

1                   **Digital Imaging and Communications in Medicine**  
2                   **(DICOM)**

3                   **Sup 187 - Preclinical Small Animal Imaging Acquisition Context**

DRAFT

4                   DICOM Standards Committee - Working Group 30 - Small Animal Imaging

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# Scope and Field of Application

This Supplement defines use-cases and templates for storage of information related to acquisition of small animal images during preclinical research.

Acquisition Context is a "description of the conditions present during data acquisition" (quoted from the text of PS3.3 Section C.7.6.14 Acquisition Context Module).

Traditionally, all attributes that describe an image acquisition are defined as specific Attributes (Data Elements) in a modality-specific IOD. This approach works extremely well when image objects have very specific applications and when the domain from which the descriptive concepts are drawn is well understood and clearly defined. When the visible light image object family was introduced, an alternative and more general mechanism was added to the standard, using lists of coded name-value pairs to specify acquisition content information, rather than depending on SOP-class-specific sets of traditional Attributes. The name-value pairs are encoded in the Acquisition Context Module. Using coded entries has benefits and disadvantages. One of the advantages is the ability to use coding schemes defined by other organizations to define names and value sets for concepts. The "acquisition context" idea was introduced to DICOM by Dean Bidgood and is well described in his article on the subject: Bidgood WD, Bray B, Brown N, Mori AR, Spackman KA, Golichowski A, et al. Image Acquisition Context: Procedure Description Attributes for Clinically Relevant Indexing and Selective Retrieval of Biomedical Images. Journal of the American Medical Informatics Association : JAMIA. 1998 Aug 17;6(1):61-75. available at <http://www.ncbi.nlm.nih.gov/pubmed/9925229>.

Both approaches assume that the Acquisition Context is known prior to encoding the image in DICOM, and that it is known to the device encoding the DICOM image (the modality). In some cases, information about the acquisition that is relevant to the interpretation of the imaging may not be known to the modality. This is particularly the case in small animal preclinical research, where a myriad of factors that affect quantitative analysis need to be recorded, which would be overwhelming if required to be captured at the modality console user interface. Though it would be possible to add this information by post-processing of the acquired images, WG 30 has concluded that it is preferable to encode the Acquisition Context in a separate standalone composite instance.

The type of information to be recorded needs to be in a structured form, and many of the concepts are expected to be available in external lexicons. This is particularly the case for descriptions of experimental conditions, animal physiology and animal handling. Accordingly, the DICOM Structured Report (SR) mechanism is a natural choice of encoding. The Acquisition Context Module in the images will remain unpopulated.

The Acquisition Context SR instances will usually be in the same Study as the acquired images.

This supplement defines a new DICOM SR root template and supporting templates, as well as an IOD and SOP Class specific to that template to facilitate interoperability.

# DICOM PS3.16 Content Mapping Resource

Add new DICOM PS3.16 - Content Mapping Resource - Normative References as follows:

## 2 Normative References

### 2.17 Anesthesia Quality Institute Schema

[AQI Schema] Anesthesia Quality Institute, Schaumburg, IL. 2015/07/30. *Anesthesia Quality Institute Schema*. <http://www.aqihq.org/aqischdoc/default.html>.

Used by permission of the Anesthesia Quality Institute (AQI) (<http://www.aqihq.org/>), established by the American Society of Anesthesiologists (ASA).

Add new DICOM PS3.16 - Content Mapping Resource - Coding Schemes as follows:

## 8 Coding Schemes

Table 8-1. Coding Schemes

Coding Scheme Designator	Coding Scheme UID	Description
<u>PUBCHEM_CID</u>	<u>1.2.840.10008.2.16.9</u>	<u>US National Center for Biotechnology Information (NCBI) PubChem Compound CID.</u>  <u>See <a href="https://pubchem.ncbi.nlm.nih.gov/">https://pubchem.ncbi.nlm.nih.gov/</a>.</u>

## A Structured Reporting Templates (Normative)

Amend DICOM PS3.16 - Content Mapping Resource - Structured Reporting Templates to add the following:

### Acquisition Context SR IOD Templates

The Templates that comprise the Acquisition Context SR are interconnected as follows:

- TID 8101 "Preclinical Small Animal Image Acquisition Context"
  - TID 1204 "Language of Content Item and Descendants"
  - TID 1001 "Observation Context"
  - TID 8110 "Biosafety Conditions"
  - TID 8121 "Animal Housing"
  - TID 8122 "Animal Feeding"
  - TID 8140 "Heating Conditions"
  - TID 8150 "Circadian Effects"
  - TID 8170 "Physiological Monitoring Performed During Procedure"
  - TID 8130 "Anesthesia"
    - TID 8131 "Medications and Mixture Medications"
  - TID 9002 "Medication, Substance, Environmental Exposure"

- TID 8182 "Exogenous Substance Administration"

## TID 8101 Preclinical Small Animal Image Acquisition Context

This root template encodes a description of the conditions present during and related to data acquisition for a single imaging procedure.

### Note

1. It is not expected that a single instance be used to describe the entire life of an animal, unless it is sacrificed after a single procedure. Rather, separate instances will be used for separate procedures, though there may be some duplication of common information, such as about the home cage environment.
2. It is expected that an SR instance encoded using this template will be contained in the same Study as other instances created during the procedure, e.g. with a common Study Instance UID. If this is not practical, e.g., due to recording on a separate device without use of a shared Modality Worklist, then commonality of other Study level attributes may be necessary to link procedures (and possibly coerce the Study Instance UID to a common value).

**Type:** Extensible  
**Order:** Non-Significant  
**Root:** Yes

**Table TID 8101. Preclinical Small Animal Image Acquisition Context**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (127001, DCM, "Preclinical Small Animal Imaging Acquisition Context")	1	M		Root node
2	>	HAS CONCEPT MOD	INCLUDE	DTID 1204 "Language of Content Item and Descendants"	1	M		
3	>	HAS OBS CONTEXT	INCLUDE	DTID 1001 "Observation Context"	1	M		
5	>	CONTAINS	INCLUDE	DTID 8110 "Biosafety Conditions"	1	U		
6	>	CONTAINS	CONTAINER	EV (127005, DCM, "Animal handling during specified phase")	1-n	U		
7	>>	HAS CONCEPT MOD	CODE	EV (127006, DCM, "Phase of animal handling")	1	M		DCID 634 "Phase of Animal Handling"
8	>>	CONTAINS	DATETIME	EV (111526, DCM, "DateTime Started")	1	U		
9	>>	CONTAINS	DATETIME	EV (111527, DCM, "DateTime Ended")	1	U		
10	>>	CONTAINS	INCLUDE	DTID 8121 "Animal Housing"	1	U		
11	>>	CONTAINS	INCLUDE	DTID 8122 "Animal Feeding"	1-n	U		
12	>>	CONTAINS	INCLUDE	DTID 8140 "Heating Conditions"	1	U		
13	>>	CONTAINS	INCLUDE	DTID 8150 "Circadian Effects"	1	U		
14	>>	CONTAINS	INCLUDE	DTID 8170 "Physiological Monitoring Performed During Procedure"	1	U		



	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
15	>	CONTAINS	INCLUDE	DTID 8130 "Anesthesia"	1	U		
16	>	CONTAINS	INCLUDE	DTID 9002 "Medication, Substance, Environmental Exposure"	1	U		\$ContainerConcept = EV (10160-0, LN, "History Of Medication Use")  \$CodeConcept = EV (111516, DCM, "Medication Type")  \$Route = DCID 11 "Route of Administration"
17	>	CONTAINS	INCLUDE	DTID 8182 "Exogenous Substance Administration"	1	U		\$ContainerConcept = EV (127400, DCM, "Exogenous substance")  \$CodeConcept = DCID 637 "Exogenous Substance Types"  \$CodeValue = DCID 638 "Exogenous Substance"  \$Route = DCID 11 "Route of Administration"  \$Site = DCID 644  \$TissueOfOrigin = DCID 645  \$TaxonomicRankOfOrigin = DCID 7454 "Animal Taxonomic Rank Values"

### Content Item Descriptions

Row 3	<p>A single pre-coordinated code describing the general type of imaging procedure can be described using TID 1005 Row 9 Procedure Code (included in TID 1001). For small animal (as opposed to human) imaging, this will likely describe a whole body acquisition in a modality-specific manner and the use of contrast and/or radiopharmaceutical. E.g., whole body FDG PET, or whole body DCE-MRI.</p> <p>May be redundant with (or default to) the value present in the top level data set in Procedure Code Sequence (0008,1032) of the General Study Module.</p> <p>Species and strain identification is not described in TID 1001; rather it is encoded in DICOM Attributes in the top level data set.</p>
Row 5	The biosafety conditions are expected to be consistent across all phases of handling, so are not described separately per-phase.
Rows 8-9	The period of time during which the phase is defined, i.e., during which the animal was managed in the specified conditions. This may be more important for interpretation for some phases (e.g., transport) than others (e.g., at rest in the home cage), and hence is optional.
Rows 10-14	The outline of subordinate templates follows the pattern of categories of Animal Housing, Care, and Physiologic Monitoring information described in [Stout et al 2013].
Row 11	Animal feeding is 1-n to allow encoding of dietary supplements and treats in addition to the regular diet.

1 2	Row 15	A single anesthesia event is normally assumed for a single procedure, though the template included can include multiple pre-, intra- and post-procedure descriptions.
3 4 5 6	Row 16	Used to describe pharmaceuticals administered that are not described elsewhere, in particular, those that are not described as anesthesia medications, and those that are not described in the images (e.g., contrast, radiopharmaceuticals). This includes therapy (such as chemotherapy, immunotherapy) and similar interventions that may be the subject of the research.  The value set of \$CodeValue is not defined, given the vast range of possible codes and coding schemes for drugs or medicaments that might be used. Nor are value sets for \$Classification or \$Site defined.
7 8 9 10 11 12	Row 17	Used to describe non-pharmaceutical exogenous substances administered, such as cells or other tumor graft, fibrils, viruses, cytokines and toxins that describe the "model" upon which the research is being performed, as distinct from the "therapeutic intervention" (Row 16) that may be the purpose of the research. The Classification parameter is not constrained by any value set.

## TID 8110 Biosafety Conditions

This template encodes a description of the biosafety conditions applicable to research small animals.

**Type:** Extensible

**Order:** Non-Significant

**Table TID 8110. Biosafety Conditions**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
20 21 22	1		CONTAINER	EV (127010, DCM, "Biosafety conditions")	1	M		
23 24	2	>	CONTAINS	CODE	EV (F-0061F, SRT, "Biosafety level")	1	U	DCID 601 "Biosafety Levels"
25 26	2	>	CONTAINS	CODE	EV (127011, DCM, "Reason for biosafety controls")	1	U	DCID 602 "Biosafety Control Reasons"
27 28	4	>	CONTAINS	TEXT	EV (121106, DCM, "Comment")	1	U	

### Content Item Descriptions

30	Row 4	A brief description of any pertinent or unusual biosafety requirements.
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## TID 8121 Animal Housing

This template encodes a description of housing of animals, e.g., in home cages, holders for imaging, etc., over an interval during which environmental and handling conditions are relatively homogenous.

### Note

1. Only "static" parameters of the design and setup are recorded, and "nominal" values for environmental conditions such as humidity and temperature, but not "dynamic" parameters that might vary during one housing interval, and potentially be monitored, such as oxygen or ammonia levels, temperature, humidity, urine or fecal corticosterone levels, etc.
2. Values for product names and codes are expected to be accurate at the time the information is recorded, recognizing that products may evolve over time.

**Type:** Extensible

**Order:** Non-Significant

Table TID 8121. Animal Housing

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (127120, DCM, "Animal housing")	1	M		
2	>	CONTAINS	CODE	EV (127121, DCM, "Animal room type")	1	U		DCID 603 "Animal Room Types"
2b	>	CONTAINS	TEXT	EV (127122, DCM, "Animal room identifier")	1	U		
3	>	CONTAINS	TEXT	EV (127125, DCM, "Housing manufacturer")	1	U		
4	>	CONTAINS	TEXT	EV (127126, DCM, "Housing rack product name")	1	U		
5	>	CONTAINS	TEXT	EV (127127, DCM, "Housing rack product code")	1	U		
6	>	CONTAINS	TEXT	EV (127128, DCM, "Housing unit product name")	1	U		
7	>	CONTAINS	TEXT	EV (127129, DCM, "Housing unit product code")	1	U		
8	>	CONTAINS	TEXT	EV (127130, DCM, "Housing unit lid product name")	1	U		
9	>	CONTAINS	TEXT	EV (127131, DCM, "Housing unit lid product code")	1	U		
10	>	CONTAINS	NUM	EV (127140, DCM, "Number of racks per room")	1	U		UNITS = EV ({racks}, UCUM, "racks")
11	>	CONTAINS	NUM	EV (127141, DCM, "Number of housing units per rack")	1	U		UNITS = EV ({housing units}, UCUM, "housing units") or EV ({cages}, UCUM, "cages")
12	>	CONTAINS	TEXT	EV (127142, DCM, "Housing unit location in rack")	1	U		
13	>	CONTAINS	NUM	EV (127143, DCM, "Number of animals within same housing unit")	1	U		UNITS = EV ({animals}, UCUM, "animals")
14	>	CONTAINS	CODE	EV (127144, DCM, "Sex of animals within same housing unit")	1	U		DCID 7457 "Sex - Male Female or Both"
15	>	CONTAINS	CODE	EV (127145, DCM, "Sex of handler")	1	U		DCID 7457 "Sex - Male Female or Both"
16	>	CONTAINS	NUM	EV (127150, DCM, "Total duration in housing")	1	U		UNITS = EV (d, UCUM, "days")
17	>	CONTAINS	NUM	EV (127151, DCM, "Housing change interval")	1	U		UNITS = EV (d, UCUM, "days")
18	>	CONTAINS	NUM	EV (127152, DCM, "Manual handling interval")	1	U		UNITS = EV (h, UCUM, "hours")
19	>	CONTAINS	TEXT	EV (127153, DCM, "Housing unit movement")	1	U		

