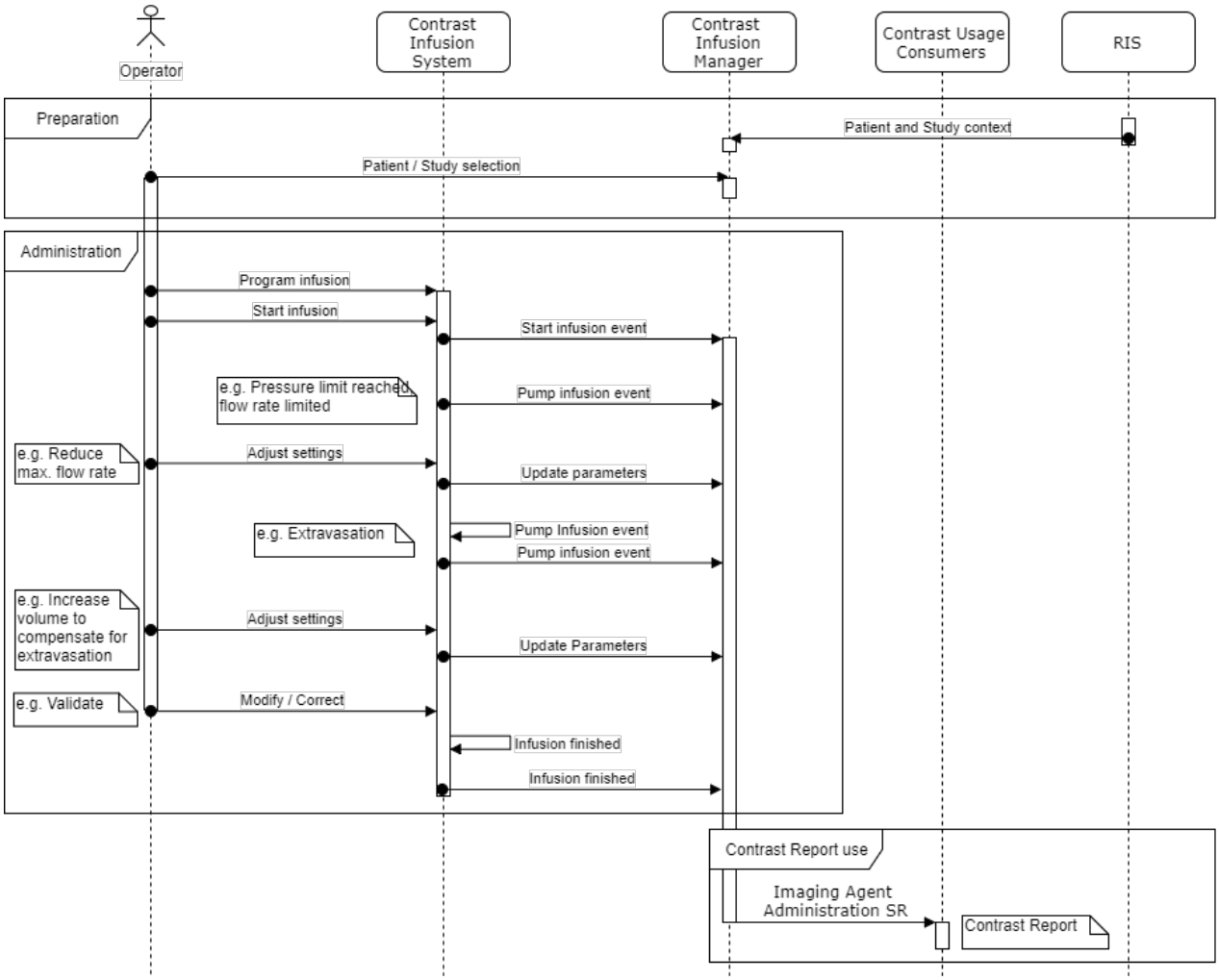


figure LLLL-2

Use Case 2 – Automatic Infusion Pump – Contrast Reporting

The use case shown in figure LLLL-3 is an example of how a performed object could be used for capturing an automatic infusion. The technologist selects a patient at the infusion manager from the work list available from the scheduling system and then performs an automated administration of contrast for the selected patient. The infusion manager records various events during the administration. The data from the injector events and from the adverse events that occurred during the administration are captured and obtained by the infusion manager.

660 Upon completion of the administration procedure, the infusion manager generates a Performed Imaging Agent Administration SR object using the injection data obtained from the injection system and including the events and updated parameters that were captured during the administration. The generated report is then sent to the PACS and other contrast usage consumers.



665

Figure LLLL-3

Use Case 3 – Protocoling

670 The use case shown in figure LLLL-4 is an example of how a planned object could be used. The radiologist uses the protocoling application in order to plan the contrast administration protocol for a patient. The protocoling application outputs the planned object into the infusion manager for immediate use or to the RIS or PACS. The planned object is used by the technologist during the study.

