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Submission Date	2016/03/23

Correction Number CP-1619
Log Summary: Add source mouse strain and genetic modifications for homograft to exogenous substances, and add genetic modifications to patient
Name of Standard PS3.3, PS3.6, PS3.16
Rationale for Correction: Some preclinical animal models are described by investigators in terms of the designated genetic modifications but a full description of the mouse strain is not available; add attributes to the Patient entity in images to describe these. Some models involve the transplantation of tissue from another animal that has been genetically modified, but the transplant is into the wild type animal that is then imaged. The wild type is properly described in the Patient attributes for the acquired images, but there is not currently any means of describing the strain or genetic modifications of the source of the transplant; extend the exogenous substances template to describe the strain and genetic modifications of the source.
Correction Wording:

Amend DICOM PS 3.3:

C.2.3 Patient Demographic Module

Table C.2-3. Patient Demographic Module Attributes

Attribute Name	Tag	Attribute Description
...	...	...
Strain Description	(0010,0212)	The strain of the patient. See Section C.7.1.1.1.4.
Strain Nomenclature	(0010,0213)	The nomenclature used for Strain Description (0010,0212). See Section C.7.1.1.1.4.
Strain Code Sequence	(0010,0219)	A coded identification of the strain of the patient. See Section C.7.1.1.1.4. One or more Items are permitted in this sequence. If more than one item is present, each item represents the same information but encoded using a different coding scheme (rather than post-coordinated modifiers).
>Include Table 8.8-1		*No Baseline CID.*
Strain Additional Information	(0010,0218)	Additional information about the strain of the patient that is not encoded in the formal nomenclature used in Strain Description (0010,0212). See Section C.7.1.1.1.4.
Strain Stock Sequence	(0010,0216)	Information identifying an animal within a strain stock. Only a single Item is permitted in this sequence.
>Strain Stock Number	(0010,0214)	The stock number of the strain of the patient issued by the organization identified by Strain Source (0010,0217). See Section C.7.1.1.1.4.
>Strain Source	(0010,0217)	Identification of the organization that is the source of the animal, issued by the registry identified by Strain Source Registry Code Sequence (0010,0215). See Section C.7.1.1.1.4.
>Strain Source Registry Code Sequence	(0010,0215)	Identification of the organization that is the registry of sources of animals. See Section C.7.1.1.1.4. Only a single Item is permitted in this sequence.
>>Include Table 8.8-1		*Defined CID 7490.*
Genetic Modifications Sequence	**(0010,eee1)**	**The genetic modifications of the patient.** **One or more Items are permitted in this Sequence.** **See Section C.7.1.1.1.4.**
>Genetic Modifications Description	**(0010,eee2)**	**The genetic modifications of the patient described using a specific nomenclature.**
>Genetic Modifications Nomenclature	**(0010,eee3)**	**The nomenclature used for Genetic Modifications Description (0010,eee2).**
>Genetic Modifications Code Sequence	**(0010,eee9)**	**A coded identification of the designated genetic modifications of the patient.** **One or more Items are permitted in this sequence. If more than one item is present, each item represents the same information but encoded using a different coding scheme (rather than post-coordinated modifiers).**
>>Include Table 8.8-1		***No Baseline CID.***

C.7.1.1 Patient Module

Table C.7-1. Patient Module Attributes

Attribute Name	Tag	Type	Attribute Description
...	...	...	...
Strain Description	(0010,0212)	3	The strain of the patient. See Section C.7.1.1.1.4.
Strain Nomenclature	(0010,0213)	3	The nomenclature used for Strain Description (0010,0212). See Section C.7.1.1.1.4.
Strain Code Sequence	(0010,0219)	3	A coded identification of the strain of the patient. See Section C.7.1.1.1.4. One or more Items are permitted in this sequence. If more than one item is present, each item represents the same information but encoded using a different coding scheme (rather than post-coordinated modifiers).
>Include Table 8.8-1			*No Baseline CID.*
Strain Additional Information	(0010,0218)	3	Additional information about the strain of the patient that is not encoded in the formal nomenclature used in Strain Description (0010,0212). See Section C.7.1.1.1.4.
Strain Stock Sequence	(0010,0216)	3	Information identifying an animal within a strain stock. Only a single Item is permitted in this sequence.
>Strain Stock Number	(0010,0214)	1	The stock number of the strain of the patient issued by the organization identified by Strain Source (0010,0217). See Section C.7.1.1.1.4.
>Strain Source	(0010,0217)	1	Identification of the organization that is the source of the animal, issued by the registry identified by Strain Source Registry Code Sequence (0010,0215). See Section C.7.1.1.1.4.
>Strain Source Registry Code Sequence	(0010,0215)	1	Identification of the organization that is the registry of sources of animals. See Section C.7.1.1.1.4. Only a single Item is permitted in this sequence.
>>Include Table 8.8-1			*Defined CID 7490.*
Genetic Modifications Sequence	**(0010,eee1)**	**3**	**The genetic modifications of the patient.** **One or more Items are permitted in this Sequence.** **See Section C.7.1.1.1.4.**
>Genetic Modifications Description	**(0010,eee2)**	**1**	**The genetic modifications of the patient described using a specific nomenclature.**
>Genetic Modifications Nomenclature	**(0010,eee3)**	**1**	**The nomenclature used for Genetic Modifications Description (0010,eee2).**
>Genetic Modifications Code Sequence	**(0010,eee9)**	**3**	**A coded identification of the genetic modifications of the patient.** **One or more Items are permitted in this sequence. If more than one item is present, each item represents the same information but encoded using a different coding scheme (rather than post-coordinated modifiers).**
>>Include Table 8.8-1			***No Baseline CID.***