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
20	>	CONTAINS	NUM	EV (127160, DCM, "Housing unit width")	1	U		UNITS = EV (cm, UCUM, "cm")
21	>	CONTAINS	NUM	EV (127161, DCM, "Housing unit height")	1	U		UNITS = EV (cm, UCUM, "cm")
22	>	CONTAINS	NUM	EV (127162, DCM, "Housing unit length")	1	U		UNITS = EV (cm, UCUM, "cm")
23	>	CONTAINS	CODE	EV (127170, DCM, "Housing individually ventilated")	1	U		DCID 231 "Yes-No Only"
24	>	CONTAINS	NUM	EV (127172, DCM, "Air changes")	1	U		UNITS = EV (/h, UCUM, "/hour")
25	>	CONTAINS	NUM	EV (C90380, NCIt, "Environmental temperature")	1	U		UNITS = EV (Cel, UCUM, "C")
26	>	CONTAINS	NUM	EV (C90395, NCIt, "Housing humidity")	1	U		UNITS = EV (% , UCUM, "%")
27	>	CONTAINS	CODE	EV (127175, DCM, "Housing unit reuse")	1	U		DCID 604 "Device Reuse"
28	>	CONTAINS	CODE	EV (C90366, NCIt, "Bedding material")	1	U		DCID 605 "Animal Bedding Material"
29	>	CONTAINS	TEXT	EV (C90366, NCIt, "Bedding material")	1	U		
30	>	CONTAINS	TEXT	EV (127180, DCM, "Bedding manufacturer")	1	U		
31	>	CONTAINS	TEXT	EV (127181, DCM, "Bedding product name")	1	U		
32	>	CONTAINS	TEXT	EV (127182, DCM, "Bedding product code")	1	U		
33	>	CONTAINS	NUM	EV (127183, DCM, "Bedding volume")	1	U		UNITS = EV (ml, UCUM, "ml")
34	>	CONTAINS	NUM	EV (127184, DCM, "Bedding mass")	1	U		UNITS = EV (g, UCUM, "g")
34b	>	CONTAINS	NUM	EV (127185, DCM, "Bedding depth")	1	U		UNITS = EV (mm, UCUM, "mm")
35	>	CONTAINS	NUM	EV (C90365, NCIt, "Bedding change")	1	U		UNITS = EV (d, UCUM, "days")
36	>	CONTAINS	CODE	EV (127192, DCM, "Enrichment material present")	1	U		DCID 241 "Present-Absent Only"
36b	>	CONTAINS	TEXT	EV (127191, DCM, "Enrichment manufacturer")	1	U		
37	>	CONTAINS	TEXT	EV (127190, DCM, "Enrichment material")	1	U		
38	>	CONTAINS	CODE	EV (127193, DCM, "Exerciser device present")	1	U		DCID 241 "Present-Absent Only"
39	>	CONTAINS	TEXT	EV (A-17200, SRT, "Exerciser device")	1	U		
40	>	CONTAINS	CODE	EV (127195, DCM, "Shelter type")	1	U		DCID 606 "Animal Shelter Types"

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
41	>	CONTAINS	TEXT	EV (127196, DCM, "Shelter manufacturer")	1	U		
42	>	CONTAINS	TEXT	EV (127197, DCM, "Shelter product name")	1	U		
43	>	CONTAINS	TEXT	EV (127198, DCM, "Shelter product code")	1	U		
44	>	CONTAINS	TEXT	EV (121106, DCM, "Comment")	1	U		

### Content Item Descriptions

Row 2 and 2b	The type and identifier of the entire room in which, for example, one or more racks of housing units is located, not the housing unit itself.
Row 3	The manufacturer is expected to be the same for all housing unit components, rack, bottom and lid.
Row 12	The position in the rack is encoded as text since it may be an "identifier" or a description. It is not a set of numeric (e.g., row, column) or coded (e.g., top, bottom or middle) values, since there are too many possible arrangements.
Row 13	The number of animals usually applies to a single housing unit, but may also be used to describe the number of animals imaged simultaneously in a multi-animal imaging carrier or support device ("chamber", "holder", etc.).
Rows 20-22	These may be internal or external dimensions, and are intended to provide an approximation of the living space and shape available.
Rows 25-26	Description of measured or monitored or nominal values of temperature and humidity. The means of maintaining these conditions, if relevant, is described elsewhere (e.g., in the case of peri-procedural temperature control, in TID 8140 "Heating Conditions").
Rows 28-29	The bedding material may be described as a code or text, or both. The codes do not distinguish between methods of sterilization of the bedding material (e.g., irradiation, autoclaving or other heat treatment), since that is not a relevant factor for image interpretation. The definition of the NCIt concept is "that which comprises the place where a subject sleeps".
Row 35	The definition of the NCIt concept is "a replacement of the existing materials that make up the sleeping area of a subject", and is used here to specify the interval between bedding changes.
Row 36-37	The presence or absence of enrichment material is coded, but the type is not, and may be described as text, e.g., "facial tissue", "cotton (nesting material)".
Row 38-39	The presence or absence of an exercise device is coded, but the type is not, and may be described as text.

### TID 8122 Animal Feeding

This template encodes a description of feeding and watering of animals, over an interval during which conditions are relatively homogeneous.

#### Note

1. No specific time interval during which the diet is applicable is described.
2. Values for product names and codes are expected to be accurate at the time the information is recorded, recognizing that products may evolve over time.

**Type:** Extensible

**Order:** Non-Significant

Table TID 8122. Animal Feeding

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (PA-00600, SRT, "Feeding")	1	M		
2	>	CONTAINS	CODE	EV (C-F5000, SRT, "Animal feed")	1	U		DCID 607 "Animal Feed Types"
3	>	CONTAINS	CODE	EV (127205, DCM, "Feed source")	1	U		DCID 608 "Animal Feed Sources"
4	>	CONTAINS	TEXT	EV (127200, DCM, "Feed manufacturer")	1	U		
5	>	CONTAINS	TEXT	EV (127201, DCM, "Feed product name")	1	U		
6	>	CONTAINS	TEXT	EV (127202, DCM, "Feed product code")	1	U		
7	>	CONTAINS	CODE	EV (C0015746, UMLS, "Feeding method")	1	U		DCID 609 "Animal Feeding Methods"
8	>	CONTAINS	CODE	EV (C-10120, SRT, "Water")	1	U		DCID 610 "Water Types"
9	>	CONTAINS	CODE	EV (C90486, NCIt, "Water delivery")	1	U		DCID 609 "Animal Feeding Methods"
10	>	CONTAINS	TEXT	EV (121106, DCM, "Comment")	1	U		

## TID 8130 Anesthesia

This template encodes a description of the anesthesia applied during a procedure (e.g., imaging of research small animals).

### Note

This template combines selected concepts from the [AQI Schema] elements, their complex types, and their children:

- AnesthesiaMethodSet (type AnesthesiaMethodSetType). See <http://www.aqihq.org/aqischdoc/AnesthesiaMethodSet.html> and <http://www.aqihq.org/aqischdoc/AnesthesiaMethodSetType.html>.
- AirwayManagementSet (type AirwayManagementSetType). See <http://www.aqihq.org/aqischdoc/AirwayManagementSet.html> and <http://www.aqihq.org/aqischdoc/AirwayManagementSetType.html>.
- MedicationsSet (type MedicationsSetType). See <http://www.aqihq.org/aqischdoc/MedicationsSet.html> and <http://www.aqihq.org/aqischdoc/MedicationsSetType.html>.

**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		
2	>	CONTAINS	CONTAINER	EV (127300, DCM, "Anesthesia Method Set")	1	M		

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
3	>>	CONTAINS	CONTAINER	EV (127301, DCM, "Anesthesia Method")	1-n	M		
4	>>>	CONTAINS	CODE	EV (127302, DCM, "Anesthesia Category")	1	M		DCID 611 "Anesthesia Category Code Type for Small Animal Anesthesia"
5	>>>	CONTAINS	TEXT	EV (127303, DCM, "Anesthesia SubCategory")	1	U		
6	>>>	CONTAINS	DATETIME	EV (DF-0068E, SRT, "Anesthesia Start Time")	1	U		
7	>>>	CONTAINS	DATETIME	EV (DF-0070B, SRT, "Anesthesia Finish Time")	1	U		
8	>>>	CONTAINS	CODE	EV (P1-C0012, SRT, "Anesthesia Induction")	1	U		DCID 613 "Anesthesia Induction Code Type for Small Animal Anesthesia"
9	>>>	CONTAINS	CODE	EV (P1-C001A, SRT, "Anesthesia Maintenance")	1	U		DCID 615 "Anesthesia Maintenance Code Type for Small Animal Anesthesia"
10	>>>	CONTAINS	TEXT	121106, DCM, "Comment")	1	U		
11	>	CONTAINS	CONTAINER	EV (127310, DCM, "Airway Management Set")	1	M		
12	>>	CONTAINS	CONTAINER	EV (P0-0409B, SRT, "Airway Management")	1-n	M		
13	>>>	CONTAINS	CODE	EV (127312, DCM, "Airway Management Method")	1	M		DCID 617 "Airway Management Method Code Type for Small Animal Anesthesia"
14	>>>	CONTAINS	CODE	EV (127313, DCM, "Airway Sub-Management Method")	1	M		DCID 619 "Airway Management Sub-Method Code Type for Small Animal Anesthesia"
15	>	CONTAINS	CONTAINER	EV (127320, DCM, "Medications Set")	1-n	M		
16	>>	CONTAINS	CODE	EV (G-7292, SRT, "Procedure Phase")	1	M		DCID 631 "Phase of Procedure Requiring Anesthesia"
17	>>	CONTAINS	INCLUDE	DTID 8131 "Medications and Mixture Medications"	1-n	M		

#### Content Item Descriptions

Rows 1-3	If this template is used, at least one description of anesthesia method is required. Note that the specific agents used are described separately, as intra-operative medications, per the [AQI Schema].
Rows 6-7	These correspond to AQI elements that are named "Time" rather than "DateTime", though their value is a DateTime; the DICOM naming convention is used here.
Row 9	Only inhalational methods of maintenance are included in this row. Absence of this row implies that the (non-inhalational) induction method is used for maintenance.

1	Row 10	The comment corresponds to AQI element "Anesthesia Notes".
2	Rows 11-13	At least one description of airway management is required.
3		The airway management method also serves as the description of the method of inhalational anesthesia delivery, even if it does not involve "management" of the "airway" per se (e.g., delivery via nose cone).
4		
5	Rows 15-17	In the AQI model, a single AQI MedicationsSet is used in the AQI IntraOp element to describe intra-operative medications.
6		
7		This template allows a more general usage, with one or more Medications Set containers, each of which may be qualified by the phase of the procedure (pre-operative, intra-operative or post-operative). The purpose of the medication (e.g., general anesthetic) is described in the (111516, DCM, "Medication Type") of the included TID 8131 "Medications and Mixture Medications".
8		
9		
10		

## 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., anesthesia for imaging of research small animals).

### Note

This template combines selected concepts from the [AQI Schema] elements, their complex types, and their children:

- Medication (type MedicationType). See <http://www.aqihq.org/aqischdoc/Medication.html> and <http://www.aqihq.org/aqischdoc/MedicationType.html>.
- MixtureMedications (type MixtureMedicationType). See <http://www.aqihq.org/aqischdoc/MixtureMedications.html> and <http://www.aqihq.org/aqischdoc/MixtureMedicationType.html>.

**Type:** Extensible

**Order:** Non-Significant

**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	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"



	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
9	>>	CONTAINS	NUM	EV (G-C0B7, SRT, "Dosage")	1	U		UNITS = DCID 82 "Units of Measurement"
10	>>	CONTAINS	NUM	EV (122093, DCM, "Concentration")	1	U		UNITS = DCID 82 "Units of Measurement"

### 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.

### TID 8140 Heating Conditions

This template encodes a description of the heating conditions applied prior to, during or after data acquisition (e.g., during imaging of research small animals).

**Type:** Extensible

**Order:** Non-Significant

**Table TID 8140. Heating Conditions**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (127040, DCM, "Heating conditions")	1	M		
2	>	CONTAINS	CODE	EV (G-7292, SRT, "Procedure Phase")	1	U		DCID 631 "Phase of Procedure Requiring Anesthesia"
3	>	CONTAINS	CODE	EV (C0018851, UMLS, "Heating")	1	U		DCID 635 "Heating Method"
4	>	CONTAINS	CODE	EV (127210, DCM, "Feedback temperature regulation")	1	U		DCID 231 "Yes-No Only"

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
5	>	CONTAINS	CODE	EV (C50304, NCIt, "Temperature sensor device component")	1	U		DCID 636 "Temperature Sensor Device Component Type for Small Animal Procedures"
6	>	CONTAINS	NUM	EV (F-021FF, SRT, "Equipment Temperature")	1	U		UNITS = EV (Cel, UCUM, "C")

### Content Item Descriptions

Row 2	Phase during which the conditions are applicable may be implicit in the context of invocation of this template (e.g., TID 8101 "Preclinical Small Animal Image Acquisition Context" Row 7), or explicitly specified.
Row 3	The definition (from MESH) is "The application of heat to raise the temperature of the environment, ambient or local, or systems for accomplishing this effect".
Row 6	This is the nominal temperature of the heating device (e.g., heating pad) and/or the set point of the feedback regulation device.

## TID 8150 Circadian Effects

This template encodes a description of the Circadian effects relevant during data acquisition (e.g., during imaging of research small animals).

**Type:** Extensible

**Order:** Non-Significant

**Table TID 8150. Circadian Effects**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (127050, DCM, "Circadian effects")	1	M		
2	>	CONTAINS	NUM	EV (127214, DCM, "Total duration of light-dark cycle")	1	U		UNITS = EV (h, UCUM, "hours")
3	>	CONTAINS	NUM	EV (C90419, NCIt, "Light cycle")	1	U		UNITS = EV (% , UCUM, "%")
4	>	CONTAINS	TIME	EV (127215, DCM, "Lights on time of day")	1-n	U		

### Content Item Descriptions

Row 2	Usually 24 hours.
Row 3	The definition is "the amount of ambient light/darkness to which a subject is exposed in a period of time"; also mapped to CDISC "the period of light that a subject is exposed to in a period of time, usually expressed as the amount of time in a 24 hour cycle".
Row 4	Can only be encoded if the light-dark cycles are aligned to a 24 hour clock. May be multiple if either multiple cycles occur during a 24 hour period, or if the cycle is longer than a 24 hour period and a multiple of 24 hours in duration.

## TID 8170 Physiological Monitoring Performed During Procedure

This template encodes a description of the physiological monitoring performed during a period of time during or related to a data acquisition procedure (e.g., imaging of research small animals).

**Type:** Extensible

**Order:** Non-Significant

**Table TID 8170. Physiological Monitoring Performed During Procedure**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (P0-005ED, SRT, "Physiological monitoring")	1	M		
2	>	CONTAINS	CODE	EV (P2-31209, SRT, "Electrocardiographic monitoring")	1	U		DCID 231 "Yes-No Only"
3	>	CONTAINS	CODE	EV (P2-22010, SRT, "Monitoring of respiration")	1	U		DCID 231 "Yes-No Only"

**Content Item Descriptions**

Row 2	There is no non-surgical procedure non-specific variant of (P2-34122, SRT, "Monitoring of electrocardiogram at surgery"). (P2-31209, SRT, "Continuous electrocardiogram monitoring") is intended for non-procedural (e.g., 24-hour) monitoring. So a more generic code for any kind of monitoring is used.
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**TID 8182 Exogenous Substance Administration**

This template provides detailed information on a research subject's exposure to exogenous substances. It is a specialization of the more general template TID 9002 "Medication, Substance, Environmental Exposure".