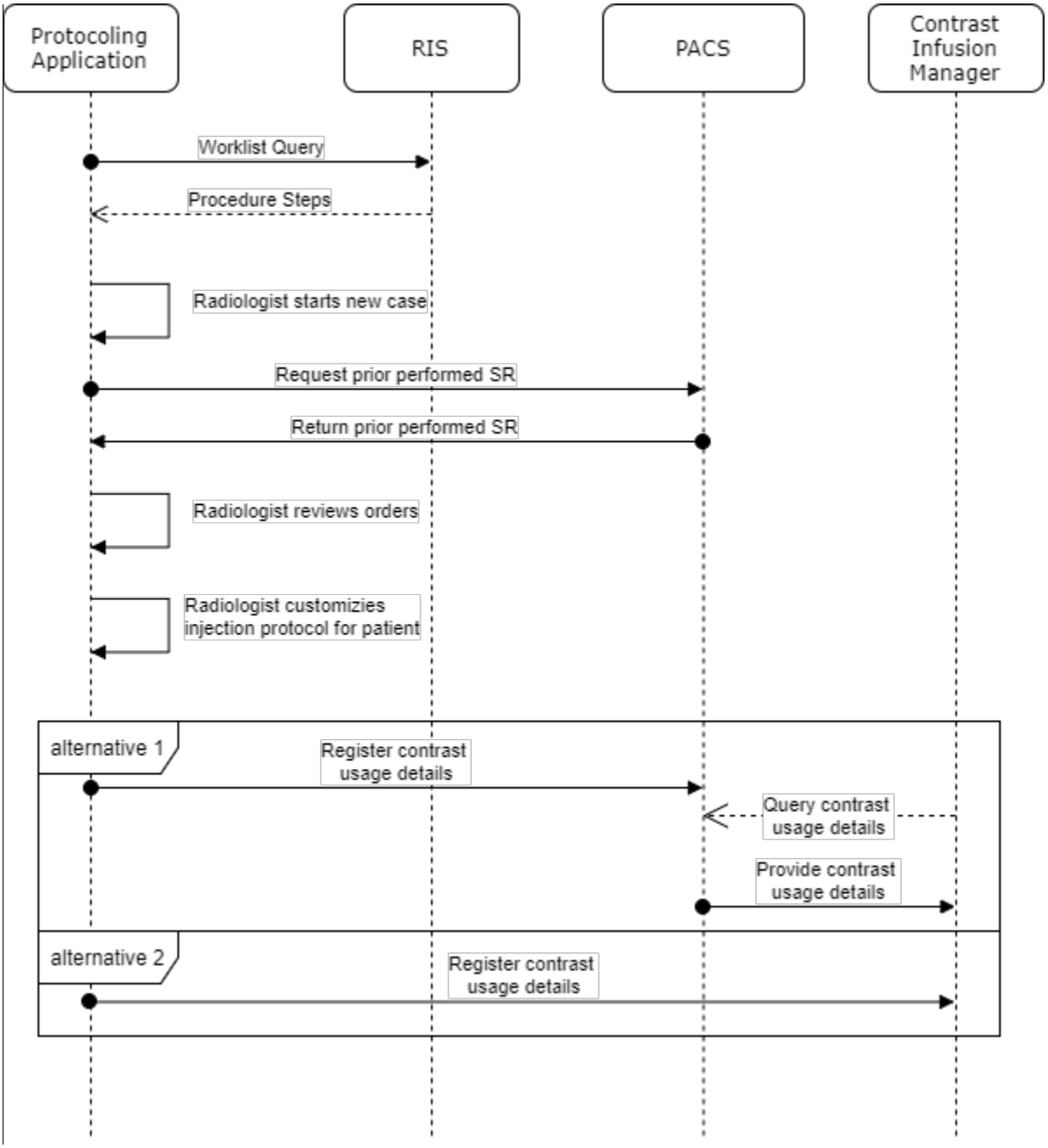


figure LLLL-4

Use Case 4 - Consumption of the Contrast Information by Reporting Systems for automated documentation

This use case gives an example of how a Performed Imaging Agent Administration SR object could be used for capturing summary values of contrast into a radiology reporting system. In this case, the radiology reporting system would be a Contrast Usage Consumer (figure LLLL-3).

The most straightforward and ubiquitous need for the contrast administration record is in the radiologist reporting workflow. Inclusion of delivered contrast data into templates or sections of the report is mandated in some regions of the world as evidence for billing reconciliation. More generally, the radiologist can include this data for completeness of study documentation. Ostensibly, contrast data included in reports may be used to construct a longitudinal record of contrast exposure for a patient undergoing multiple imaging studies.

Data of primary importance in this workflow are the summary values of contrast administered to the patient (total volume of contrast, saline, flow rate and concentration/type of contrast used). Often, information describing the vascular access device used (e.g., catheter gauge) is clinically relevant and/or mandated.

The guidance from ACR [ACR Guideline] about the procedures and materials description in the report body states, “The report should include a description of the studies and/or procedures performed and any contrast media and/or radiopharmaceuticals (including specific administered activities, concentration, volume, and route of administration when applicable), medications, catheters, or devices used, if not recorded elsewhere.”

LLLL.3 Informative References

[ACR Guideline] *ACR Practice Parameters and Technical Standards*. Resolution 11, Revision 2014. Section II.3.a “American College of Radiology’s Practice Guideline for Communication of Diagnostic Imaging Findings”. https://www.acr.org/-/media/ACR/Files/Practice-Parameters/CommunicationDiag.pdf

Annex MMMM Performed Imaging Agent Administration Structured Report (Informative)

This Annex describes the use of Imaging Agent Administration Structured Report objects.

MMMM.1 Performed Imaging Agent Administration Structured Report

This Section contains examples for use cases involving contrast imaging of a single patient in CT system.

In the basic use case:

- Patient was scheduled by RIS system with a study UID and accession number.
- An Injection procedure for the study was described by an IAASR plan object.
- Patient suffers from insufficient renal function, so intravenous (i.v.) contrast agents were dissolved to achieve necessary volumes.
- Before i.v. contrast was administered a 10 mg Prednisone injection was given to the patient.
- After connecting the patient to the injection system, a patency test injection was done. (The injection system does not record detailed graph information of this.)
- “Keep vein open” was activated at a rate of 1 ml per minute.
- The Requested Procedure was a CT abdominal study with both i.v. and oral contrast administration.
  - Oral contrast media OralContrastofin was diluted to 25:1000 as given in the drug usage description. 1000 ml of oral contrast media was given 2 hours in advance of the procedure. (Preparation of 1000 ml solution uses 24.4 ml contrast and 975.6 ml water)
  - Test bolus and Imaging injection phase was done at 3 ml/s and were followed by a 30 ml flush at the same flow rate.
  - Before the diagnostic injection, a test bolus of 10 ml undiluted ContrastStuff 370 contrast was given, in order to determine scan delay time for the diagnostic injection.
  - Finally 88 ml i.v. contrast media ContrastStuff 370 (corresponding to 0.5 g iodine / kg body weight for a 65 kg person) was given during imaging. Due to the high viscosity of the contrast and renal insufficiency of the patient, ContrastStuff 370 was diluted 1:1 with 88 ml flush on the fly during injection.

The content tree structure would resemble:

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
1	Performed Imaging Agent Administration		TID 11020
1.1	Language of Content Item and Descendants	English	TID 11020 TID 1204
1.1.1	Country of Language	United States	TID 1204
1.2	Observer Type	Person	TID 1002 CID 270
1.3	Person Observer Name	Doe^Jane	TID 1003

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
1.4	Observer Type	Device	TID 1002 SINCE Observer Type is Device
1.5	Device Observer UID	1.2.3.4.47110815.1	TID 1004
1.6	Device Observer Manufacturer	Injector Corporation	TID 1004
1.7	Device Observer Model Name	XYZ INJECTOR	TID 1004
1.8	Device Observer Serial Number	1234567890	TID 1004
1.9	Station AE Title	XYZINJAET	TID 1004
1.10	Procedure Study Instance UID	1.2.3.4.47110815.2	TID 1005 Defaults to Study Instance UID (0020,000D) of General Study Module
1.11	Accession Number	123456789	TID 1005 Defaults to (0008,0050)
1.12	Medication given		TID 8131
1.12.1	Route of administration	(SRT, G-D101, “Intravenous route”)	TID 8131 CID 11
1.12.2	Mixture		TID 8131
1.12.2.1	Drug administered	Prednisone	TID 8131 row 7
1.12.2..2	Medication Type	(DCM, 130259, “Contrast Reaction Prophylactic Agent”)	TID 8131 CID 76
1.12.2.3	Dosage	2 ml	TID 8131 CID 82 (Units)
1.12.2.4	Concentration	5 mg/ml	TID 8131 CID 82 (Units)
1.13	Patient Characteristics		TID 10024
1.13.1	Patient State	(SRT, R-102B6, “History of renal failure”)	TID 10024 CID 64
1.13.2	Subject Age	25	TID 10024 CID 7456 UNITS=EV (a, UCUM, “year”)
1.13.3	Subject Sex	(DCM, M, “Male”)	TID 10024 CID 7455
1.13.4	Patient Height	175	TID 10024 UNITS=EV (cm, UCUM, “cm”)
1.13.5	Patient Weight	65	TID 10024 UNITS=EV (kg, UCUM, “kg”)
1.13.6	Body Mass Index	21.23	TID 10024 UNITS=EV (kg/m2,