Attribute Name	Tag	Type	Attribute Description
Responsible Person	(0010,2297)	2C	Name of person with medical or welfare decision making authority for the patient. Required if the patient is an animal. May be present otherwise.
...	...	...	...

C.7.1.1.1 Patient Module Attributes

C.7.1.1.1.4 Patient Strain and Genetic Modifications

The strain of an animal (group of animals that is genetically uniform), if known, may be encoded in Strain Description (0010,0212). The nomenclature used may be encoded in Strain Nomenclature (0010,0213). A precoordinated code identifying the strain may be encoded in Strain Code Sequence (0010,0219).

Defined Terms for Strain Nomenclature (0010,0213) and Genetic Modifications Nomenclature (0010,eee3):

MGI_2013 International Committee on Standardized Genetic Nomenclature for Mice, Rat Genome and Nomenclature Committee. MGI-Guidelines for Nomenclature of Mouse and Rat Strains. 2013/10. Available from: http://www.informatics.jax.org/mgihome/nomen/strains.shtml

Note

- A pair of text and nomenclature Attributes are used, since standard nomenclatures typically define values that are constructed from multiple components, and do not distinguish between value and meaning. These are distinct from the precoordinated codes used in Stain Code Sequence (0010,0219).
- Some strain **and genetic modifications** nomenclatures make use of superscripts. To encode these superscripts consistently in an unformatted string, the convention of enclosing the superscript text in "<" and ">" pairs may be used. E.g., "D2.B6-Ahr^{b-1}/J" would be encoded as "D2.B6-Ahr<b-1>/J".
- Relevant information that is not encoded in the formal description of the strain (i.e., not defined in the nomenclature used), such as the number of transgenes, may be encoded as plain text in Strain Additional Information (0010,0218).

The strain of an animal may be more specifically identified by the Attributes within Strain Stock Sequence (0010,0216).

Note

- The MGI-Guidelines for Nomenclature of Mouse and Rat Strains recommends the use of the laboratory codes assigned by the Institute of Laboratory Animal Research (ILAR). See the International Laboratory Code Registry (ILCR) http://dels.nas.edu/global/ilar/lab-codes.
- Because allele names are closely tied to gene names/symbols it is necessary to have a unique and permanent code for any allele that is part of a genotype of interest. For mice, MGI is the authoritative source of the nomenclature for genes and alleles and maintains unique, permanent codes for these entities. The MGI provides a report of all precoordinated MGI codes that are assigned to specific strains at ftp://ftp.informatics.jax.org/pub/reports/MGI_Strain.rpt. These may be used in Strain Code Sequence (0010,0219) **and Genetic Modifications Code Sequence (0010,eee9)** with a coding scheme of "MGI".
- Another source of pre-coordinated codes for strains is the NCI Thesaurus, which includes a snapshot of strains from the International Mouse Strain Resource (IMSR), as children of (C14421, NCIt, "Inbred Mouse Strains"). See http://ncit.nci.nih.gov/ncitbrowser/pages/concept_details.jsf?dictionary=NCI_Thesaurus&code=C14421.
- For example, a C57BL/6J mouse strain from The Jackson Laboratory might be identified as:
  - Strain Description (0010,0212) = "C57BL/6J"
  - Strain Nomenclature (0010,0213) = "MGI_2013"
  - Strain Code Sequence (0010,0219)