**Table TID 8182. Parameters**

Parameter Name	Parameter Usage
\$ContainerConcept	Coded term for the concept name of the CONTAINER, identifying it as an exogenous substance.
\$CodeConcept	Coded term for the concept name of the CODE, identifying the type of substance.
\$CodeValue	Coded term or Context Group for value of the substance.
\$Classification	Coded term or Context Group for classification of the substance.
\$Route	Coded term or Context Group for the route of administration of the substance.
\$Site	Coded term or Context Group for the anatomical site of administration of the substance
\$TissueOfOrigin	Coded term or Context Group for the tissue of origin of the substance
\$TaxonomicRankOfOrigin	Coded term or Context Group for the taxonomic rank (e.g., species) of origin of the substance

**Type:** Extensible

**Order:** Significant

**Table TID 8182. Exogenous Substance Administration**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	\$ContainerConcept	1	M		
2	>	CONTAINS	CODE	\$CodeConcept	1-n	M		\$CodeValue
3	>>	HAS CONCEPT MOD	CODE	EV (G-C032, SRT, "Classification")	1	U		\$Classification

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
4	>>	HAS OBS CONTEXT	CODE	EV (111534, DCM, "Role of person reporting")	1	U		DCID 7450 "Person Roles"/>
5	>>	HAS PROPERTIES	NUM	EV (111524, DCM, "Age Started")	1	U		UNITS = DCID 7456 "Units of Measure for Age"
6	>>	HAS PROPERTIES	NUM	EV (111525, DCM, "Age Ended")	1	U		UNITS = DCID 7456 "Units of Measure for Age"
7	>>	HAS PROPERTIES	DATETIME	EV (111526, DCM, "DateTime Started")	1	U		
8	>>	HAS PROPERTIES	DATETIME	EV (111527, DCM, "DateTime Ended")	1	U		
9	>>	HAS PROPERTIES	NUM	EV (G-7290, SRT, "Duration")	1	U		UNITS = DCID 6046 "Units of Follow-up Interval"
10	>>	HAS PROPERTIES	CODE	EV (111528, DCM, "Ongoing")	1	U		DCID 230 "Yes-No"
11	>>	HAS PROPERTIES	TEXT	EV (111529, DCM, "Brand Name")	1	U		
12	>>	HAS PROPERTIES	NUM	DCID 6092 "Quantitative Concepts for Usage, Exposure"	1	U		The unit of measure shall be quantity per unit of time
13	>>	HAS PROPERTIES	CODE	DCID 6093 "Qualitative Concepts for Usage, Exposure Amount"	1	U		DCID 6090 "Relative Usage, Exposure Amount"
14	>>	HAS PROPERTIES	CODE	DCID 6094 "Qualitative Concepts for Usage, Exposure Frequency"	1	U		DCID 6091 "Relative Frequency of Event Values"
15	>>	HAS PROPERTIES	CODE	EV (G-C340, SRT, "Route of administration")	1	U		\$Route
16	>>>	HAS PROPERTIES	CODE	EV (G-C581, SRT, "Site of")	1	U		\$Site
17	>>>>	HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	1	MC	IF Row 16 has laterality	DCID 244 "Laterality"
18	>>>	HAS PROPERTIES	COORD3D	EV (127450, DCM, "Stereotactic coordinates")	1	U		
19	>>>	HAS PROPERTIES	CODE	EV (127451, DCM, "Position reference indicator")	1	U		DCID 647 "Position Reference Indicator for Frame of Reference"
20	>>	HAS PROPERTIES	CODE	EV (127401, DCM, "Tissue of origin")	1	U		\$TissueOfOrigin
21	>>	HAS PROPERTIES	CODE	EV (127402, DCM, "Taxonomic rank of origin")	1	U		\$TaxonomicRankOfOrigin

#### Content Item Descriptions

Row 3	Classification is inherited from the more general template TID 9002 "Medication, Substance, Environmental Exposure", and may be supplied as a parameter, but is entirely generic and is not used as an alternative to the more specific information provided in other rows, for example, Rows 19 and 20, tissue and taxonomic rank of origin.
Row 11	Brand name may be used for any type of descriptor or identifier. E.g., a particular cell line might have a designated name, such as "MDA-MB-468", which designates a particular human breast cancer cell line.

Amend existing relevant templates in DICOM PS3.16:

## TID 9002 Medication, Substance, Environmental Exposure

This general template provides detailed information on a patient's medication or substance use, or exposure to environmental factors, including type and duration of use or exposure.

**Table TID 9002. Parameters**

Parameter Name	Parameter Usage
\$ContainerConcept	Coded term for the concept name of the CONTAINER, identifying it as medication, substance, or environmental exposure history.
\$CodeConcept	Coded term for the concept name of the CODE, identifying it as medication, substance, or environmental exposure.
\$CodeValue	Coded term or Context Group for value of the medication, substance, or environmental exposure.
<u>\$Classification</u>	<u>Coded term or Context Group for classification of the medication, substance, or environmental exposure.</u>
<u>\$Route</u>	<u>Coded term or Context Group for the route of administration of the medication, substance, or route of environmental exposure.</u>
<u>\$Site</u>	<u>Coded term or Context Group for the anatomical site of administration of the medication, substance, or anatomical site of environmental exposure.</u>

Type: Extensible  
Order: Significant

**Table TID 9002. Medication, Substance, Environmental Exposure**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	\$ContainerConcept	1	M		
2	>	CONTAINS	CODE	\$CodeConcept	1-n	M		\$CodeValue
3	>>	HAS CONCEPT MOD	CODE	EV (G-C032, SRT, "Classification")	1	U		<u>\$Classification</u>
4	>>	HAS OBS CONTEXT	CODE	EV (111534, DCM, "Role of person reporting")	1	U		DCID 7450 "Person Roles"/>
5	>>	HAS PROPERTIES	NUM	EV (111524, DCM, "Age Started")	1	U		UNITS = <u>EV (a; UCUM, "Year") DCID 7456 "Units of Measure for Age"</u>
6	>>	HAS PROPERTIES	NUM	EV (111525, DCM, "Age Ended")	1	U		UNITS = <u>EV (a; UCUM, "Year") DCID 7456 "Units of Measure for Age"</u>
7	>>	HAS PROPERTIES	DATETIME	EV (111526, DCM, "DateTime Started")	1	U		
8	>>	HAS PROPERTIES	DATETIME	EV (111527, DCM, "DateTime Ended")	1	U		
9	>>	HAS PROPERTIES	NUM	EV (G-7290, SRT, "Duration")	1	U		UNITS = DCID 6046 "Units of Follow-up Interval"
10	>>	HAS PROPERTIES	CODE	EV (111528, DCM, "Ongoing")	1	U		DCID 230 "Yes-No"

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
11	>>	HAS PROPERTIES	TEXT	EV (111529, DCM, "Brand Name")	1	U		
12	>>	HAS PROPERTIES	NUM	DCID 6092 "Quantitative Concepts for Usage, Exposure"	1	U		The unit of measure shall be quantity per unit of time
13	>>	HAS PROPERTIES	CODE	DCID 6093 "Qualitative Concepts for Usage, Exposure Amount"	1	U		DCID 6090 "Relative Usage, Exposure Amount"
14	>>	HAS PROPERTIES	CODE	DCID 6094 "Qualitative Concepts for Usage, Exposure Frequency"	1	U		DCID 6091 "Relative Frequency of Event Values"
15	>>	<u>HAS PROPERTIES</u>	<u>CODE</u>	<u>EV (G-C340, SRT, "Route of administration")</u>	1	U		<u>\$Route</u>
16	>>>	<u>HAS PROPERTIES</u>	<u>CODE</u>	<u>EV (G-C581, SRT, "Site of")</u>	1	U		<u>\$Site</u>
17	>>>>	<u>HAS CONCEPT MOD</u>	<u>CODE</u>	<u>EV (G-C171, SRT, "Laterality")</u>	1	MC	<u>IF Row 16 has laterality</u>	<u>DCID 244 "Laterality"</u>

### Content Item Descriptions

Row 3 " <b>Classification</b> "	<b>No context group is provided for the value set, but it is recommended that values from a standard external coding scheme, such as SRT or NDC, be used. Classification is mapped in UMLS to (C0008902, UMLS, "Classification"). Its definition is completely generic; i.e., it does not refer to any particular type of classification.</b>
Rows 13 & 14	If both of these content items are instantiated, the concept names selected for each should match. For example, use "Relative dose amount" as the concept name for row 13 with "Relative dose frequency" as the concept name for row 14.
<b>Row 15</b>	<b><u>Even though the concept name is route of administration, it is also used for route of exposure in the case of environmental exposure.</u></b>
<b>Rows 16 and 17</b>	<b><u>This pattern of route with a site and laterality modifier follows that used in TID 10022 Radiopharmaceutical Administration Event Data.</u></b>

Rename Annex in DICOM PS3.16:

## C Acquisition Context Module and Protocol Context Templates (Normative)

For reference (unchanged), existing relevant templates in DICOM PS3.16:

### TID 3471 PET Covariates Acquisition Context

Type: Extensible  
Order: Non-Significant

Table TID 3471. PET Covariates Acquisition Context

	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1	NUMERIC	(14749-6, LN, "Glucose")	1	U		UNITS = EV (mmol/l, UCUM, "mmol/l")
2	DATE	(109081, DCM, "Glucose Measurement Date")	1	MC	IFF Row 1 is present	

	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
3	TIME	(109082, DCM, "Glucose Measurement Time")	1	MC	IFF Row 1 is present	

## B DCMR Context Groups (Normative)

Amend DICOM PS3.16 - Content Mapping Resource - Annex B - DCMR Context Groups (Normative) as follows, to add new Context Groups for Preclinical Small Animal Imaging Acquisition Contexts:

### CID 231 Yes-No Only

Type: Non-Extensible  
Version: 20151110

Table CID 231. Yes-No Only

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	R-0038D	Yes	373066001	C1298907
SRT	R-00339	No	373067005	C1298908

#### Note

This context group is intended for use rather than CID 230 "Yes-No" when the value (R-0038A, SRT, "Undetermined") is not permissible.

### CID 241 Present-Absent Only

Type: Non-Extensible  
Version: 20151110

Table CID 241. Present-Absent Only

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	G-A203	Present	52101004	C0150312
SRT	R-4089B	Absent	272519000	C0442733

#### Note

This context group is intended for use rather than CID 240 "Normal-Abnormal" when the value (R-40271, SRT, "Presence Undetermined") is not permissible.

### CID 601 Biosafety Levels

Type: Extensible  
Version: 20151110

Table CID 601. Biosafety Levels

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	R-41E4D	Biosafety level 1	409600007	C1443934
SRT	R-41E4E	Biosafety level 2	409603009	C1443937

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	R-41E4F	Biosafety level 3	409604003	C1443938
SRT	R-41E50	Biosafety level 4	409605002	C1443939

### CID 602 Biosafety Control Reasons

Type: Extensible

Version: 20151110

Table CID 602. Biosafety Control Reasons

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	F-61E79	Biohazardous material	409595003	C0079021
SRT	C-29000	Carcinogen	88376000	C0007090
SRT	F-00D5F	Patient immunocompromised	370388006	C0085393
UMLS	C0003069	Transgenic animal		C0003069

### CID 7457 Sex - Male Female or Both

Type: Extensible

Version: 20151110

Table CID 7457. Sex - Male Female or Both

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
DCM	M	Male		
DCM	F	Female		
DCM	127146	Mixed sex		

### CID 603 Animal Room Types

Type: Extensible

Version: 20151110

Table CID 603. Animal Room Types

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
DCM	127370	Animal housing room		
DCM	127371	Preparation room		
DCM	127372	Imaging procedure room		
SRT	R-305D6	Induction room	414485004	C1532289
SRT	R-305C3	Recovery room	398161000	C0198828
SRT	R-305D3	Isolation room	409688003	C1443994



**Note**

1. Only rooms appropriate for animals in the context of in vivo imaging are described (e.g., not necropsy rooms, etc.)
2. (R-305C3, SRT, "Recovery room" (synonym of "postoperative anesthesia care unit ") is reused here even though its parent is "Location within hospital premises (environment)", which is arguably specifically human. The same is true for (R-305D6, SRT, "Induction room") and (R-305D3, SRT, "Isolation room").

**CID 604 Device Reuse****Type:** Extensible**Version:** 20151110**Table CID 604. Device Reuse**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
DCM	127177	Unused		
DCM	127178	Reused		

**CID 605 Animal Bedding Material****Type:** Extensible**Version:** 20151110**Table CID 605. Animal Bedding Material**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
DCM	127230	Aspen chip bedding		
DCM	127231	Aspen shaving bedding		
DCM	127232	Corn cob bedding		
DCM	127233	Paper-based bedding		
DCM	127234	Pine chip bedding		
DCM	127235	Pine shaving bedding		

**CID 606 Animal Shelter Types****Type:** Extensible**Version:** 20151110**Table CID 606. Animal Shelter Types**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	R-40775	None	260413007	C0549184
DCM	127220	Igloo		
DCM	127221	Red translucent igloo		

**CID 607 Animal Feed Types****Type:** Extensible

Version: 20151110

Table CID 607. Animal Feed Types

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
DCM	127271	NIH07		
DCM	127270	NIH31		
DCM	127272	AIN76		
DCM	127273	AIN93G		
DCM	127274	AIN93M		

**Note**

This context group includes the open source diets described in Barnard DE et al. Open- and Closed-Formula Laboratory Animal Diets and Their Importance to Research. Journal of the American Association for Laboratory Animal Science : JAALAS (2009), 48(6), 709–713. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2786923/>.

A more extensive list of NIH-specified diets for small animals (not just mice and rats) can be found at [https://web.archive.org/web/20100527090853/http://dvrnet.ors.od.nih.gov/diets\\_info.asp](https://web.archive.org/web/20100527090853/http://dvrnet.ors.od.nih.gov/diets_info.asp).

**CID 608 Animal Feed Sources**

Type: Extensible

Version: 20151110

Table CID 608. Animal Feed Sources

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
UMLS	C1547887	Commercial product		
DCM	127390	Locally manufactured product		

**Note**

(C1547887, UMLS, "Commercial product") originates from the HL7 V2.5 Chapter 04 blood products description as an attribute name rather than a value, but in UMLS is not expressly constrained and has as a parent generic semantic type of "Manufactured Object".

**CID 609 Animal Feeding Methods**

Type: Extensible

Version: 20151110

Table CID 609. Animal Feeding Methods

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
NCIt	C64636	ad libitum		C1879743
UMLS	C0425422	Restricted diet		C0425422
DCM	127391	Food treat		
SRT	PA-00620	Gavage	61420007	C0041281

**Note**

(C0425422, UMLS, "Restricted diet") corresponds to the inactive SNOMED concept of "Dietary restriction NOS"; SNOMED currently does not seem to have an active generic concept of a restricted diet, as opposed to many specific types of restricted diet. In this context, the intent is to convey that the diet is controlled and restricted to finite quantities (e.g., as opposed to ad libitum) without requiring a detailed classification of what components are restricted.