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			UCUM, “kg/m2”)
1.13.7	Equation	(122265, DCM, “BMI=Wt/Ht^2”)	TID 10024
1.13.8	Serum Creatinine	2.7	TID 10024 UNITS=DT (mg/dl, UCUM, “mg/dl”)
1.13.9	Glomerular Filtration Rate	38	TID 10024 UNITS=DT (ml/min{1.73_m2}, UCUM, “ml/min/1.73m2”)
1.13.9.1	Measurement Method	(DCM, 113570, “Cockroft-Gault Formula estimation of GFR”)	TID 10024 CID 10047
1.13.9.2	Equivalent meaning of concept name	(LN,33914-3, “Glomerular Filtration Rate (MDRD)”)	TID 10024 CID 10046
1.14	Imaging Agent Information		TID 11002
1.14.1	Imaging Agent Identifier	INJECTOR_CONTRAST_AGENT	TID 11002
1.14.2	Imaging Agent Warmed	(SRT, R-0038D, “Yes)	TID 11002 CID 231
1.14.3	Imaging Agent Component Usage		TID 11002
1.14.3.1	Imaging Agent Component		TID 11004
1.14.3.1.1	Drug administered	(SRT, C-B0382, “Iopromide”)	TID 11004 CID 12
1.14.3.1.2	Active Ingredient	(SRT, C-11400, “Iodine”)	TID 11004 CID 13
1.14.3.1.3	Concentration	370	TID 11004 UNITS = EV (mg/ml, “UCUM”, “mg/ml”)
1.14.3.1.4	Osmolality at 37°	770	TID 11004 UNITS=EV (mosm/kg, UCUM, “mosm/kg”)
1.14.3.1.5	Viscosity at 37°	10	TID 11004 UNITS = EV (cP, “UCUM”, “centi Poise”)
1.14.3.1.6	Unit of Presentation	(SRT, A-27500, “Bottle”)	TID 11004 CID 68
1.14.3.1.7	Imaging Agent Volume Per Unit of Presentation	500	TID 11004 UNITS=EV (ml, UCUM, “ml”)
1.14.3.1.8	Medical Product Expiration Date	20190301	TID 11004
1.14.3.1.9	Manufacturer Name	ContrastMed Corp	TID 11004
1.14.3.1.10	Brand Name	ContrastStuff 370	TID 11004
1.14.3.1.11	Barcode Value	-07363935	TID 11004

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			PZN number
1.14.3.1.12	Lot Identifier	4B17010	TID 11004
1.14.3.2	Component Volume	97.84	TID 11002 UNITS=EV (ml, UCUM, “ml”)
1.15	Imaging Agent Information		TID 11002
1.15.1	Imaging Agent Identifier	INJECTOR_FLUSH_AGENT	TID 11002
1.15.2	Imaging Agent Warmed	(SRT, R-0038D, “Yes)	TID 11002 CID 231
1.15.3	Imaging Agent Component Usage		TID 11002
1.15.3.1	Imaging Agent Component		TID 11004
1.15.3.1.1	Drug administered	(SRT, C-70841, “Saline”)	TID 11004 CID 70
1.15.3.1.2	Unit of Presentation	(SRT, A-27500, “Bottle”)	TID 11004 CID 68
1.15.3.1.3	Imaging Agent Volume Per Unit of Presentation	500	TID 11004 UNITS=EV (ml, UCUM, “ml”)
1.15.3.1.4	Manufacturer Name	Saline Water Corp	TID 11004
1.15.3.1.5	Brand Name	Isotonic Natriumchloride Solution	TID 11004
1.15.3.1.6	Barcode Value	-00854309	TID 11004 PZN number
1.15.3.1.7	Lot Identifier	13CQ4857	TID 11004
1.15.3.2	Component Volume	200	TID 11002 UNITS=EV (ml, UCUM, “ml”)
1.16	Imaging Agent Information		TID 11002
1.16.1	Imaging Agent Identifier	ORAL_CONTRAST_AGENT	TID 11002
1.16.2	Imaging Agent Warmed	(SRT, R-00339, “No”)	TID 11002 CID 231
1.16.3	Imaging Agent Component Usage		TID 11002
1.16.3.1	Imaging Agent Component		TID 11004
1.16.3.1.1	Drug administered	(SRT, C-B0345, “Meglumine diatrizoate”)	TID 11004 CID 12
1.16.3.1.2	Active Ingredient	(SRT, C-11400, “Iodine”)	TID 11004 CID 13
1.16.3.1.3	Concentration	370	TID 11004 UNITS = EV (mg/ml, “UCUM”, “mg/ml”)
1.16.3.1.4	Viscosity at 37°	8.9	TID 11004 UNITS = EV (cP, “UCUM”, “centiPoise”)

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
1.16.3.1.5	Unit of Presentation	Bottle	TID 11004 CID 68
1.16.3.1.6	Imaging Agent Volume Per Unit of Presentation	100	TID 11004 UNITS=EV (ml, UCUM, “ml”)
1.16.3.1.7	Manufacturer Name	ContrastMed Corp	TID 11004
1.16.3.1.8	Brand Name	OralContrastofin	TID 11004
1.16.3.1.9	Barcode Value	-00408497	TID 11004 PZN number
1.16.3.1.10	Lot Identifier	6X14325	TID 11004
1.16.3.2	Component Volume	24.4	TID 11002 UNITS=EV (ml, UCUM, “ml”)
1.16.4	Imaging Agent Component Usage		TID 11002
1.16.4.1	Imaging Agent Component		TID 11002 TID 11004
1.16.4.1.1	Drug administered	(SRT, C-10120, “Water”)	TID 11004 CID 12
1.16.4.1.2	Unit of Presentation	(SRT, A-27500, “Bottle”)	TID 11004 CID 68
1.16.4.1.3	Imaging Agent Volume Per Unit of Presentation	1000	TID 11004 UNITS=EV (ml, UCUM, “ml”)
1.16.4.1.4	Manufacturer Name	Fresh Water Corp	TID 11004
1.16.4.1.5	Brand Name	BestWaterEver	TID 11004
1.16.4.1.6	Barcode Value	-4801694	TID 11004 PZN number
1.16.4.2	Component Volume	975.6	TID 11002 UNITS=EV (ml, UCUM, “ml”)
1.17	Summary	Administered 1000 ml of OralContrastofin via oral route and 88ml of ContrastStuff 370 via intravenous route in Left Arm Vein..	TID 11020
1.18	Imaging Agent Administration Consumable		TID 11005
1.18.1	Imaging Agent Administration Consumable Type	(SRT, R-FDF5C, “Contrast medium injection system manifold kit”)	TID 11005 CID 69
1.18.2	Quantity of Material	1	TID 11005
1.18.2.1	Consumable is New	(SRT, R-00339, “No”)	TID 11005 CID 231
1.18.3	Billing Code	317627C	TID 11005
1.18.4	Medical Product Expiration Date	20221031	TID 11005
1.18.5	Manufacturer Name	Injector Corp	TID 11005