- >Code Value = "3028467"
- >Coding Scheme Designator = "MGI"
- >Code Meaning = "C57BL/6J"
- Strain Stock Sequence (0010,0216)
- >Strain Stock Number (0010,0214) = "000664"
- >Strain Source (0010,0217) = "Jrep"
- >Strain Source Registry Code Sequence (0010,0215) = (126850, DCM, "ILCR")

- **For example, a FVB/N mouse with a Tg(MMTV-Erbb2*)NDL2-5Mul transgene might be identified as:**
  - **Strain Description (0010,0212) = "FVB/N-Tg(MMTV-Erbb2*)NDL2-5Mul"**
  - **Strain Nomenclature (0010,0213) = "MGI_2013"**
  - **Genetic Modifications Sequence (0010,eee1)**
  - **>Genetic Modifications Description (0010,eee2) = "Tg(MMTV-Erbb2*)NDL2-5Mul"**
  - **>Genetic Modifications Nomenclature (0010,eee3) = "MGI_2013"**
  - **>Genetic Modifications Code Sequence (0010,eee9)**
  - **>>Code Value = "3793949"**
  - **>>Coding Scheme Designator = "MGI"**
  - **>>Code Meaning = "Tg(MMTV-Erbb2*)NDL2-5Mul"**

In this example, a precoordinated code for the genetic modification is defined in MGI, but not for the mouse strain.

Amend DICOM PS 3.6:

6 Registry of DICOM Data Elements

Table 6-1. Registry of DICOM Data Elements

Tag	Name	Keyword	VR	VM	
(0010,0212)	Strain Description	StrainDescription	UC	1	
(0010,0213)	Strain Nomenclature	StrainNomenclature	LO	1	
(0010,0214)	Strain Stock Number	StrainStockNumber	LO	1	
(0010,0215)	Strain Source Registry Code Sequence	StrainSourceRegistryCode Sequence	SQ	1	
(0010,0216)	Strain Stock Sequence	StrainStockSequence	SQ	1	
(0010,0217)	Strain Source	StrainSource	LO	1	
(0010,0218)	Strain Additional Information	StrainAdditionalInformation	UT	1	
(0010,0219)	Strain Code Sequence	StrainCodeSequence	SQ	1	
(0010,eee1)	**Genetic Modifications Sequence**	**GeneticModificationsSequence**	**SQ**	**1**	
(0010,eee2)	**Genetic Modifications Description**	**GeneticModificationsDescription**	**UC**	**1**	
(0010,eee3)	**Genetic Modifications Nomenclature**	**GeneticModifications Nomenclature**	**LO**	**1**	

Tag	Name	Keyword	VR	VM	
(0010,eee9)	**Genetic Modifications Code Sequence**	**GeneticModificationsCode Sequence**	**SQ**	**1**	

Amend DICOM PS 3.16:

TID 8182 Exogenous Substance Administration

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
...	...	...	...	...	...	...	...	...
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
22	**>>**	**HAS PROPERTIES**	**CODE**	**EV (ddd001, DCM, "Strain")**	**1**	**U**		
23	**>>**	**HAS PROPERTIES**	**TEXT**	**EV (ddd002, DCM, "Strain description")**	**1**	**U**		
24	**>>>**	**HAS CONCEPT MOD**	**TEXT**	**EV (ddd003, DCM, "Nomenclature")**	**1**	**U**		
25	**>>**	**HAS PROPERTIES**	**TEXT**	**EV (ddd005, DCM, "Genetic modifications description")**	**1-n**	**U**		
26	**>>>**	**HAS CONCEPT MOD**	**TEXT**	**EV (ddd003, DCM, "Nomenclature")**	**1**	**U**		
27	**>>>**	**HAS PROPERTIES**	**CODE**	**EV (ddd004, DCM, "Genetic modifications")**	**1**	**U**		

Content Item Descriptions

Row 3	Classification is inherited from the more general template TID 9002, 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.
Rows 22-27	**The strain and genetic characteristics of the animal into which the exogenous substance is grafted is described in the Patient Module; see Section C.7.1.1.1.4. These rows describe the strain and genetic modifications of the source of the graft using content items that correspond to the Attributes described in Section C.7.1.1.1.4.**

D DICOM Controlled Terminology Definitions (Normative)

Table D-1. DICOM Controlled Terminology Definitions

Code Value	Code Meaning	Definition	Notes
ddd001	Strain	An identifier of a group of animals that is genetically uniform.	
ddd002	Strain description	A description of a group of animals that is genetically uniform.	
ddd003	Nomenclature	A system of names or descriptions used in a particular field.	
ddd004	Genetic modifications	An identifier of a specific variation of a targeted gene or introduced transgene.	
ddd005	Genetic modifications description	A description of a specific variation of a targeted gene or introduced transgene.	