**CID 610 Water Types**

**Type:** Extensible

**Version:** 20151110

**Table CID 610. Water Types**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	C-101E9	Tap water	444923006	C2919405
SRT	C-101E8	Distilled water	444883009	C0790233
DCM	127290	Reverse osmosis purified water		
DCM	127291	Reverse osmosis purified, HCl acidified water		

**CID 611 Anesthesia Category Code Type for Small Animal Anesthesia**

**Type:** Extensible

**Version:** 20151110

**Table CID 611. Anesthesia Category Code Type for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
<i>Include CID 612 "Anesthesia Category Code Type from Anesthesia Quality Initiative (AQI)"</i>				

**CID 612 Anesthesia Category Code Type from Anesthesia Quality Initiative (AQI)**

**Type:** Extensible

**Version:** 20151110

**Table CID 612. Anesthesia Category Code Type from Anesthesia Quality Initiative (AQI)**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	P1-C0010	General anesthesia	50697003	C0002915
SRT	P1-C0B00	Sedation	72641008	C0344106
SRT	P1-C0208	Spinal anesthesia	231249005	C0002928
SRT	P1-C0220	Epidural anesthesia	18946005	C0002913
SRT	P1-C0200	Regional anesthesia	27372005	C0002911
SRT	P1-C0037	Topical local anesthesia	386760001	C0472473
SRT	P1-C0038	Local anesthesia	386761002	C0002921
SRT	P1-0512E	Monitored Anesthesia Care (MAC)	398239001	C1301902

**Note**

This context group contains SNOMED procedure code equivalents of enumerated string concepts for the [AQI Schema] element AnesthesiaCategoryCodeType. See <http://www.aqihq.org/aqischdoc/AnesthesiaCategoryCodeType.html>.

**CID 613 Anesthesia Induction Code Type for Small Animal Anesthesia**

**Type:** Extensible

**Version:** 20151110

**Table CID 613. Anesthesia Induction Code Type for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
<i>Include CID 614 "Anesthesia Induction Code Type from Anesthesia Quality Initiative (AQI)"</i>				
SRT	G-D106	Intraperitoneal route	38239002	C1522583

**Note**

The intraperitoneal route is added to the AQI value set, since that route is used for small animal imaging.

**CID 614 Anesthesia Induction Code Type from Anesthesia Quality Initiative (AQI)**

**Type:** Extensible

**Version:** 20151110

**Table CID 614. Anesthesia Induction Code Type from Anesthesia Quality Initiative (AQI)**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	G-D150	By inhalation	112239003	C0205535
SRT	G-D101	Intravenous route	47625008	C1522726
SRT	G-D160	Per rectum	37161004	C1527425
SRT	G-D103	Intramuscular route	78421000	C1556154

**Note**

This context group contains SNOMED administration route code equivalents of enumerated string concepts for the [AQI Schema] element AnesthesiaInductionCodeType. See <http://www.aqihq.org/aqischdoc/AnesthesiaInductionCodeType.html>.

**CID 615 Anesthesia Maintenance Code Type for Small Animal Anesthesia**

**Type:** Extensible

**Version:** 20151110

**Table CID 615. Anesthesia Maintenance Code Type for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
<i>Include CID 616 "Anesthesia Maintenance Code Type from Anesthesia Quality Initiative (AQI)"</i>				

**CID 616 Anesthesia Maintenance Code Type from Anesthesia Quality Initiative (AQI)**

**Type:** Extensible

Version: 20151110

**Table CID 616. Anesthesia Maintenance Code Type from Anesthesia Quality Initiative (AQI)**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	P1-C0020	Inhalation anesthesia system closed rebreathing primary agent	112987001	C0198795
SRT	P1-C0030	Inhalation anesthesia system closed no rebreathing primary agent	44812007	C0198796

**Note**

This context group contains SNOMED procedure code equivalents of enumerated string concepts for the [AQI Schema] element AnesthesiaMaintenanceCodeType. See <http://www.aqihq.org/aqischdoc/AnesthesiaMaintenanceCodeType.html>.

The AQI value "circle system" corresponds to (P1-C0020, SRT, "Inhalation anesthesia, machine system, closed, rebreathing of primary agent"). The SNOMED code meaning has been abbreviated to fit within the allowed DICOM Value Representation.

The AQI value "non-rebreathing" corresponds to (P1-C0030, SRT, "Inhalation anesthesia, machine system, closed, no rebreathing of primary agent"). The SNOMED code meaning has been abbreviated to fit within the allowed DICOM Value Representation.

**CID 617 Airway Management Method Code Type for Small Animal Anesthesia**

Type: Extensible

Version: 20151110

**Table CID 617. Airway Management Method Code Type for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
<i>Include CID 618 "Airway Management Method Code Type from Anesthesia Quality Initiative (AQI)"</i>				
DCM	127060	Nose cone		

**CID 618 Airway Management Method Code Type from Anesthesia Quality Initiative (AQI)**

Type: Extensible

Version: 20151110

**Table CID 618. Airway Management Method Code Type from Anesthesia Quality Initiative (AQI)**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	P2-2290D	Controlled Ventilation	243147009	C0419011
SRT	P2-22902	Artificial Respiration	40617009	C0035205
SRT	P2-22500	Oxygen Therapy	57485005	C0184633
SRT	P0-05DE2	Laryngeal Mask Airway (LMA)	424979004	C0396618
SRT	P0-06211	Intubation of respiratory tract	447996002	C3164350
SRT	A-00BA2	Anesthetic face mask	297120004	C0573976
SRT	A-00BA2	Anesthetic face mask	297120004	C0573976
DCM	127061	Nasal cannula		C0179574
SRT	G-D13E	Via tracheostomy	180640008	C0393370

**Note**

This context group contains SNOMED procedure or physical object or qualifier value code equivalents of enumerated string concepts for the [AQI Schema] element AirwayManagementMethodCodeType. See <http://www.aqihq.org/aqischdoc/AirwayManagementMethodCodeType.html>. Used by permission of the Anesthesia Quality Institute (AQI) (<http://aqihq.org/>).

**CID 619 Airway Management Sub-Method Code Type for Small Animal Anesthesia**

**Type:** Extensible

**Version:** 20151110

**Table CID 619. Airway Management Sub-Method Code Type for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
<i>Include CID 620 "Airway Management Sub-Method Code Type from Anesthesia Quality Initiative (AQI)"</i>				

**CID 620 Airway Management Sub-Method Code Type from Anesthesia Quality Initiative (AQI)**

**Type:** Extensible

**Version:** 20151110

**Table CID 620. Airway Management Sub-Method Code Type from Anesthesia Quality Initiative (AQI)**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
UMLS	C2223982	Inverse ratio ventilation		C2223982
SRT	P2-22914	High frequency ventilation	243154003	C0019540
SRT	P2-22933	Transtracheal jet ventilation	448442005	C3164603
SRT	P2-22916	Continuous flow ventilation	243156001	C0419018

**Note**

This context group contains SNOMED procedure code equivalents of enumerated string concepts for the [AQI Schema] element AirwayManagementSubMethodCodeType. See <http://www.aqihq.org/aqischdoc/AirwayManagementSubMethodCodeType.html>.

**CID 621 Medication Type Code Type for Small Animal Anesthesia**

**Type:** Extensible

**Version:** 20151110

**Table CID 621. Medication Type Code Type for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
<i>Include CID 622 "Medication Type Code Type from Anesthesia Quality Initiative (AQI)"</i>				
DCM	127330	Carrier gas		

**CID 622 Medication Type Code Type from Anesthesia Quality Initiative (AQI)**

**Type:** Extensible

**Version:** 20160212

**Table CID 622. Medication Type Code Type from Anesthesia Quality Initiative (AQI)**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	C-68000	Adrenergic agent	86308005	C0001637
SRT	C-52500	Aminoglycoside antibiotic	14443002	C0002556
SRT	F-6181F	Analgesic	373265006	C0002771
SRT	F-6196E	Antiarrhythmic	372813008	C0003195
SRT	C-5008C	Antibiotic	255631004	C0003232
SRT	F-6180B	Anticholinergic	373246003	C0242896
SRT	F-6180B	Anticholinergic agent	373246003	C0242896
SRT	F-6199A	Anticoagulant	372862008	C0003280
SRT	R-F1216	Anticonvulsant	255632006	C0003286
SRT	R-F1216	Anticonvulsant	255632006	C0003286
SRT	F-B1810	Antidiuretic hormone	77671006	C1705480
SRT	C-85800	Antiemetic	52017007	C0003297
SRT	F-617EF	Antifungal	373219008	C0003308
SRT	F-618BA	Anti-heparin agent	372708000	C0304941
SRT	F-61969	Antihistamine	372806008	C0003360
SRT	C-81100	Antihypertensive	1182007	C0003364
UMLS	C1579431	Antihypoglycemic		C1579431
SRT	R-F2B23	Barbiturate	372798009	C0004745
SRT	R-F2B1D	Benzodiazepine	372664007	C0005064
SRT	F-619EF	Benzodiazepine antagonist	372906009	C0360298
SRT	F-61814	Beta-blocker	373254001	C0001645
SRT	C-00231	Beta-Lactam antibiotic	373297006	C0026458
SRT	R-005B3	Blood product	410652009	C0456388
SRT	F-616EB	Bronchodilator	372580007	C0006280
SRT	C-14300	Calcium	5540006	C0006675
SRT	F-61878	Calcium channel blocker	373304005	C0006684
SRT	F-618D8	Caloric agent	373530005	C0280082
SRT	C-002B1	Carbapenem antibiotic	396345004	C0006968
SRT	C-0021C	Cephalosporin antibiotic	373262009	C3536856
SRT	F-620E8	Cholinergic agent	421148003	C1720711
SRT	F-618AF	Diuretic	372695000	C0012798
SRT	C-50013	Drug diluent	74626007	C0304221
SRT	F-B2700	Estrogen	41598000	C0014939
SRT	C-84989	Gastrointestinal prokinetic	116532005	C1268865
SRT	F-6186A	General anesthetic	373288007	C0017302
UMLS	C0019593	H2 antagonist		C0019593
SRT	F-618A5	Hemostatic agent	372681003	C0019120
SRT	C-50309	Hypoglycemic	312064005	C0020616
SRT	C-80120	Inotropic agent	111139005	C0304509
SRT	C-0023B	Lincomycin antibiotic	372677003	C0023726

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	C-00286	Linezolid antibiotic	387056004	C0663241
SRT	F-6183D	Local anesthetic	373477003	C0002934
SRT	F-6186F	Low Molecular Weight Heparin	373294004	C0019139
SRT	C-00211	Macrolide antibiotic	372480009	C0003240
SRT	C-14800	Magnesium	72717003	C0024467
SRT	F-616FE	Metronidazole antibiotic	372602008	C0025872
SRT	F-6188F	Narcotic (opiate) antagonist	372656001	C0027410
UMLS	C0027409	Narcotic analgesic		C0027409
SRT	C-97302	Nasal decongestant	96329004	C0042398
SRT	F-6180F	NeuroMuscular Blocking (NMB) - depolarizing	373250005	C0027867
SRT	F-61959	NeuroMuscular Blocking (NMB) - non depolarizing	372790002	C0304435
SRT	F-61898	NSAID	372665008	C0003211
SRT	F-61D70	Ocular Lubricant	398828005	C0717951
SRT	F-61E2A	Oxytocic	410937004	C0030094
SRT	C-0021D	Penicillin antibiotic	373270004	C0030842
SRT	F-616E7	Plasma Expander	372578001	C1268852
SRT	C-13500	Potassium	88480006	C0032821
SRT	C-0024C	Quinolone antibiotic	372722000	C1533693
SRT	F-6205D	Respiratory stimulant	418760000	C0282685
SRT	F-61899	Skeletal muscle relaxant	372666009	C0037250
SRT	C-10098	Steroid	116566001	C0038317
SRT	C-00257	Sulfonamide antibiotic	372788003	C0599503
SRT	C-00216	Tetracycline antibiotic	373206009	C1744619
SRT	F-B3000	Thyroid hormone	18220004	C0040135
SRT	C-0024E	Vancomycin antibiotic	372735009	C0042313
SRT	F-619AA	Vasoconstrictor	372881000	C0042397
SRT	F-61957	Vasodilator	372787008	C0042402
SRT	F-BB000	Vitamin	87708000	C0042890

### Note

This context group contains SNOMED substance or product code equivalents of enumerated string concepts for the [AQI Schema] element MedicationTypeCodeType. See <http://www.aqihq.org/aqischdoc/MedicationTypeCodeType.html> and <http://www.aqihq.org/aqischdoc/MedicationTypeCodeTypeExampleList.html>.

The AQI value "ABX-Miscellaneous" corresponds to (C-5008C, SRT, "Antibiotic") product, since there is no substance code in SNOMED.

The AQI value "Vasopressor" corresponds to (F-619AA, SRT, "Vasoconstrictor").

No equivalent concepts are included for MedicationTypeCodeType values of NonFormulary antibiotic, Dye, Indigo Carmine Red, and Non-Formulary.



## CID 623 Medication for Small Animal Anesthesia

Type: Extensible

Version: 20151110

**Table CID 623. Medication for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
<i>Include CID 624 "Inhalational Anesthesia Agents for Small Animal Anesthesia"</i>				
<i>Include CID 625 "Injectable Anesthesia Agents for Small Animal Anesthesia"</i>				
<i>Include CID 626 "Premedication Agents for Small Animal Anesthesia"</i>				
<i>Include CID 627 "Neuromuscular Blocking Agents for Small Animal Anesthesia"</i>				
<i>Include CID 628 "Ancillary Medications for Small Animal Anesthesia"</i>				
<i>Include CID 629 "Carrier Gases for Small Animal Anesthesia"</i>				
<i>Include CID 630 "Local Anesthetics for Small Animal Anesthesia"</i>				

## CID 624 Inhalational Anesthesia Agents for Small Animal Anesthesia

Type: Extensible

Version: 20151110

**Table CID 624. Inhalational Anesthesia Agents for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	C-10520	Carbon dioxide	31811003	C0007012
SRT	C-20830	Chloroform	259153006	C0008238
SRT	F-61AC9	Desflurane	386841003	C0063252
SRT	C-21216	Diethyl ether	259170003	C0014994
SRT	F-61A3F	Enflurane	387176008	C0014277
SRT	F-61AFE	Halothane	387351001	C0018549
SRT	F-61B0A	Isoflurane	387368002	C0022180
SRT	C-6A16A	Methoxyflurane	11136004	C0025688
SRT	C-6A118	Nitrous oxide	111132001	C0028215
SRT	F-61ACA	Sevoflurane	386842005	C0074414

### Note

In this context group, SNOMED substance codes are used in preference to product codes, since there is no need to refer to specific products or preparations. SNOMED codes are used in preference to other potential sources of pharmaceutical related codes, such as from the National Drug Code (NDC) directory.