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
1.18.6	Barcode Value	(01)14250299676272(19)13111501(17)181000	TID 11005
1.18.7	Lot Identifier	13111501	TID 11005
1.19	Imaging Agent Administration Consumable		TID 11005
1.19.1	Imaging Agent Administration Consumable Type	(SRT, A-30360, “Needle”)	TID 11005 CID 69
1.19.2	Quantity of Material	1	TID 11005
1.19.2.1	Consumable is New	(SRT, R-0038D, “Yes)	TID 11005 CID 231
1.19.3	Billing Code	206342	TID 11005
1.19.4	Medical Product Expiration Date	20181130	TID 11005
1.19.5	Manufacturer Name	Dr. Poke Inc.	TID 11005
1.19.6	Brand Name	Sterile Standard, Green	TID 11005
1.20	Imaging Agent Administration Consumable		TID 11005
1.20.1	Imaging Agent Administration Consumable Type	(SRT, A-27500, “Bottle”)	TID 11005 CID 69
1.20.2	Quantity of Material	1	TID 11005
1.20.2.1	Consumable is New	(SRT, R-0038D, “Yes)	TID 11005 CID 231
1.20.3	Billing Code	47110815	TID 11005
1.20.4	Medical Product Expiration Date	20191001	TID 11005
1.21	Imaging Agent Administration Steps		TID 11006
1.21.1	Imaging Agent Administration Steps Name	Abdomen intestinal and vessel contrast processing	TID 11006
1.21.2	Imaging Agent Administration Steps Description	This contrast processing is given by an oral administration of first 2 hours in advance of the procedure. I.v. administration is done with a pre-inject to determine scan delay time. Patent test injection applies as a default procedure.	TID 11006
1.21.3	Imaging Agent Administration Step		TID 11007
1.21.3.1.	Imaging Agent Administration Step Identifier	ORAL_STEP_1	TID 11007
1.21.3.2	Imaging Agent Administration Performed Step UID	1.2.3.4.47110815.3	TID 11007 SINCE “Root Concept Name Code Sequence” IS “Performed Imaging

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			Agent Administration"
1.21.3.3	Administration Mode	(DCM, 130174, "Manual Administration")	TID 11007 CID 63
1.21.3.4	Person Role in Organization	(SRT, 121025, "Patient")	TID 11007 CID 7450 SINCE "Administration Mode" IS "Manual Administration", condition holds (self-administration)
1.21.3.5	Administration Step Type	(DCM, 130249, "Diagnostic Administration")	TID 11007 CID 72
1.21.3.6	Scan Delay	7200	TID 11007 UNITS = EV (s, UCUM, "s")
1.21.3.7	Route of Administration	(SRT, G-D140, "Oral route")	TID 11007 CID 11
1.21.3.8	Imaging Agent Administration Phase		TID 11008
1.21.3.8.1	Imaging Agent Administration Phase Identifier	ORAL_PHASE	TID 11008
1.21.3.8.2	Imaging Agent Administration Performed Phase UID	1.2.3.4.47110815.4	TID 11008 SINCE "Root Concept Name Code Sequence" IS "Performed Imaging Agent Administration"
1.21.3.8.3	Imaging Agent Administration Syringe/Pump Phase Activity		TID 11003
1.21.3.8.3.1	Referenced Imaging Agent Identifier	ORAL_CONTRAST_AGENT	TID 11003 Value of 1.16.1
1.21.3.8.3.2	Volume Administered	1000	TID 11003 UNITS = EV (ml, UCUM, "ml") Same value as 1.21.3.8.4
1.21.3.8.3.3	Starting Flow Rate of administration	0.37	TID 11003 UNITS = EV (ml/s, UCUM "ml/s") Calculated value: 1000ml /2700s
1.21.3.8.3.4	DateTime Started	20181012101531	TID 11003

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			SINCE root Concept Name IS “Performed Imaging Agent Administration”
1.21.3.8.3.5	Duration	2700	TID 11003 UNITS = EV (s, UCUM, “s”) SINCE root Concept Name IS “Performed Imaging Agent Administration”
1.21.3.8.4	Total Phase Volume Administered	1000	TID 11008 UNITS = EV (ml, UCUM, “ml”) Same value as 1.21.3.8.3.2
1.21.3.8.5	DateTime Started	20181012101531	TID 11008 SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.3.8.6	Duration	2700	TID 11008 UNITS = EV (s, UCUM, “s”) SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.4	Imaging Agent Administration Step		TID 11007
1.21.4.1	Imaging Agent Administration Step Identifier	EXTRAVASATION_TEST_STEP_2	TID 11007
1.21.4.2	Imaging Agent Administration Performed Step UID	1.2.3.4.47110815.5	TID 11007 SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.4.3	Administration Mode	(DCM,130173, “Automated Administration”)	TID 11007 CID 63

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
1.21.4.4	Administration Step Type	(DCM,130247, “Patency Test Injection”)	TID 11007 CID 72
1.21.4.5	Route of Administration	(SRT, G-D101,Intravenous route”)	TID 11007 CID 11
1.21.4.5.1	Site of	(SRT, G-D0C6, “Via arm vein”)	TID 11007 CID 3746 SINCE “Route of Administration” IS “Intravenous route”
1.21.4.5.1.1	Laterality	(SRT, G-A101, “Left”)	TID 11007 CID 244 SINCE “Site of” IS “Via arm vein”
1.21.4.6	Imaging Agent Administration Phase		TID 11008
1.21.4.6.1	Imaging Agent Administration Phase Identifier	EXTRAVASATION_TEST_PHASE	TID 11008
1.21.4.6.2	Imaging Agent Administration Performed Phase UID	1.2.3.4.47110815.6	TID 11008 SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.4.6.3	Imaging Agent Administration Phase Type	(DCM,130171, “Automatic with Manual Inject Phase”)	TID 11008 CID 62 SINCE 1.21.4.3 (Administration Mode) IS “Automated Administration”
1.21.4.6.4	Imaging Agent Administration Syringe/Pump Phase Activity		TID 11003
1.21.4.6.4.1	Referenced Imaging Agent Identifier	INJECTOR_FLUSH_AGENT	TID 11003 Value of 1.15.1
1.21.4.6.4.2	Volume Administered	30	TID 11003 UNITS = EV (ml, UCUM, “ml”) Same value as 1.21.4.6.5 and 1.21.4.9.1
1.21.4.6.4.3	Starting Flow Rate of administration	3	TID 11003 UNITS = EV (ml/s, UCUM “ml/s”)
1.21.4.6.4.4	Peak Flow Rate in Phase Activity	3	TID 11003 UNITS = EV (ml/s,