## CID 625 Injectable Anesthesia Agents for Small Animal Anesthesia

Type: Extensible

Version: 20160212

**Table CID 625. Injectable Anesthesia Agents for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	C-23805	Alphachloralose	277016007	C0008162
SRT	C-6A161	Alphadolone	125707004	C0051481
UMLS	C0051482	Alphaxalone		C0051482
SRT	C-640A0	Azaperone	96229001	C0004477
SRT	R-F2B27	Butabarbital	372901004	C0006464
SRT	R-F6E36	Chloral hydrate	273948005	C0008161
SRT	R-F2B2C	Diazepam	387264003	C0012010
SRT	F-61A26	Droperidol	387146001	C0013136
SRT	F-61A66	Etomidate	387218008	C0015131
UMLS	C0060473	Fluanisone		C0060473
SRT	F-6182F	Ketamine	373464007	C0022614
SRT	F-61848	Methohexital	373488009	C0025668
UMLS	C0025856	Metomidate		C0025856
SRT	F-6183C	Midazolam	373476007	C0026056
SRT	R-F2B1F	Pentobarbital	372703009	C0030883
SRT	F-61B48	Propofol	387423006	C0033487
SRT	C-6A16B	Thiamylal	40342009	C0039855
SRT	F-61BB2	Thiopental	387448009	C0936073
SRT	C-6A190	Tiletamine	96265006	C0242522
SRT	C-6A16E	Tribromoethanol	84386009	C0084847
SRT	C-29020	Urethane (ethyl carbamate)	873008	C0041964
SRT	C-640B0	Xylazine	96230006	C0242544
SRT	C-64090	Zolazepam	96227004	C0917859

**Note**

In this context group, SNOMED substance codes are used in preference to product codes, since there is no need to refer to specific products or preparations. SNOMED codes are used in preference to other potential sources of pharmaceutical related codes, such as from the National Drug Code (NDC) directory.

**CID 626 Premedication Agents for Small Animal Anesthesia**

**Type:** Extensible

**Version:** 20151110

**Table CID 626. Premedication Agents for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	C-62960	Acepromazine	96218000	C0000959
SRT	F-61A7F	Chlorpromazine	387258005	C0008286

**CID 627 Neuromuscular Blocking Agents for Small Animal Anesthesia**

**Type:** Extensible

2 **Version:** 20151110

3 **Table CID 627. Neuromuscular Blocking Agents for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	F-61916	Succinylcholine	372724004	C0038627
SRT	F-61639	Pancuronium	373738000	C0030310

8 **Note**

9 In this context group, SNOMED substance codes are used in preference to product codes, since there is no need to refer  
10 to specific products or preparations. SNOMED codes are used in preference to other potential sources of pharmaceutical  
11 related codes, such as from the National Drug Code (NDC) directory.

12 **CID 628 Ancillary Medications for Small Animal Anesthesia**

13 **Type:** Extensible

16 **Version:** 20151110

17 **Table CID 628. Ancillary Medications for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
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19 **Note**

20 This context group is currently empty since no ancillary medications have been identified for this use case yet.

21 **CID 629 Carrier Gases for Small Animal Anesthesia**

22 **Type:** Extensible

25 **Version:** 20151110

26 **Table CID 629. Carrier Gases for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	C-6A102	Oxygen gas	320917000	C0350411
SRT	C-6A148	Medical air	417696007	C3536832
UMLS	C3846005	Room air		C3846005

32 **Note**

33 In this context group, though SNOMED substance codes are normally used in preference to product codes, in the case of  
34 (C-6A102, SRT, "Oxygen gas") there is no corresponding substance that is specifically the gaseous form of oxygen.

35 **CID 630 Local Anesthetics for Small Animal Anesthesia**

36 **Type:** Extensible

38 **Version:** 20151110

**Table CID 630. Local Anesthetics for Small Animal Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	F-61A28	Bupivacaine	387150008	C0006400
SRT	C-80477	Lidocaine + Prilocaine	346553009	C0617623
SRT	F-61BD0	Lidocaine	387480006	C0023660

**Note**

- In this context group, SNOMED substance codes are used in preference to product codes, since there is no need to refer to specific products or preparations. SNOMED codes are used in preference to other potential sources of pharmaceutical related codes, such as from the National Drug Code (NDC) directory.
- For Lidocaine + Prilocaine, since it is a mixture of two substances, the code for the product concept is used. The code for a mixture of unspecified type is used, rather than a more specific code, e.g., for the so-called "Eutectic Mixture of Local Anesthetics (EMLA)", which consists of Lidocaine + Prilocaine. UMLS contains three distinct concepts, (C0059079, UMSL, "EMLA"), (C0617623, UMLS, "Lidocaine/Prilocaine") and (C0950567, UMLS, "Eutectic Lidocaine-Prilocaine").

**CID 631 Phase of Procedure Requiring Anesthesia****Type:** Extensible**Version:** 20151110**Table CID 631. Phase of Procedure Requiring Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
<i>Include CID 632 "Phase of Surgical Procedure Requiring Anesthesia"</i>				
<i>Include CID 633 "Phase of Imaging Procedure Requiring Anesthesia"</i>				

**CID 632 Phase of Surgical Procedure Requiring Anesthesia****Type:** Extensible**Version:** 20151110**Table CID 632. Phase of Surgical Procedure Requiring Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	R-413C5	Preoperative	262068006	C0445204
SRT	R-400B2	Intraoperative	277671009	C0456904
SRT	R-413B7	Postoperative	262061000	C0032790

**CID 633 Phase of Imaging Procedure Requiring Anesthesia****Type:** Extensible**Version:** 20151110

**Table CID 633. Phase of Imaging Procedure Requiring Anesthesia**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	R-40FB9	Before procedure	307153007	C0585032
SRT	R-40FBA	During procedure	307154001	C0585033
SRT	R-422A4	After procedure	303110006	C0580203

**Note**

The concepts used in this context group are more general than those for a specific procedure, e.g., surgery, radiotherapy, chemotherapy. In SNOMED, the concepts used in this context group are the parent concepts of the surgically-specific concepts used in CID 631 "Phase of Procedure Requiring Anesthesia". There are no concepts defined specifically for periods related to an imaging procedure so the general concepts suffice (in context).

**CID 634 Phase of Animal Handling**

**Type:** Extensible

**Version:** 20151110

**Table CID 634. Phase of Animal Handling**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
DCM	127101	In home cage		
DCM	127102	During transport		
DCM	127103	Staging prior to imaging		
DCM	127104	Preparation for imaging		
SRT	P1-C0012	Anesthesia induction	241687005	C0473960
SRT	P0-0099A	Imaging procedure	363679005	C0011923
UMLS	C0002908	Anesthesia recovery period		C0002908

**CID 635 Heating Method**

**Type:** Extensible

**Version:** 20151110

**Table CID 635. Heating Method**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	R-FDB79	Air heating pad	468192005	
SRT	A-18041	Electric blanket	79811009	C0336614
SRT	A-2C140	Electric heating pad	27812008	C0181157
DCM	127250	Forced air heater		
SRT	A-17454	Forced air warming blanket	420572009	C1719899
DCM	127251	Heated imaging device		
DCM	127252	Heated patient support		
DCM	127253	Heated water blanket		
UMLS	C0181514	Heat lamp		C0181514

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	A-2C141	Non-electric heating pad	39790008	C0521200
DCM	127254	Pre-heated pad		
DCM	127255	Unheated		
SRT	A-17450	Warmer device	71384000	C0184348
SRT	A-17452	Warming blanket	421335007	C0184351

## CID 636 Temperature Sensor Device Component Type for Small Animal Procedures

Type: Extensible

Version: 20151110

### Table CID 636. Temperature Sensor Device Component Type for Small Animal Procedures

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	F-00BB8	Rectal temperature	307047009	C0489749
UMLS	C0039810	Thermography		C0039810
DCM	127240	Carrier temperature sensor		

#### Note

(C0039810, UMLS, "Thermography") is a general concept that also encompasses diagnostic uses of thermography, in addition to simple temperature measurement; only the latter meaning is used here, as is implicit from the context of invocation.

## CID 637 Exogenous Substance Types

Type: Extensible

Version: 20151110

### Table CID 637. Exogenous Substance Types

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	G-C1F9	Graft material	246345001	C0181074
DCM	127460	Tumor Graft		
SRT	T-1A080	Fibril	88921000	C0225328
SRT	L-30000	Virus	49872002	C0042776
SRT	F-CB250	Cytokine	75777003	C0079189
SRT	C-00224	Toxin	80917008	C0040549

#### Note

The specific concept (C22490, NCIt, "Tumor Cell Graft") (UMLS:C1519674) is not used, since grafts may not be cell suspensions, but rather entire tumors, fragments of tumor tissue, etc. Whether the graft is a xenograft or homograft is not specified, and may be encoded elsewhere (e.g., by encoding the species of origin). The non-tumor specific concept (G-C1F9, SRT, "Graft material") may be used when the graft is not a tumor (though strictly speaking, it is a SNOMED attribute rather than substance; UMLS:C0181074 does not make such a distinction).

## CID 638 Exogenous Substance

Type: Extensible

Version: 20151110

Table CID 638. Exogenous Substance

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
<i>Include CID 639 "Tumor Graft Histologic Type"</i>				
<i>Include CID 640 "Fibrils"</i>				
<i>Include CID 641 "Viruses"</i>				
<i>Include CID 642 "Cytokines"</i>				
<i>Include CID 643 "Toxins"</i>				

## CID 639 Tumor Graft Histologic Type

Type: Extensible

Version: 20151110

Table CID 639. Tumor Graft Histologic Type

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	M-81403	Adenocarcinoma	35917007	C0001418
SRT	M-87303	Amelanotic melanoma	70594002	C0206735
SRT	M-94003	Astrocytoma	38713004	C0004114
NCIt	C2923	Bronchioloalveolar adenocarcinoma		C0007120
SRT	M-80103	Carcinoma	68453008	C0007097
SRT	M-89803	Carcinosarcoma	63264007	C0007140
SRT	M-84403	Cystadenocarcinoma	21008007	C0010631
SRT	M-94403	Glioblastoma	63634009	C0017636
SRT	D0-F0369	Infiltrating ductal carcinoma of breast	408643008	C1134719
SRT	M-80123	Large cell carcinoma	22687000	C0206704
SRT	DC-F4113	Leukemia	93143009	C0023418
SRT	M-87203	Melanoma	2092003	C0025202
SRT	M-90503	Mesothelioma	62064005	C0025500
SRT	M-80453	Mixed small cell carcinoma	21326004	C0334240
SRT	M-80463	Non-small cell carcinoma	128632008	C1266002
SRT	M-91803	Osteosarcoma	21708004	C0029463
SRT	R-FB83F	Renal cell carcinoma	702391001	C0007134
SRT	M-88003	Sarcoma	2424003	C1261473
SRT	M-80413	Small cell carcinoma	74364000	C0262584
SRT	M-80323	Spindle cell carcinoma	65692009	C0205697
SRT	M-80703	Squamous cell carcinoma	28899001	C0007137

**CID 640 Fibrils**

Type: Extensible  
Version: 20151110

**Table CID 640. Fibrils**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
DCM	127851	Human alpha synuclein preformed fibrils		
DCM	127852	Mouse alpha synuclein preformed fibrils		
DCM	127853	Human Tau preformed fibrils		
DCM	127854	Mouse Tau preformed fibrils		

**CID 641 Viruses**

Type: Extensible  
Version: 20151110

**Table CID 641. Viruses**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	L-30606	Theiler's murine encephalomyelitis virus	42024000	C0206425
SRT	L-35500	Adeno-associated virus group	112381006	C0001417

**CID 642 Cytokines**

Type: Extensible  
Version: 20151110

**Table CID 642. Cytokines**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	F-CB962	Tumor necrosis factor alpha	39525005	C1456820
SRT	F-C0101	Interferon gamma	420303002	C0021745
SRT	F-CB902	Vascular endothelial growth factor	417324009	C0078058

**CID 643 Toxins**

Type: Extensible  
Version: 20151110

**Table CID 643. Toxins**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	F-63750	Lysophosphatidylcholine	54446009	C0024360
UMLS	C0019873	Ethidium Bromide		C0019873
PUBCHEM_CID	4624	6-hydroxydopamine		



Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	F-63390	Lipopolysaccharide	3325005	C0023810

## CID 644 Exogenous Substance Administration Sites

Type: Extensible  
Version: 20151110

Table CID 644. Exogenous Substance Administration Sites

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	T-D2310	Flank	58602004	C0230171
SRT	T-A0100	Brain	12738006	C0006104
SRT	M-8FFFF	Tumor	108369006	C0027651

### Note

Since this context group defines the sites, rather than routes of administration, if the exogenous substance is administered into a tumor, the code for the morphologic abnormality (M-8FFFF, SRT, "Tumor") is used, rather than the specific concept for the route (R-F2CD4, SRT, "Intratumor route") (which may also be present as the value for the separately encoded route of administration, if present).

## CID 645 Exogenous Substance Tissue of Origin

Type: Extensible  
Version: 20151110

Table CID 645. Exogenous Substance Tissue of Origin

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	T-D04AC	Ascitic fluid	409615008	C0003964
SRT	T-D016E	Bone	272673000	C0262950
SRT	T-A0100	Brain	12738006	C0006104
SRT	T-04000	Breast	76752008	C0006141
SRT	T-A0090	Central nervous system	21483005	C0927232
SRT	T-59300	Colon	71854001	C0009368
DCM	127801	Embryonic kidney		
SRT	T-71000	Kidney	64033007	C0022646
SRT	T-28000	Lung	39607008	C0024109
SRT	T-C6020	Lymph	38000004	C0024202
SRT	T-D03C2	Lymphatic tissue	181768009	C0024296
SRT	T-C4000	Lymph Node	59441001	C0024204
SRT	DF-00436	Metastasis	128462008	C2939419
SRT	T-87000	Ovary	15497006	C0029939
SRT	D2-80100	Pleural effusion	60046008	C0032227
SRT	T-9200B	Prostate	181422007	C1278980
SRT	D2-F1106	Pulmonary metastasis	94391008	C0153676

## CID 646 Preclinical Small Animal Imaging Procedures

Type: Extensible

Version: 20151110

**Table CID 646. Preclinical Small Animal Imaging Procedures**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
LN	46305-9	Whole body CT		C1830206
LN	24725-4	Head CT	303653007	C0202691
LN	46358-8	MRI whole body	426252008	C1830259
LN	24590-2	Brain MRI		
LN	44139-4	PET whole body	702767007	C1715409
LN	44138-6	Brain PET	241434002	C0412493
LN	42175-0	Radionuclide scan of whole body	229033006	C1626178
LN	24730-4	Radionuclide brain scan	41440006	C0581582
DCM	127901	SPECT of whole body		
LN	39632-5	Brain SPECT		C1543694
DCM	127902	SPECT CT of whole body		
SRT	P5-B0008	Ultrasonography of total body	24135002	C0203309

### Note

- The inconsistent pattern of modality and anatomy in the code meaning is present in the source coding scheme (e.g., "Whole body CT" versus "PET whole body"), and not changed, except where necessary (e.g., (42175-0, LN, "Radionuclide scan of whole body") is actually just "scan of whole body" in the source scheme, which is insufficient, so "radionuclide" has been added).
- The UMLS codes that map to the SNOMED concepts, when present, are shown, in the cases when UMLS is lacking a mapping between the LOINC and SNOMED codes. E.g., (44138-6, LN, "Brain PET") maps directly to (C1715408, UMLS, "Multisection:Find:Pt:Brain:Doc:Radnuc.PET"), but (P5-0A001, SRT, "PET Brain Study") maps to (C0412493, UMLS, "PET Brain Study"), which is used instead. In general, UMLS does not unify the mappings from LOINC and SNOMED, presumably due to the lexical dissimilarity of the terms (i.e., the LOINC mapping seems to be based on the fully-specified name rather than the long common name).

## CID 647 Position Reference Indicator for Frame of Reference

Type: Extensible

Version: 20151110

**Table CID 647. Position Reference Indicator for Frame of Reference**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
FMA	264776	Bregma		C0934419
FMA	264773	Lambda		C0926407

### Note

An FMA code is used for bregma since SNOMED only contains fetal bregma.

Amend existing context groups in DICOM PS3.16 to add additional concepts:

## CID 11 Route of Administration

Type: Extensible  
Version: ~~20100608~~ 20151110

Table CID 11. Route of Administration

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	G-D101	Intravenous route	47625008	C1522726
SRT	G-D102	Intra-arterial route	58100008	C1561451
SRT	G-D103	Intramuscular route	78421000	C1556154
SRT	G-D104	Subcutaneous route	34206005	C1522438
SRT	G-D105	Intracutaneous route	59593002	C1522475
SRT	G-D106	Intraperitoneal route	38239002	C1522583
SRT	G-D107	Intramedullary route	60213007	C1512957
SRT	G-D108	Intrathecal route	72607000	C0677897
SRT	G-D109	Intra-articular route	12130007	C0205528
SRT	G-D111	Intraepithelial route	89947002	C1512943
SRT	G-D112	Topical route	6064005	C1522168
SRT	G-D140	Oral route	26643006	C1527415
SRT	G-D142	Transluminal route	9942002	C0205532
SRT	G-D144	Intraluminal route	37737002	C1522217
SRT	G-D146	Extraluminal route	31638007	C0205534
SRT	G-D150	By inhalation	112239003	C0205535
SRT	G-D160	Per rectum	37161004	C1527425
SRT	G-D164	Vaginal route	16857009	C1522570
SRT	G-D17C	Intracoronary route	372463005	C0595454
SRT	G-D173	Intracardiac route	372460008	C1522207
SRT	R-F2C86	Intraventricular route - cardiac	420287000	C1720462
<b><u>DCM</u></b>	<b><u>127070</u></b>	<b><u>Retro-orbital route</u></b>		
<b><u>SRT</u></b>	<b><u>G-D172</u></b>	<b><u>Nasal route</u></b>	<b><u>46713006</u></b>	<b><u>C1522019</u></b>
<b><u>SRT</u></b>	<b><u>G-D17D</u></b>	<b><u>Intradermal route</u></b>	<b><u>372464004</u></b>	<b><u>C1522475</u></b>
<b><u>SRT</u></b>	<b><u>R-F2CD4</u></b>	<b><u>Intratumor route</u></b>	<b><u>447122006</u></b>	<b><u>C2960749</u></b>

For reference (unchanged) and to allow the hypertext links to work, existing relevant context groups in DICOM PS3.16:

## CID 100 Quantitative Diagnostic Imaging Procedures

Type: Extensible  
Version: 20141110

**Table CID 100. Quantitative Diagnostic Imaging Procedures**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	P5-09051	Magnetic resonance imaging guidance	258177008	C0442974
DCM	126020	Multiparametric MRI		
DCM	126021	Multiparametric MRI of prostate		
DCM	126022	Multiparametric MRI of whole body		
SRT	P5-0907F	Dynamic magnetic resonance imaging of knee	433139009	C2315346
SRT	P5-70694	Dynamic magnetic resonance imaging of pelvis	446315002	C2960816
LN	44139-4	PET whole body		C1715409
SRT	P5-080FF	PET/CT FDG imaging of whole body	443271005	C2732676
SRT	P5-08118	PET/CT MET imaging of whole body	443844003	C2732956
RADLEX	RPID96	CT head perfusion with IV contrast		
RADLEX	RPID5258	NM head perfusion brain SPECT		
RADLEX	RPID5427	NM head perfusion brain PET-CT AV-45		

**CID 230 Yes-No**

Type: Non-Extensible  
Version: 20060613

**Table CID 230. Yes-No**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	R-0038D	Yes	373066001	C1298907
SRT	R-00339	No	373067005	C1298908
SRT	R-0038A	Undetermined	373068000	C3536725

**CID 244 Laterality**

Type: Non-Extensible  
Version: 20030108

**Table CID 244. Laterality**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	G-A100	Right	24028007	C0205090
SRT	G-A101	Left	7771000	C0205091
SRT	G-A102	Right and left	51440002	C0238767
SRT	G-A103	Unilateral	66459002	C0205092

**CID 6092 Quantitative Concepts for Usage, Exposure**

Type: Extensible  
Version: 20040112

**Table CID 6092. Quantitative Concepts for Usage, Exposure**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	G-C0B7	Dosage	260911001	C0178602
DCM	111578	Dose frequency		
DCM	111579	Rate of exposure		
DCM	111580	Volume of use		

**CID 6046 Units of Follow-up Interval**

Type: Extensible  
Version: 20020904

**Table CID 6046. Units of Follow-up Interval**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
UCUM	d	day		
UCUM	wk	week		
UCUM	mo	month		
UCUM	a	year		

**CID 6090 Relative Usage, Exposure Amount**

Type: Extensible  
Version: 20050822

**Table CID 6090. Relative Usage, Exposure Amount**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
DCM	111575	High		
DCM	111576	Medium		
DCM	111577	Low		
DCM	111587	No known exposure		

**CID 6091 Relative Frequency of Event Values**

Type: Extensible  
Version: 20040112

**Table CID 6091. Relative Frequency of Event Values**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
SRT	R-40377	Continuous	255238004	C0549178
SRT	G-7154	Frequent	70232002	C0332183
SRT	R-40365	Mid-frequency	255218000	C0439604
SRT	G-7155	Infrequent	27789000	C0521114
SRT	R-40B16	As required	225761000	C0558288
SRT	R-4112F	Single event	307486002	C0585347

## CID 6093 Qualitative Concepts for Usage, Exposure Amount

Type: Extensible  
Version: 20040112

**Table CID 6093. Qualitative Concepts for Usage, Exposure Amount**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
DCM	111581	Relative dose amount		
DCM	111582	Relative amount of exposure		
DCM	111583	Relative amount of use		

## CID 6094 Qualitative Concepts for Usage, Exposure Frequency

Type: Extensible  
Version: 20040112

**Table CID 6094. Qualitative Concepts for Usage, Exposure Frequency**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
DCM	111584	Relative dose frequency		
DCM	111585	Relative frequency of exposure		
DCM	111586	Relative frequency of use		

## D Controlled Terminology Definitions (Normative)

*Amend DICOM PS3.16 - Content Mapping Resource - Controlled Terminology Definitions to add the following new concepts:*

**Table D-1. DICOM Controlled Terminology Definitions**

Code Value	Code Meaning	Definition	Notes
127001	Preclinical Small Animal Imaging Acquisition Context	A description of the conditions present during acquisition of images of small animals during preclinical research.	
127005	Animal handling during specified phase	The conditions present related to the handling of an animal during a specified phase.	
127006	Phase of animal handling	A specified phase of handling of an animal (e.g., transport, preparation).	
127010	Biosafety conditions	A description of biosafety conditions (e.g., present during small animal handling for research).	
127011	Reason for biosafety controls	The reason that biosafety controls are in place.	
127040	Heating conditions	A description of heating conditions (e.g., present during small animal handling for research).	
127050	Circadian effects	A description of Circadian effects (e.g., present during small animal handling for research).	
127060	Nose cone	A form of face mask that fits over the nose used for delivery of inhalational anesthesia (usually for small animals)	
127061	Nasal cannula	Cannula inserted in the nose used for delivery of inhalational anesthesia or other inhaled gases.	

Code Value	Code Meaning	Definition	Notes
127070	Retro-orbital route	A route of administration of a substance via the retro-orbital venous sinus.  Yardeni T et al. (2011). Retro-orbital injections in mice. Lab Animal, 40(5), 155–160. doi:10.1038/labon0511-155 <a href="http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3158461/">http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3158461/</a>	
127101	In home cage	The phase of handling of an animal that provides their normal environment between procedures.	
127102	During transport	The phase of handling of an animal that is transport between environments.	
127103	Staging prior to imaging	The phase of handling of an animal that is staging prior to an imaging procedure (e.g., after removal from their home environment and transport cage, and awaiting preparation, induction or imaging). During this phase the animals are not subject to intervention (e.g., injection, catheterization) (cf. 127104, DCM, "Preparation for imaging").	
127104	Preparation for imaging	The phase of handling of an animal that is preparation prior to an imaging procedure that involves handling and intervention (e.g., such as injection, catheterization) (cf. 127103, DCM, "Staging prior to imaging").	
127110	Housing role	The phase of handling of an animal during which the housing conditions are applicable.	
127120	Animal housing	The manner in which animals are housed.	
127121	Animal room type	The room type in which racks of animal cages are housed.	
127122	Animal room identifier	The identifier of the room in which racks of animal cages are housed.	
127125	Housing manufacturer	The manufacturer of the animal housing.	
127126	Housing rack product name	The manufacturer's product name of the animal housing rack.	
127127	Housing rack product code	The manufacturer's product code of the animal housing rack.	
127128	Housing unit product name	The manufacturer's product name of the animal housing unit (or bottom of unit if separate lid).	
127129	Housing unit product code	The manufacturer's product code of the animal housing unit (or bottom of unit if separate lid).	
127130	Housing unit lid product name	The manufacturer's product name of the animal housing unit lid.	
127131	Housing unit lid product code	The manufacturer's product code of the animal housing unit lid.	
127140	Number of racks per room	The number of animal housing racks per room.	
127141	Number of housing units per rack	The number of animal housing units per rack.	
127142	Housing unit location in rack	The location of the housing unit in the rack.	
127143	Number of animals within same housing unit	The number of animals in a single housing (e.g., in a single cage, or in an animal carrier for imaging).	
127144	Sex of animals within same housing unit	The sex of multiple animals contained in a single housing (cage).	
127145	Sex of handler	The sex of the animal handler(s).	
127146	Mixed sex	A group consisting of individuals of both sexes (both males and females). E.g., a group of animals in a cage, group of animal handlers.	
127150	Total duration in housing	The total period of time that a subject spends in specified housing conditions.	
127151	Housing change interval	The period of time between changes of housing conditions.	
127152	Manual handling interval	The period of time between episodes of manual handling of the subject.	

Code Value	Code Meaning	Definition	Notes
127153	Housing unit movement	A description of the manner in which the housing unit is moved (e.g., how a cage is transported).	
127160	Housing unit width	The width of the housing unit (e.g., cage).	
127161	Housing unit height	The height of the housing unit (e.g., cage).	
127162	Housing unit length	The length of the housing unit (e.g., cage).	
127170	Housing individually ventilated	Whether or not the housing unit (e.g., cage) is individually ventilated.	
127172	Air changes	How frequently the entire volume of air within a defined space is replaced (e.g., within an animal cage).	
127175	Housing unit reuse	Whether or not the housing unit has been previously used for different animals.	
127177	Unused	The device (e.g., animal housing unit aka. cage) has not previously been used for different animals.	
127178	Reused	The device (e.g., animal housing unit aka. cage) has previously been used for different animals.	
127180	Bedding manufacturer	The manufacturer of the bedding material.	
127181	Bedding product name	The manufacturer's product name of the bedding material.	
127182	Bedding product code	The manufacturer's product code of the bedding material.	
127183	Bedding volume	The volume of bedding material.	
127184	Bedding mass	The mass of bedding material.	
127185	Bedding depth	The depth of bedding material.	
127190	Enrichment material	Material provided to enrich the environment of a small animal for the purpose of reducing stress, improving health and/or improving reproducibility of results. E.g., nesting material.	
127191	Enrichment manufacturer	The manufacturer of the material provided to enrich the environment of a small animal.	
127192	Enrichment material present	Whether or not material is provided to enrich the environment of a small animal for the purpose of reducing stress, improving health and/or improving reproducibility of results. E.g., nesting material.	
127193	Exerciser device present	Whether or not an exerciser device is present.	
127195	Shelter type	The type of shelter provided for small animals within their housing.	
127196	Shelter manufacturer	The manufacturer of the small animal shelter.	
127197	Shelter product name	The manufacturer's product name of the small animal shelter.	
127198	Shelter product code	The manufacturer's product code of the small animal shelter.	
127200	Feed manufacturer	The manufacturer of the feed.	
127201	Feed product name	The manufacturer's product name of the feed.	
127202	Feed product code	The manufacturer's product code of the feed.	
127205	Feed source	The source of animal feed.	
127210	Feedback temperature regulation	Temperature is regulated by feedback from a temperature sensor used to control an active heating or cooling device.	
127214	Total duration of light-dark cycle	The total duration of single light-dark cycle (e.g., usually 24 hours).	
127215	Lights on time of day	The time of day when the lights are turned on.	
127220	Igloo	Igloo shaped small animal shelter	
127221	Red translucent igloo	Red translucent igloo-shaped small animal shelter	
127230	Aspen chip bedding	Animal bedding material made from aspen chips.	
127231	Aspen shaving bedding	Animal bedding material made from aspen shavings.	



Code Value	Code Meaning	Definition	Notes
127232	Corn cob bedding	Animal bedding material made from (milled) corn cobs.	
127233	Paper-based bedding	Animal bedding material made from paper.	
127234	Pine chip bedding	Animal bedding material made from pine chips.	
127235	Pine shaving bedding	Animal bedding material made from pine shavings.	
127240	Carrier temperature sensor	A device for measuring the temperature of the carrier (holder) used for small animal imaging as a means of monitoring or regulating the animal's temperature (e.g., a non-magnetic thermocouple embedded in or attached to the carrier for MRI).	
127250	Forced air heater	A method or device that uses forced hot air to maintain the body temperature of a subject.	
127251	Heated imaging device	An imaging device that contains an integrated method of temperature regulation for maintaining the body temperature of the imaging subject.	
127252	Heated patient support	A device that physically supports the patient and contains an integrated method of temperature regulation for maintaining the body temperature of the imaging subject (e.g., the carrier used for imaging a small animal such as a mouse).	
127253	Heated water blanket	A blanket that uses circulating hot water to maintain the body temperature of a subject.	
127254	Pre-heated pad	A pad that is pre-heated before use that is used to maintain the body temperature of a subject (e.g., pre-heated in a microwave or autoclave).	
127255	Unheated	No mechanism is used to maintain the body temperature of a subject.	
127270	NIH31	NIH Open Formula Rat and Mouse Ration - 18% Crude Protein Autoclavable.  Specification at <a href="http://www.ors.od.nih.gov/sr/dvr/Documents/SSFiles/nih31-137j2004.pdf">http://www.ors.od.nih.gov/sr/dvr/Documents/SSFiles/nih31-137j2004.pdf</a> .	
127271	NIH07	NIH07 open-formula, natural-ingredient rodent diet.	
127272	AIN76	AIN76 purified diet.	
127273	AIN93G	AIN93 growth diet.	
127274	AIN93M	AIN93 maintenance diet.	
127290	Reverse osmosis purified water	Water that has been purified by reverse osmosis.	
127291	Reverse osmosis purified, HCl acidified water	Water that has been purified by reverse osmosis and HCl acidified.	
127300	Anesthesia Method Set	Information about different anesthesia methods used during a procedure (from AQI Schema AnesthesiaMethodSetType; see <a href="http://www.aqihq.org/aqischdoc/AnesthesiaMethodSetType.html">http://www.aqihq.org/aqischdoc/AnesthesiaMethodSetType.html</a> ).	
127301	Anesthesia Method	Information about a single anesthesia method used during a procedure (from AQI Schema AnesthesiaMethodType; see <a href="http://www.aqihq.org/aqischdoc/AnesthesiaMethodType.html">http://www.aqihq.org/aqischdoc/AnesthesiaMethodType.html</a> ).	
127302	Anesthesia Category	Category of anesthesia technique used during a procedure (from AQI Schema AnesthesiaCategoryCodeType; see <a href="http://www.aqihq.org/aqischdoc/AnesthesiaCategoryCodeType.html">http://www.aqihq.org/aqischdoc/AnesthesiaCategoryCodeType.html</a> ).	
127303	Anesthesia SubCategory	Details of anesthesia technique used during a procedure (from AQI Schema AnesthesiaMethodType; see <a href="http://www.aqihq.org/aqischdoc/AnesthesiaMethodType.html">http://www.aqihq.org/aqischdoc/AnesthesiaMethodType.html</a> ).	
127310	Airway Management Set	Information about airway management used during a procedure (from AQI Schema AirwayManagementSetType; see <a href="http://www.aqihq.org/aqischdoc/AirwayManagementSetType.html">http://www.aqihq.org/aqischdoc/AirwayManagementSetType.html</a> ).	