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			UCUM “ml/s”) SINCE 1.21.4.3 (Administration Mode) IS “Automated Administration” AND “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.4.6.4.5	Peak Pressure in Phase Activity	2.5	TID 11003 UNITS = EV (kPa, UCUM “kPa”) SINCE 1.21.4.3 (Administration Mode) IS “Automated Administration” AND “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.4.6.4.6	Initial Volume of Imaging Agent in Container	197	TID 11003 UNITS = EV (ml, UCUM, “ml”) SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.4.6.4.7	Residual Volume of Imaging Agent in Container	167	TID 11003 UNITS = EV (ml, UCUM, “ml”) SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.4.6.4.8	DateTime Started	20181012121537	TID 11003 SINCE root Concept Name IS “Performed Imaging Agent Administration”
1.21.4.6.4.9	Duration	10	TID 11003 UNITS = EV (s, UCUM, “s”) SINCE root Concept Name IS “Performed

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			Imaging Agent Administration"
1.21.4.6.5	Total Phase Volume Administered	30	TID 11008 UNITS = EV (ml, UCUM, "ml") In this case the same value as 1.21.4.6.4.2 and 1.21.4.9.1
1.21.4.6.6	DateTime Started	20181012121537	TID 11008 SINCE root Concept Name Code Sequence IS "Performed Imaging Agent Administration"
1.21.4.6.7	Duration	10	TID 11008 UNITS = EV (s, UCUM, "s") SINCE root Concept Name Code Sequence IS "Performed Imaging Agent Administration")
1.21.4.7	Number of Injector Heads	2	TID 11007
1.21.4.8	Programmable Device	(SRT, R-0038D, "Yes)	TID 11007 CID 231
1.21.4.9	Manually triggered injection information		TID 11007 SINCE 1.21.4.3 (Administration Mode) IS "Automated Administration" AND root Concept Name Code Sequence IS "Performed Imaging Agent Administration"
1.21.4.9.1	Total Step Volume Administered	30	TID 11007 UNITS = EV (ml, UCUM, "ml") In this case the same value as 1.21.4.6.4.2 and 1.21.4.6.5
1.21.4.9.2	Total number of manually triggered injections	1	TID 11007
1.21.5	Imaging Agent Administration		TID 11007

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
	Step		
1.21.5.1	Imaging Agent Administration Step Identifier	DELAY_ESTIMATE_STEP_3	TID 11007
1.21.5.2	Imaging Agent Administration Performed Step UID	1.2.3.4.47110815.7	TID 11007 SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.5.3	Administration Mode	(DCM,130173, “Automated Administration”)	TID 11007 CID 63
1.21.5.4	Administration Step Type	(DCM,130248, “Transit Time Test Injection”)	TID 11007 CID 72
1.21.5.5	Pressure Limit	15	TID 11007 UNITS = EV (kPa, UCUM “kPa”) SINCE 1.21.5.3 IS “Automated Administration”
1.21.5.6	Route of Administration	(SRT, G-D101, "Intravenous route”)	TID 11007 CID 11
1.21.5.6.1	Site of	(SRT, G-D0C6, “Via arm vein”)	TID 11007 CID 3746 SINCE “Route of Administration” IS “Intravenous route”
1.21.5.6.1.1	Laterality	(SRT, G-A101, “Left”)	TID 11007 CID 244 SINCE “Site of” IS “Via arm vein”
1.21.5.7	Imaging Agent Administration Phase		TID 11008
1.21.5.7.1	Imaging Agent Administration Phase Identifier	DELAY_ESTIMATE_PHASE_1	TID 11008
1.21.5.7.2	Imaging Agent Administration Performed Phase UID	1.2.3.4.47110815.8	TID 11008 SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.5.7.3	Imaging Agent Administration Phase Type	(DCM,130168, “Automatic Administration Phase”)	TID 11008 CID 62 SINCE 1.21.5.3 IS “Automated

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			Administration"
1.21.5.7.4	Imaging Agent Administration Syringe/Pump Phase Activity		TID 11003
1.21.5.7.4.1	Referenced Imaging Agent Identifier	INJECTOR_CONTRAST_AGENT	TID 11003 Value of 1.14.1
1.21.5.7.4.2	Volume Administered	10	TID 11003 UNITS = EV (ml, UCUM, "ml") Same value as 1.21.5.7.5
1.21.5.7.4.3	Starting Flow Rate of administration	3	TID 11003 UNITS = EV (ml/s, UCUM "ml/s")
1.21.5.7.4.4	Peak Flow Rate in Phase Activity	3	TID 11003 UNITS = EV (ml/s, UCUM "ml/s") SINCE 1.21.5.3 IS "Automated Administration" AND "Root Concept Name Code Sequence" IS "Performed Imaging Agent Administration"
1.21.5.7.4.5	Peak Pressure in Phase Activity	2	TID 11003 UNITS = EV (kPa, UCUM "kPa") SINCE 1.21.5.3 IS "Automated Administration" AND "Root Concept Name Code Sequence" IS "Performed Imaging Agent Administration"
1.21.5.7.4.6	Initial Volume of Imaging Agent in Container	195	TID 11003 UNITS = EV (ml, UCUM, "ml") SINCE "Root Concept Name Code Sequence" IS "Performed Imaging Agent Administration"
1.21.5.7.4.7	Residual Volume of Imaging Agent in Container	185	TID 11003 UNITS = EV (ml, UCUM, "ml") SINCE "Root Concept

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			Name Code Sequence" IS "Performed Imaging Agent Administration"
1.21.5.7.4.8	DateTime Started	20181012121637	TID 11003 SINCE root Concept Name is "Performed Imaging Agent Administration"
1.21.5.7.4.9	Duration	3.3	TID 11003 UNITS = EV (s, UCUM, "s") SINCE root Concept Name is "Performed Imaging Agent Administration"
1.21.5.7.5	Total Phase Volume Administered	10	TID 11008 UNITS = EV (ml, UCUM, "ml") Same value as 1.21.5.7.4.2
1.21.5.7.6	DateTime Started	20181012121637	TID 11008 SINCE root Concept Name Code Sequence IS "Performed Imaging Agent Administration"
1.21.5.7.7	Duration	3.3	TID 11008 UNITS = EV (s, UCUM, "s") SINCE root Concept Name Code Sequence IS "Performed Imaging Agent Administration")
1.21.5.8	Imaging Agent Administration Phase		TID 11008
1.21.5.8.1	Imaging Agent Administration Phase Identifier	DELAY_ESTIMATE_PHASE_2	TID 11008
1.21.5.8.2	Imaging Agent Administration Performed Phase UID	1.2.3.4.47110815.9	TID 11008 SINCE "Root Concept Name Code