Code Value	Code Meaning	Definition	Notes
127312	Airway Management Method	Type of airway management used during a procedure (from AQI Schema AirwayManagementMethodCodeType; see <a href="http://www.aqihq.org/aqischdoc/AirwayManagementMethodCodeType.html">http://www.aqihq.org/aqischdoc/AirwayManagementMethodCodeType.html</a> ).	
127313	Airway Sub-Management Method	Subtype of airway management of airway management used during a procedure (from AQI Schema AirwayManagementSubMethodCodeType; see <a href="http://www.aqihq.org/aqischdoc/AirwayManagementSubMethodCodeType.html">http://www.aqihq.org/aqischdoc/AirwayManagementSubMethodCodeType.html</a> ).	
127320	Medications Set	Set of medications applied during the anesthesia (from AQI Schema MedicationsSetType; see <a href="http://www.aqihq.org/aqischdoc/MedicationsSetType.html">http://www.aqihq.org/aqischdoc/MedicationsSetType.html</a> ).	
127330	Carrier gas	A gas that delivers an inhalational anesthetic to a subject (e.g., air, oxygen).	
127370	Animal housing room	A room for keeping and raising animals for observation or research (vivarium).	
127371	Preparation room	A room for preparing a subject (such as a research small animal) prior to a procedure (such as an imaging procedure).	
127372	Imaging procedure room	A room in which an imaging procedure is performed.	
127390	Locally manufactured product	A product that is locally manufactured (i.e., within the facility or institution).	
127391	Food treat	A food item that is out of the ordinary and provides pleasure.	
127400	Exogenous substance	A substance from a source external to a subject.  E.g., a homograft or xenograft (including tumor cells or tissue), fibrils, viruses, cytokines or toxins.	
127401	Tissue of origin	The tissue from which a substance originated.  E.g., the tissue or organ from which a homograft or xenograft (including tumor cells or tissue) was obtained.	
127402	Taxonomic rank of origin	The taxonomic rank value (e.g., genus, subgenus, species or subspecies) from which a substance originated.  E.g., the species of animal from which a homograft or xenograft (including tumor cells or tissue) was obtained.	
127450	Stereotactic coordinates	The three dimensional coordinates that identify a (usually small) target within the body.  E.g., for the purpose of ablation, biopsy, lesion, injection, stimulation, implantation or radiosurgery.	
127451	Position reference indicator	The part of the imaging target that was used as a reference point associated with a specific Frame of Reference.  The Position Reference Indicator may or may not coincide with the origin of the fixed frame of reference related to the Frame of Reference.  For a Patient-related Frame of Reference, this is an anatomical reference point, often a well-known surface anatomical point.	
127460	Tumor graft	Tumor cells or tissue or other material obtained from a donor intended to be implanted in a research subject.	
127801	Embryonic Kidney	The kidney of an embryo. E.g., used as the source of human embryonic kidney cell lines, though the concept is not specifically human.	

<b>Code Value</b>	<b>Code Meaning</b>	<b>Definition</b>	<b>Notes</b>
127851	Human alpha synuclein preformed fibrils	Preformed fibrils of human alpha synuclein.	
127852	Mouse alpha synuclein preformed fibrils	Preformed fibrils of mouse alpha synuclein.	
127853	Human Tau preformed fibrils	Preformed fibrils of human Tau.	
127854	Mouse Tau preformed fibrils	Preformed fibrils of mouse Tau.	
127901	SPECT of whole body	A nuclear medicine imaging procedure using a single photon emissive radionuclide with tomographic reconstruction, over an anatomical extent of the entire body.	
127902	SPECT CT of whole body	A nuclear medicine imaging procedure using a single photon emissive radionuclide with tomographic reconstruction combined with transmissive X-Ray computed tomography for attenuation compensation, over an anatomical extent of the entire body.	

DRAFT

# DICOM PS3.17 Explanatory Information

Amend DICOM PS3.17 - Explanatory Information to add new Annex XXXX - Preclinical Small Animal Imaging Acquisition Context as follows:

## XXXX Preclinical Small Animal Imaging Acquisition Context (Informative)

Amend DICOM PS3.17 - Explanatory Information to add new Annex XXX:

### XXXX.1

This Annex describes the use of Preclinical Small Animal Imaging Acquisition Context.

#### XXXX.1.1 Example of housing and anesthesia for PET-CT

This Section contains examples for use cases involving imaging of a single animal in a hybrid PET-CT system.

The basic use case involves an animal, which:

- lives in an individually ventilated home cage with several other animals in the same cage
- is (briefly) transported (in its home cage) with its cage mates to the imaging facility, without heating, with an appropriate lid
- is removed from its home/transport cage for preparation for imaging, involving insertion of a tail vein cannula, performed on an electrically heated pad
- is induced by (a) placement in an induction chamber with more concentrated volatile anesthetic, or (b) intraperitoneal injection of Ketamine mixture
- is placed in a PET-CT compatible imaging sled/carrier/chamber for imaging (of one animal at a time), with anesthesia with Isoflurane and Oxygen as the carrier gas, and heated with an electric pad regulated by feedback from a rectal probe
- is removed for recovery in a separate cage

The content tree structure (when induction is by a volatile anesthetic) would resemble:

Node	Code Meaning of Concept Name	Code Meaning or Example Value	TID
1	Preclinical Small Animal Imaging Acquisition Context		TID 8101
1.1	Language of Content Item and Descendants	English	TID 1204
1.1.2	Country of Language	United States	TID 1204
1.2	Person Observer Name	Doe^Jane	TID 1003
1.3	Procedure Code	PET/CT FDG imaging of whole body	TID 1005 CID 100
1.4	Biosafety conditions		TID 8110
1.4.1	Biosafety level	Biosafety level 1	TID 8110 CID 601
1.5	Animal handling during specified phase		TID 8101
1.5.1	Phase of animal handling	In home cage	TID 8101 CID 634

Node	Code Meaning of Concept Name	Code Meaning or Example Value	TID
1.5.2	Animal housing		TID 8121
1.5.2.1	Housing manufacturer	Acme Inc.	TID 8121
1.5.2.2	Housing rack product name	Acmerack IVC Mouse	TID 8121
1.5.2.3	Housing unit product name	Acmecage Mouse Pre-Bedded Corn Cob with Enrichment	TID 8121
1.5.2.4	Housing unit product code	12345	TID 8121
1.5.2.5	Housing unit lid product name	Acmecage IVC Mouse Single Filter	TID 8121
1.5.2.6	Housing unit lid product code	6789	TID 8121
1.5.2.7	Number of racks per room	4 {racks}	TID 8121
1.5.2.8	Number of housing units per rack	154 {housing units}	TID 8121
1.5.2.9	Housing unit location in rack	Row 4 Column 7	TID 8121
1.5.2.10	Number of animals per housing	5 {animals}	TID 8121
1.5.2.11	Sex of animals within housing	Female	TID 8121
1.5.2.12	Sex of handler	Mixed	TID 8121
1.5.2.13	Total duration in housing	133 days	TID 8121
1.5.2.14	Housing change interval	7 days	TID 8121
1.5.2.15	Manual handling interval	24 hours	TID 8121
1.5.2.16	Housing unit width	23.4 cm	TID 8121
1.5.2.17	Housing unit height	14.0 cm	TID 8121
1.5.2.18	Housing unit length	37.3 cm	TID 8121
1.5.2.19	Housing individually ventilated	Yes	TID 8121 CID 231
1.5.2.20	Air changes	50 /hour	TID 8121
1.5.2.21	Environmental temperature	22 C	TID 8121
1.5.2.22	Housing humidity	50 %	TID 8121
1.5.2.23	Housing unit reuse	Unused	TID 8121 CID 604
1.5.2.24	Bedding material	Corn cob bedding	TID 8121 CID 605
1.5.2.25	Bedding volume	450 ml	TID 8121
1.5.2.26	Enrichment material	Acmerichment paper twists	TID 8121
1.5.2.27	Exerciser device	Acme wheel	TID 8121
1.5.2.28	Shelter	Red translucent igloo	TID 8121 CID 606
1.5.2.29	Shelter manufacturer	Acme Inc.	TID 8121 CID 606
1.5.2.30	Shelter product name	Acmedome	TID 8121 CID 606

Node	Code Meaning of Concept Name	Code Meaning or Example Value	TID
1.6	Animal handling during specified phase		TID 8101
1.6.1	Phase of animal handling	During transport	TID 8101 CID 634
1.6.2	Animal housing		TID 8121
1.6.2.1	Housing manufacturer	Acme Inc.	TID 8121
1.6.2.2	Housing unit product name	Acmecage Mouse Pre-Bedded Corn Cob with Enrichment	TID 8121
1.6.2.3	Housing unit product code	12345	TID 8121
1.6.2.4	Housing unit lid product name	Acmecage Mouse Transport	TID 8121
1.6.2.5	Housing unit lid product code	9872	TID 8121
1.6.2.6	Number of animals per housing	5 {animals}	TID 8121
1.6.2.7	Sex of animals within housing	Female	TID 8121
1.6.3	Heating conditions		TID 8140
1.6.3.1	Heating	Unheated	TID 8140 CID 635
1.7	Animal handling during specified phase		TID 8101
1.7.1	Phase of animal handling	Staging prior to imaging	TID 8101 CID 634
1.8	Animal handling during specified phase		TID 8101
1.8.1	Phase of animal handling	Preparation for imaging	TID 8101 CID 634
1.8.2	Animal housing		TID 8121
1.8.2.1	Comment	Animal exposed and restrained whilst cannulating tail vein	TID 8121
1.8.3	Heating conditions		TID 8140
1.8.3.1	Heating	Electric heating pad	TID 8140 CID 635
1.8.3.2	Feedback temperature regulation	No	TID 8140 CID 231
1.9	Animal handling during specified phase		TID 8101
1.9.1	Phase of animal handling	Anesthesia induction	TID 8101 CID 634
1.9.2	Animal housing		TID 8121
1.9.2.1	Housing manufacturer	Acme Inc	TID 8121
1.9.2.2	Housing unit product name	Gas Anesthesia Induction Chamber Mouse	TID 8121
1.9.2.3	Housing unit product code	3487236	TID 8121
1.10	Animal handling during specified phase		TID 8101

Node	Code Meaning of Concept Name	Code Meaning or Example Value	TID
1.10.1	Phase of animal handling	Imaging procedure	TID 8101 CID 634
1.10.2	DateTime Started	yyyymmddhhss	TID 8101
1.10.3	DateTime Ended	yyyymmddhhss	TID 8101
1.10.4	Animal housing		TID 8121
1.10.4.1	Housing manufacturer	Acme Inc	TID 8121
1.10.4.2	Housing unit product name	Multimodal Mouse Chamber	TID 8121
1.10.5	Heating conditions		TID 8140
1.10.5.1	Heating	Electric heating pad	TID 8140 CID 635
1.10.5.1	Feedback temperature regulation	Yes	TID 8140 CID 231
1.10.5.2	Temperature sensor device component	Rectal temperature	TID 8140 CID 636
1.10.5.3	Equipment Temperature	37 C	TID 8140
1.10.6	Physiological Monitoring		TID 8170
1.10.6.1	Electrocardiographic monitoring	Yes	TID 8170 CID 231
1.10.6.2	Monitoring of respiration	No	TID 8170 CID 231
1.11	Animal handling during specified phase		TID 8101
1.11.1	Phase of animal handling	Anesthesia recovery period	TID 8101 CID 634
1.12	Administration of anesthesia		TID 8130
1.12.1	Anesthesia Method Set		TID 8130
1.12.1.1	Anesthesia Method		TID 8130
1.12.1.1.1	Anesthesia Category	General anesthesia	TID 8130 CID 611
1.12.1.1.2	Anesthesia Start Time	yyyymmddhhss	TID 8130
1.12.1.1.3	Anesthesia Finish Time	yyyymmddhhss	TID 8130
1.12.1.1.4	Anesthesia Induction	By inhalation	TID 8130 CID 613
1.12.1.1.5	Anesthesia Maintenance	Inhalation anesthesia, machine system, closed, no rebreathing of primary agent	TID 8130 CID 615
1.12.2	Airway Management Set		TID 8130
1.12.2.1	Airway Management		TID 8130

Node	Code Meaning of Concept Name	Code Meaning or Example Value	TID
1.12.2.1.1	Airway Management Method	Nose cone	TID 8130 CID 617
1.12.3	Medications Set		TID 8130
1.12.3.1	Procedure Phase	During procedure	TID 8130 CID 631
1.12.3.2	Medication given		TID 8131
1.12.3.2.1	Drug start	yyyymmddhhss	TID 8131
1.12.3.2.2	Drug end	yyyymmddhhss	TID 8131
1.12.3.2.3	Route of administration	By inhalation	TID 8131 CID 11
1.12.3.2.4	Mixture		TID 8131
1.12.3.2.4.1	Drug administered	Isoflurane	TID 8131 CID 623
1.12.3.2.4.2	Medication Type	General anesthetic	TID 8131 CID 621
1.12.3.2.4.3	Concentration	4 %	TID 8131
1.12.3.2.5	Mixture		TID 8131
1.12.3.2.5.1	Drug administered	Oxygen	TID 8131 CID 623
1.12.3.2.5.2	Medication Type	Carrier gas	TID 8131 CID 621
1.12.3.2.5.3	Concentration	100 %	TID 8131
1.12.3.3	Medication given		TID 8131
1.12.3.3.1	Drug start	yyyymmddhhss	TID 8131
1.12.3.3.2	Drug end	yyyymmddhhss	TID 8131
1.12.3.3.3	Route of administration	By inhalation	TID 8131 CID 11
1.12.3.3.4	Mixture		TID 8131
1.12.3.3.4.1	Drug administered	Isoflurane	TID 8131 CID 623
1.12.3.3.4.2	Medication Type	General anesthetic	TID 8131 CID 621
1.12.3.3.4.3	Concentration	2 %	TID 8131
1.12.3.3.5	Mixture		TID 8131
1.12.3.3.5.1	Drug administered	Oxygen	TID 8131 CID 623