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			Sequence" IS "Performed Imaging Agent Administration"
1.21.5.8.3	Imaging Agent Administration Phase Type	(DCM,130168, "Automatic Administration Phase")	TID 11008 CID 62 SINCE 1.21.5.3 IS "Automated Administration"
1.21.5.8.4	Imaging Agent Administration Syringe/Pump Phase Activity		TID 11003
1.21.5.8.4.1	Referenced Imaging Agent Identifier	INJECTOR_FLUSH_AGENT	TID 11003 Value of 1.15.1
1.21.5.8.4.2	Volume Administered	30	TID 11003 UNITS = EV (ml, UCUM, "ml") Same value as 1.21.5.9.5
1.21.5.8.4.3	Starting Flow Rate of administration	3	TID 11003 UNITS = EV (ml/s, UCUM "ml/s")
1.21.5.8.4.4	Peak Flow Rate in Phase Activity	3	TID 11003 UNITS = EV (ml/s, UCUM "ml/s") SINCE 1.21.5.3 IS "Automated Administration" AND "Root Concept Name Code Sequence" IS "Performed Imaging Agent Administration"
1.21.5.8.4.5	Peak Pressure in Phase Activity	5	TID 11003 UNITS = EV (kPa, UCUM "kPa") SINCE 1.21.5.3 IS "Automated Administration" AND "Root Concept Name Code Sequence" IS "Performed Imaging Agent Administration"
1.21.5.8.4.6	Initial Volume of Imaging Agent in Container	166	TID 11003 UNITS = EV (ml, UCUM, "ml") SINCE "Root Concept Name Code Sequence" IS

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			"Performed Imaging Agent Administration"
1.21.5.8.4.7	Residual Volume of Imaging Agent in Container	136	TID 11003 UNITS = EV (ml, UCUM, "ml") SINCE "Root Concept Name Code Sequence" IS "Performed Imaging Agent Administration"
1.21.5.8.4.8	DateTime Started	20181012121640.3	TID 11003 SINCE root Concept Name is "Performed Imaging Agent Administration"
1.21.5.8.4.9	Duration	10	TID 11003 UNITS = EV (s, UCUM, "s") SINCE root Concept Name is "Performed Imaging Agent Administration"
1.21.5.8.5	Total Phase Volume Administered	30	TID 11008 UNITS = EV (ml, UCUM, "ml") Same value as 1.21.5.9.4.2
1.21.5.8.6	DateTime Started	20181012121640.3	TID 11008 SINCE root Concept Name Code Sequence IS "Performed Imaging Agent Administration"
1.21.5.8.7	Duration	10	TID 11008 UNITS = EV (s, UCUM, "s") SINCE root Concept Name Code Sequence IS "Performed Imaging Agent Administration")
1.21.5.9	Imaging Agent Administration		TID 11023

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
	Graph		
1.21.5.9.1	Referenced Imaging Agent Identifier	INJECTOR_CONTRAST_AGENT	TID 11023
1.21.5.9.2	Flow Rate vs time		TID 3990 Concept name is parameter $MeasurmentGraph
1.21.5.9.2.1	X-Concept	(130194, DCM, "Time after the start of injection")	TID 3990 Parameter $X-Concept
1.21.5.9.2.2	Y-Concept	(122094, DCM, "Rate of administration")	TID 3990 Parameter $Y-Concept
1.21.5.9.2.3	Flow Rate vs time	IMAGE = 1.2.3.4.5.6.7.8.9.10	TID 3990
1.21.5.9.3	Pressure vs time		TID 3990 Concept name is parameter $MeasurementGraph of TID 3990
1.21.5.9.3.1	X-Concept	(130194, DCM, "Time after the start of injection")	Parameter $X-Concept of TID 3990
1.21.5.9.3.2	Y-Concept	(R0-010AC, SRT, "Pressure")	Parameter $Y-Concept of TID 3990
1.21.5.9.3.3	Pressure vs time	IMAGE = 1.2.3.4.5.6.7.8.9.10	TID 3990 All graphs are in the same image in this example.
1.21.5.10	Imaging Agent Administration Graph		TID 11023
1.21.5.10.1	Referenced Imaging Agent Identifier	INJECTOR_FLUSH_AGENT	TID 11023
1.21.5.10.2	Flow Rate vs time		TID 3990 Concept name is parameter $MeasurementGraph of TID 3990
1.21.5.10.2.1	X-Concept	(130194, DCM, "Time after the start of injection")	TID 3990 Parameter $X-Concept
1.21.5.10.2.2	Y-Concept	(122094, DCM, "Rate of administration")	TID 3990 Parameter $Y-Concept
1.21.5.10.2.3	Flow Rate vs time	IMAGE = 1.2.3.4.5.6.7.8.9.10	TID 3990
1.21.5.10.3	Pressure vs time		TID 3990 Concept name is parameter $MeasurementGraph of TID 3990

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
1.21.5.10.3.1	X-Concept	(130194, DCM, "Time after the start of injection")	Parameter $X-Concept of TID 3990
1.21.5.10.3.2	Y-Concept	(R0-010AC, SRT, "Pressure")	Parameter $Y-Concept of TID 3990
1.21.5.10.3.3	Pressure vs time	IMAGE = 1.2.3.4.5.6.7.8.9.10	TID 3990
1.21.5.11	Number of Injector Heads	2	TID 11007
1.21.5.12	Programmable Device	(SRT, R-0038D, “Yes)	TID 11007 CID 231
1.21.6	Imaging Agent Administration Step		TID 11007
1.21.6.1	Imaging Agent Administration Step Identifier	DIAGNOSTIC_STEP_4	TID 11007
1.21.6.2	Imaging Agent Administration Performed Step UID	1.2.3.4.47110815.10	TID 11007 SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.6.3	Administration Mode	(DCM,130173, “Automated Administration”)	TID 11007 CID 63
1.21.6.4	Administration Step Type	(DCM,130249, “Diagnostic Administration”)	TID 11007 CID 72
1.21.6.5	Scan Delay	12	TID 11007 UNITS = EV (s, UCUM, “s”)
1.21.6.6	Pressure Limit	15	TID 11007 UNITS = EV (kPa, UCUM “kPa”) SINCE 1.21.6.3 IS “Automated Administration”
1.21.6.7	Route of Administration	(SRT, G-D101, "Intravenous route”)	TID 11007 CID 11
1.21.6.7.1	Site of	(SRT, G-D0C6, “Via arm vein”)	TID 11007 CID 3746 SINCE “Route of Administration” IS “Intravenous route”
1.21.6.7.1.1	Laterality	(SRT, G-A101, “Left”)	TID 11007 CID 244 SINCE “Site of” IS “Via arm vein”
1.21.6.8	Imaging Agent Administration Phase		TID 11008