Node	Code Meaning of Concept Name	Code Meaning or Example Value	TID
1.12.3.3.5.2	Medication Type	Carrier gas	TID 8131 CID 621
1.12.3.3.5.3	Concentration	100 %	TID 8131

The content tree structure when induction is by intra-peritoneal injection might be different in the following way, in that the housing during the induction phase does not involve a chamber, and the injected agent is specified, as follows:

Node	Code Meaning of Concept Name	Code Meaning or Example Value	TID
...	...	...	...
1.9	Animal handling during specified phase		TID 8101
1.9.1	Phase of animal handling	Anesthesia induction	TID 8101 CID 634
1.9.2	Animal housing		TID 8121
1.9.2.1	Comment	Animal exposed whilst inducing anesthesia	TID 8121
...	...	...	...
1.12	Administration of anesthesia		TID 8130
1.12.1	Anesthesia Method Set		TID 8130
1.12.1.1	Anesthesia Method		TID 8130
1.12.1.1.1	Anesthesia Category	General anesthesia	TID 8130 CID 611
1.12.1.1.2	Anesthesia Start Time	yyyymmddhhss	TID 8130
1.12.1.1.3	Anesthesia Finish Time	yyyymmddhhss	TID 8130
1.12.1.1.4	Anesthesia Induction	Intraperitoneal route	TID 8130 CID 613
1.12.1.1.5	Anesthesia Maintenance	Inhalation anesthesia, machine system, closed, no rebreathing of primary agent	TID 8130 CID 615
...	...	...	...
1.12.3	Medications Set		TID 8130
1.12.3.1	Procedure Phase	During procedure	TID 8130 CID 631
1.12.3.2	Medication given		TID 8131
1.12.3.2.1	Drug start	yyyymmddhhss	TID 8131
1.12.3.2.2	Route of administration	Intraperitoneal route	TID 8131 CID 11
1.12.3.2.3	Mixture		TID 8131
1.12.3.2.3.1	Drug administered	Ketamine	TID 8131 CID 623

Node	Code Meaning of Concept Name	Code Meaning or Example Value	TID
1.12.3.2.3.2	Medication Type	General anesthetic	TID 8131 CID 621
1.12.3.2.3.2	Dosage	nn mg	TID 8131
1.12.3.2.4	Mixture		TID 8131
1.12.3.2.4.1	Drug administered	Medetomidine	TID 8131 CID 623
1.12.3.2.4.2	Medication Type	General anesthetic	TID 8131 CID 621
1.12.3.2.4.2	Dosage	nn mg	TID 8131
...	...	...	...

### XXXX.1.2 Example of exogenous substance administration to encode tumor cell line

Only the exogenous substance information is included in this example and content describing animal handling, anesthesia information, etc. is excluded for clarity. Indeed, given the optionality of the other content, it would be possible to create an Acquisition Context SR instance that describes only the exogenous substance information and nothing else.

The content tree structure would resemble:

Node	Code Meaning of Concept Name	Code Meaning or Example Value	TID
1	Preclinical Small Animal Imaging Acquisition Context		TID 8101
1.1	Language of Content Item and Descendants	English	TID 1204
1.1.2	Country of Language	United States	TID 1204
1.2	Person Observer Name	Doe^Jane	TID 1003
...	...	...	...
1.n	Exogenous substance		TID 8182
1.n.1	Tumor Graft	Adenocarcinoma	TID 8182 CID 637 CID 639
1.n.2	Age Started	6 week	TID 8182 CID 7456 "Units of Measure for Age"
1.n.3	DateTime Started	yyymmddhhss	TID 8182
1.n.4	Brand name	MDA-MB-468	TID 8182
1.n.5	Dosage	10E6 {cells}	TID 8182 CID 6092
1.n.6	Relative dose frequency	Single event	TID 8182 CID 6094 CID 6091

Node	Code Meaning of Concept Name	Code Meaning or Example Value	TID
1.n.7	Route of Administration	Subcutaneous route	TID 8182 CID 11
1.n.7.1	Site of	Flank	TID 8182 CID 644
1.n.7.1.1	Laterality	Left	TID 8182 CID 244
1.n.8	Tissue of origin	Breast	TID 8182 CID 645
1.n.9	Taxonomic rank of origin	homo sapiens	TID 8182 CID 7454 "Animal Taxonomic Rank Values"

### XXXX.1.3 Informative References

#### XXXX.1.3.1 Method Descriptions

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[Van der Meer et al 2004] *Journal of the American Association for Laboratory Animal Science*. Van der Meer E. 2004. 38. 4. 376–83. "Short-term effects of a disturbed light–dark cycle and environmental enrichment on aggression and stress-related parameters in male mice". <http://www.animalexperiments.info/resources/Studies/Animal-impacts/Stress.-Balcombe-et-al-2004./Stress-Balcombe-et-al-2004.pdf> .

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# DICOM PS3.3 Information Object Definitions

## 3 Definitions

*Amend DICOM PS3.3 - Information Object Definitions - Section 3 - Definitions, to add definition of Acquisition Context.*

For the purposes of this Standard the following definitions apply.

### 3.8 DICOM Information Object

**Acquisition Context**                      **A description of the conditions present during data acquisition.**

## A Composite Information Object Definitions (Normative)

*Amend DICOM PS3.3 - Information Object Definitions - Annex A - Composite Information Object Definitions (Normative), to add Acquisition Context IOD Modules to A.1.4 Overview of the Composite IOD Module Content.*

*Amend DICOM PS3.3 - Information Object Definitions - Annex A - Composite Information Object Definitions (Normative) as follows, to add a new Acquisition Context Structured Report IOD:*

### A.35.16 Acquisition Context SR IOD

#### A.35.16.1 Acquisition Context SR Information Object Description

The Acquisition Context SR IOD is used to represent the description of the conditions present during data acquisition of other data that is stored separately (such as images).

#### A.35.16.2 Acquisition Context SR IOD Entity-Relationship Model

The E-R Model in Section A.1.2 applies to the Acquisition Context SR IOD.

#### A.35.16.3 Acquisition Context SR IOD Module Table

Table A.35.16-1 specifies the Modules of the Acquisition Context SR IOD.

**Table A.35.16-1. Acquisition Context 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	C - Required if time synchronization was applied
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

IE	Module	Reference	Usage
	SOP Common	C.12.1	M

### A.35.16.3.1 Acquisition Context SR IOD Content Constraints

#### A.35.16.3.1.1 Value Type

Value Type (0040,A040) in 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):

#### Enumerated Values:

**TEXT**  
**CODE**  
**NUM**  
**DATETIME**  
**DATE**  
**TIME**  
**UIDREF**  
**PNAME**  
**SCoord3D**  
**CONTAINER**

#### A.35.16.3.1.2 Relationship Constraints

Relationships between Content Items in the content of this IOD shall be conveyed in the by-value mode. See Table C.17.3-8 for Relationship Type definitions.

#### Note

Relationships by-reference are forbidden. Therefore, Referenced Content Item Identifier (0040,DB73) is not present in any of the Content Items within the SR Document Content Module.

Table A.35.16-2 specifies the relationship constraints of this IOD.

**Table A.35.16-2. Relationship Content Constraints for Acquisition Context SR IOD**

Source Value Type	Relationship Type (Enumerated Values)	Target Value Type
CONTAINER	CONTAINS	CODE, CONTAINER, DATETIME, NUM, PNAME, TEXT, TIME, UIDREF
CONTAINER	HAS OBS CONTEXT	CODE, DATE, DATETIME, NUM, PNAME, TEXT, TIME, UIDREF
CODE	HAS OBS CONTEXT	CODE
any type	HAS CONCEPT MOD	CODE, TEXT <sup>1</sup>
CODE	HAS PROPERTIES	CODE, DATETIME, NUM, SCoord3D, TEXT

#### Note

The HAS CONCEPT MOD relationship is used to modify the meaning of the Concept Name of a Source Content Item, for example to provide a more descriptive explanation, a different language translation, or to define a post-coordinated concept.

#### A.35.16.3.1.3 Template Constraints

The document may be constructed from Baseline TID 8101 "Preclinical Small Animal Image Acquisition Context" invoked at the root node.

#### Note

This IOD maybe used with other Templates defined for Acquisition Context.

# DICOM PS3.4 Service Class Specifications

## B Storage Service Class (Normative)

Amend DICOM PS3.4 - Service Class Specifications - Annex B - Storage Service Class (Normative) as follows:

### B.3.1.4 Related General SOP Classes (A-ASSOCIATE-RQ)

...

**Table B.3-3. Standard and Related General SOP Classes**

SOP Class Name	Related General SOP Class Name
...	...
Radiopharmaceutical Radiation Dose SR	Enhanced SR
	Comprehensive SR
	Comprehensive 3D SR
	Extensible SR
<b>Acquisition Context SR</b>	<b>Enhanced SR (see note)</b>
	<b>Comprehensive SR (see note)</b>
	<b>Comprehensive 3D SR</b>
	<b>Extensible SR</b>
...	...

**Note**

**The Acquisition Context SR may be encoded as Enhanced or Comprehensive only if it does not contain stereotactic coordinates (SCOORD3D).**

### B.5 Standard SOP Classes

...

**Table B.5-1. Standard SOP Classes**

SOP Class Name	SOP Class UID	IOD Specification (defined in PS3.3)
...	...	...
<b>Acquisition Context SR Storage</b>	<b>1.2.840.10008.5.1.4.1.1.88.71</b>	<b>Acquisition Context SR IOD</b>
...	...	...

#### B.5.1.5 Structured Reporting Storage SOP Classes

The requirements of Annex O apply to the following SOP Classes:

- ...
- **Acquisition Context SR**

## I Media Storage Service Class (Normative)

Amend DICOM PS3.4 - Service Class Specifications - Annex I - Media Storage Service Class (Normative) as follows:

## I.4 Media Storage Standard SOP Classes

...

**Table I.4-1. Media Storage Standard SOP Classes**

SOP Class Name	SOP Class UID	IOD Specification (defined in PS3.3)
...	...	...
<b><u>Acquisition Context SR Storage</u></b>	<b><u>1.2.840.10008.5.1.4.1.1.88.71</u></b>	<b><u>Acquisition Context SR IOD</u></b>
...	...	...

### I.4.1.2 Structured Reporting Storage SOP Classes

The requirements of Annex O apply to the following SOP Classes:

- ...
- **Acquisition Context SR**

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# DICOM PS3.6 Data Dictionary

## A Registry of DICOM Unique Identifiers (UIDs) (Normative)

Amend DICOM PS3.6 - Data Dictionary - Annex A - Registry of DICOM Unique Identifiers (UIDs) as follows:

**Table A-1. UID Values**

UID Value	UID NAME	UID TYPE	Part
...	...	...	...
<b><u>1.2.840.10008.5.1.4.1.1.88.71</u></b>	<b><u>Acquisition Context SR Storage</u></b>	<b><u>SOP Class</u></b>	<b><u>PS3.4</u></b>
...	...	...	...
<b><u>1.2.840.10008.2.16.9</u></b>	<b><u>PubChem Compound CID</u></b>	<b><u>Coding Scheme</u></b>	<b><u>PS3.16</u></b>

Amend DICOM PS3.6 - Data Dictionary - Annex A - Add new Context Group UIDs as follows:

**Table A-3. Context Group UID Values**

Context UID	Context Identifier	Context Group Name
1.2.840.10008.6.1.1064	CID 231	
1.2.840.10008.6.1.1065	CID 601	
1.2.840.10008.6.1.1066	CID 602	
1.2.840.10008.6.1.1067	CID 7457	
1.2.840.10008.6.1.1068	CID 603	
1.2.840.10008.6.1.1069	CID 604	
1.2.840.10008.6.1.1070	CID 605	
1.2.840.10008.6.1.1071	CID 606	
1.2.840.10008.6.1.1072	CID 607	
1.2.840.10008.6.1.1073	CID 608	
1.2.840.10008.6.1.1074	CID 609	
1.2.840.10008.6.1.1075	CID 610	
1.2.840.10008.6.1.1076	CID 611	
1.2.840.10008.6.1.1077	CID 612	
1.2.840.10008.6.1.1078	CID 613	
1.2.840.10008.6.1.1079	CID 614	
1.2.840.10008.6.1.1080	CID 615	
1.2.840.10008.6.1.1081	CID 616	
1.2.840.10008.6.1.1082	CID 617	
1.2.840.10008.6.1.1083	CID 618	
1.2.840.10008.6.1.1084	CID 619	
1.2.840.10008.6.1.1085	CID 620	
1.2.840.10008.6.1.1086	CID 621	
1.2.840.10008.6.1.1087	CID 622	
1.2.840.10008.6.1.1088	CID 623	



	<b>Context UID</b>	<b>Context Identifier</b>	<b>Context Group Name</b>
1			
2			
3	1.2.840.10008.6.1.1089	CID 624	
4	1.2.840.10008.6.1.1090	CID 625	
5	1.2.840.10008.6.1.1091	CID 626	
6	1.2.840.10008.6.1.1092	CID 627	
7	1.2.840.10008.6.1.1093	CID 628	
8	1.2.840.10008.6.1.1094	CID 629	
9	1.2.840.10008.6.1.1095	CID 630	
10	1.2.840.10008.6.1.1096	CID 631	
11	1.2.840.10008.6.1.1097	CID 632	
12	1.2.840.10008.6.1.1098	CID 633	
13	1.2.840.10008.6.1.1099	CID 634	
14	1.2.840.10008.6.1.1100	CID 635	
15	1.2.840.10008.6.1.1101	CID 636	
16	1.2.840.10008.6.1.1102	CID 637	
17	1.2.840.10008.6.1.1103	CID 638	
18	1.2.840.10008.6.1.1104	CID 639	
19	1.2.840.10008.6.1.1105	CID 640	
20	1.2.840.10008.6.1.1106	CID 641	
21	1.2.840.10008.6.1.1107	CID 642	
22	1.2.840.10008.6.1.1108	CID 643	
23	1.2.840.10008.6.1.1109	CID 644	
24	1.2.840.10008.6.1.1110	CID 645	
25	1.2.840.10008.6.1.1111	CID 646	
26	1.2.840.10008.6.1.1112	CID 647	

# DICOM PS3.2 Conformance

## A DICOM Conformance Statement Template (Normative)

*Amend DICOM PS3.2 - Conformance - Annex A - DICOM Conformance Statement Template (Normative) as follows:*

**Table A.1-2. UID Values**

UID Value	UID Name	Category
...	...	...
<b>1.2.840.10008.5.1.4.1.1.88.71</b>	<b>Acquisition Context SR Storage SOP Class</b>	<b>Transfer</b>
...	...	...

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