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
1.21.6.8.1	Imaging Agent Administration Phase Identifier	DIAGNOSTIC_INJECTION_PHASE_1	TID 11008
1.21.6.8.2	Imaging Agent Administration Performed Phase UID	1.2.3.4.47110815.11	TID 11008 SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.6.8.3	Imaging Agent Administration Phase Type	(DCM,130168, “Automatic Administration Phase”)	TID 11008 CID 62 SINCE 1.21.6.3 IS “Automated Administration”
1.21.6.8.4	Imaging Agent Administration Syringe/Pump Phase Activity		TID 11003
1.21.6.8.4.1	Referenced Imaging Agent Identifier	INJECTOR_CONTRAST_AGENT	TID 11003 Value of 1.14.1
1.21.6.8.4.2	Volume Administered	88	TID 11003 UNITS = EV (ml, UCUM, “ml”) See 1.21.6.8.6 (Phase Volume) also
1.21.6.8.4.3	Starting Flow Rate of administration	1.5	TID 11003 UNITS = EV (ml/s, UCUM “ml/s”)
1.21.6.8.4.4	Peak Flow Rate in Phase Activity	1.5	TID 11003 UNITS = EV (ml/s, UCUM “ml/s”) SINCE 1.21.6.3 IS “Automated Administration” AND “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.6.8.4.5	Peak Pressure in Phase Activity	5	TID 11003 UNITS = EV (kPa, UCUM “kPa”) SINCE 1.21.6.3 IS “Automated Administration” AND “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
1.21.6.8.4.6	Initial Volume of Imaging Agent in Container	185	TID 11003 UNITS = EV (ml, UCUM, “ml”) SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.6.8.4.7	Residual Volume of Imaging Agent in Container	97	TID 11003 UNITS = EV (ml, UCUM, “ml”) SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.6.8.4.8	DateTime Started	20181012121900	TID 11003 SINCE root Concept Name is “Performed Imaging Agent Administration”
1.21.6.8.4.9	Duration	58.6	TID 11003 UNITS = EV (s, UCUM, “s”) SINCE root Concept Name is “Performed Imaging Agent Administration”
1.21.6.8.5	Imaging Agent Administration Syringe/Pump Phase Activity		TID 11003
1.21.6.8.5.1	Referenced Imaging Agent Identifier	INJECTOR_FLUSH_AGENT	TID 11003 Value of 1.15.1
1.21.6.8.5.2	Volume Administered	88	TID 11003 UNITS = EV (ml, UCUM, “ml”) See 1.21.6.8.6 (Phase Volume) also
1.21.6.8.5.3	Starting Flow Rate of administration	1.5	TID 11003 UNITS = EV (ml/s, UCUM “ml/s”)
1.21.6.8.5.4	Peak Flow Rate in Phase Activity	1.5	TID 11003 UNITS = EV (ml/s, UCUM “ml/s”) SINCE 1.21.6.3 IS “Automated

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			Administration" AND "Root Concept Name Code Sequence" IS "Performed Imaging Agent Administration"
1.21.6.8.5.5	Peak Pressure in Phase Activity	5	TID 11003 UNITS = EV (kPa, UCUM "kPa") SINCE 1.21.6.3 IS "Automated Administration" AND "Root Concept Name Code Sequence" IS "Performed Imaging Agent Administration"
1.21.6.8.5.6	Initial Volume of Imaging Agent in Container	134	TID 11003 UNITS = EV (ml, UCUM, "ml") Value results from 136ml – 2ml KVO within 1 min 10 sec until now SINCE "Root Concept Name Code Sequence" IS "Performed Imaging Agent Administration"
1.21.6.8.5.7	Residual Volume of Imaging Agent in Container	46	TID 11003 UNITS = EV (ml, UCUM, "ml") SINCE "Root Concept Name Code Sequence" IS "Performed Imaging Agent Administration"
1.21.6.8.5.8	DateTime Started	20181012121900	TID 11003 SINCE root Concept Name is "Performed Imaging Agent Administration"
1.21.6.8.5.9	Duration	58.6	TID 11003 UNITS = EV (s, UCUM, "s") SINCE root Concept Name is "Performed Imaging Agent

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			Administration”
1.21.6.8.6	Total Phase Volume Administered	176	TID 11008 UNITS = EV (ml, UCUM, “ml”) Sum of 1.21.6.8.4.2 and 1.21.6.8.5.2
1.21.6.8.7	DateTime Started	20181012121900	TID 11008 SINCE root Concept Name Code Sequence IS “Performed Imaging Agent Administration”
1.21.6.8.8	Duration	58.56	TID 11008 UNITS = EV (s, UCUM, “s”) SINCE root Concept Name Code Sequence IS “Performed Imaging Agent Administration”)
1.21.6.9	Imaging Agent Administration Phase		TID 11008
1.21.6.9.1	Imaging Agent Administration Phase Identifier	DIAGNOSTIC_INJECTION_PHASE_2	TID 11008
1.21.6.9.2	Imaging Agent Administration Performed Phase UID	1.2.3.4.47110815.12	TID 11008 SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.6.9.3	Imaging Agent Administration Phase Type	(DCM,130168, “Automatic Administration Phase”)	TID 11008 CID 62 SINCE 1.21.6.3 IS “Automated Administration”
1.21.6.9.4	Imaging Agent Administration Syringe/Pump Phase Activity		TID 11003
1.21.6.9.4.1	Referenced Imaging Agent Identifier	INJECTOR_FLUSH_AGENT	TID 11003 Value of 1.15.1
1.21.6.9.4.2	Volume Administered	30	TID 11003 UNITS = EV (ml, UCUM, “ml”)

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			Same value as 1.21.6.9.5
1.21.6.9.4.3	Starting Flow Rate of administration	3	TID 11003 UNITS = EV (ml/s, UCUM “ml/s”)
1.21.6.9.4.4	Peak Flow Rate in Phase Activity	3	TID 11003 UNITS = EV (ml/s, UCUM “ml/s”) SINCE 1.21.6.3 IS “Automated Administration” AND “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.6.9.4.5	Peak Pressure in Phase Activity	5	TID 11003 UNITS = EV (kPa, UCUM “kPa”) SINCE 1.21.6.3 IS “Automated Administration” AND “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.6.9.4.6	Initial Volume of Imaging Agent in Container	46	TID 11003 UNITS = EV (ml, UCUM, “ml”) SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.6.9.4.7	Residual Volume of Imaging Agent in Container	16	TID 11003 UNITS = EV (ml, UCUM, “ml”) SINCE “Root Concept Name Code Sequence” IS “Performed Imaging Agent Administration”
1.21.6.9.4.8	DateTime Started	20181012121958.56	TID 11003 SINCE root Concept Name is “Performed Imaging Agent Administration”
1.21.6.9.4.9	Duration	10	TID 11003

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			UNITS = EV (s, UCUM, “s”) SINCE root Concept Name is “Performed Imaging Agent Administration”
1.21.6.9.5	Total Phase Volume Administered	30	TID 11008 UNITS = EV (ml, UCUM, “ml”) Same value as 1.21.6.9.4.2
1.21.6.9.6	DateTime Started	20181012121958.56	TID 11008 SINCE root Concept Name Code Sequence IS “Performed Imaging Agent Administration”
1.21.6.9.7	Duration	10	TID 11008 UNITS = EV (s, UCUM, “s”) SINCE root Concept Name Code Sequence IS “Performed Imaging Agent Administration”)
1.21.6.10	Imaging Agent Administration Graph		TID 11023
1.21.6.10.1	Referenced Imaging Agent Identifier	INJECTOR_CONTRAST_AGENT	TID 11023
1.21.6.10.2	Flow Rate vs time		TID 3990 Concept name is parameter $MeasurementGraph
1.21.6.10.2.1	X-Concept	(130194, DCM, "Time after the start of injection")	TID 3990 Parameter $X-Concept
1.21.6.10.2.2	Y-Concept	(122094, DCM, "Rate of administration")	TID 3990 Parameter $Y-Concept
1.21.6.10.2.3	Flow Rate vs time	IMAGE = 1.2.3.4.5.6.7.8.9.11	TID 3990
1.21.6.10.3	Pressure vs time		TID 3990 Named by parameter $MeasurementGraph
1.21.6.10.3.1	X-Concept	(130194, DCM, "Time after the start of injection")	TID 3990 Parameter $X-

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			Concept
1.21.6.10.3.2	Y-Concept	(R0-010AC, SRT, "Pressure")	TID 3990 Parameter $Y-Concept
1.21.6.10.3.3	Pressure vs time	IMAGE = 1.2.3.4.5.6.7.8.9.11	TID 3990
1.21.6.11	Imaging Agent Administration Graph		TID 11023
1.21.6.11.1	Referenced Imaging Agent Identifier	INJECTOR_FLUSH_AGENT	TID 11023
1.21.6.11.2	Flow Rate vs time		TID 3990 Concept name is parameter $MeasurementGraph
1.21.6.11.2.1	X-Concept	(130194, DCM, "Time after the start of injection")	TID 3990 Parameter
1.21.6.11.2.2	Y-Concept	(122094, DCM, "Rate of administration")	TID 3990 Parameter $Y-Concept
1.21.6.11.2.3	Flow Rate vs time	IMAGE = 1.2.3.4.5.6.7.8.9.11	TID 3990
1.21.6.11.3	Pressure vs time		TID 3990 Named by parameter $MeasurementGraph
1.21.6.11.3.1	X-Concept	(130194, DCM, "Time after the start of injection")	TID 3990 Parameter $X-Concept
1.21.6.11.3.2	Y-Concept	(R0-010AC, SRT, "Pressure")	TID 3990 Parameter $Y-Concept
1.21.6.11.3.3	Pressure vs time	IMAGE = 1.2.3.4.5.6.7.8.9.11	TID 3990
1.21.6.12	Number of Injector Heads	2	TID 11007
1.21.6.13	Programmable Device	(SRT, R-0038D, “Yes”)	TID 11007 CID 231
1.22	Planned Imaging Agent Administration SOP Instance	1.2.3.4.47110815.13	TID 11020 SINCE this administration was based on a Imaging Administration Plan
1.23	Imaging Agent Administration Completion Status	(SRT, R-404F1, “Complete”)	TID 11020 CID 67
1.24	Imaging Agent Administration Adverse Events		TID 11021
1.24.1	Administration discontinued	(SRT, R-00339, “No”)	TID 11021 CID 231
1.24.2	Adverse Event	(SRT, F-400A9, “Sweating”)	TID 11021 CID 60
1.24.2.1	Severity	(SRT, R-404FA, “Mild”)	TID 11021

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
			CID 3716
1.24.2.2	Relative Time	(SRT, R-40FB9, “Before Procedure”)	TID 11021 CID 61
1.24.2.3	Adverse Event Detection Date Time	20181012121500	TID 11021
1.24.2.4	Referenced Imaging Agent Administration Step UID	1.2.3.4.47110815.5	TID 11021 Same value as 1.21.4.2
1.24.2.5	Referenced Imaging Agent Administration Phase UID	1.2.3.4.47110815.6	TID 11021 Same value as 1.21.4.6.2
1.24.2.6	Comment	Patient was afraid of procedure	TID 11021
1.24.3	Adverse Event	(SRT, D0-B0330, “Injection Site Extravasation”)	TID 11021 CID 60
1.24.3.1	Relative Time	(SRT, R-422A4, “After Procedure”)	TID 11021 CID 61
1.24.3.2	Adverse Event Detection Date Time	20181012122100	TID 11021
1.24.3.3	Estimated Extravasation Volume	2	TID 11021 UNITS = EV (ml, UCUM, “ml”) SINCE 1.17.3 IS “Injection Site Extravasation”
1.24.3.4	Referenced Imaging Agent Administration Step UID	1.2.3.4.47110815.10	TID 11021 Same value as 1.21.6.2
1.24.3.5	Referenced Imaging Agent Administration Phase UID	1.2.3.4.47110815.12	TID 11021 Same value as 1.21.6.9.2
1.24.3.6	Comment	Detected extravasation when removing needle	TID 11021
1.25	Imaging Agent Administration Injector Events		TID 11022
1.25.1	Administration discontinued	(SRT, R-00339, “No”)	TID 11022 CID 231
1.25.2	Imaging Agent Administration Injector Event Type	(DCM, 130161, “Keep vein open started”)	TID 11022 CID 71
1.25.2.1	Injector Event Detection Date Time	20181012121628	TID 11022
1.25.2.2	Referenced Imaging Agent Identifier	INJECTOR_FLUSH_AGENT	TID 11022
1.25.3	Imaging Agent Administration Injector Event Type	(DCM, 130162, “Keep vein open ended”)	TID 11022 CID 71
1.25.3.1	Injector Event Detection Date Time	201810121958	TID 11022

Node	Code Meaning of Concept Name	Code Meaning or Example Value	Reference to TID / CID / … Comments
1.25.3.2	Referenced Imaging Agent Identifier	INJECTOR_FLUSH_AGENT	TID 11022
1.26	Total Keep Vein Open Volume Administered	3	TID 11020 UNITS = EV (ml, UCUM, “ml”)