DICOM Change Proposal

STATUS	Assigned
Date of Last Update	2025/03/24
Person Assigned	Go Kinoshita
Submitter Name	Go Kinoshita, g-kinoshita@jmorita-mfg.co.jp
Submission Date	2024/11/01

Change Number	CP-2461
Log Summary:	Add rows for intended use of dose calibration in RDSR
Name of Standard PS3.16	

Rationale for Change:

The calibration container in the Projection X-Ray RDSR and Enhanced X-Ray RDSR contains information related to the calibration factors stored on the irradiating device or device generating the RDSR. These calibrations are typically determined by a user or owner of the system, such as a medical physicist. They are intended only to be stored and sent with the RDSR, not to be applied by the RDSR-generating system to the values stored within the RDSR. The current DICOM framework for this container allows for multiple calibration containers within an RDSR but does not provide sufficient guidance on how they may be applied by users or interpreters of the RDSR.

This CP proposes two additional content items within the calibration container. The first is a coded value describing the radiation dose index for which the calibration factor is intended. The second is a text value describing the acquisition protocol for which the calibration factor is intended. For both values, the intent of the additions is to provide the user/interpreter of the RDSR with sufficient information on when to apply a given calibration factor. Ultimately, the decision on whether to apply a calibration factor will be made by the user of the RDSR after consideration of the content of the calibration container and the other dose information and technical details of the RDSR. There may be instances when calibration containers are sent with the RDSR even if they are not applicable to the irradiation events that are contained within that RDSR.

If a calibration factor is applicable to multiple dose indices or acquisition protocols, the calibration container may be repeated 1-n times, with each repeat changing the coded dose index and/or acquisition protocol.

Open Issue:

1. (Closed) Are there any extra rows in RDSR to show intent of dose calibration provider's effectively? e.g. (113946, DCM, "Projection Eponymous Name").

   A (NB): While it's possible the eponymous name would be helpful to identify appropriate protocols, this is an optional value and not all irradiations have such a name. Without including an entire protocol object within the calibration container, a text description of the acquisition protocol and dose metric will likely need to suffice.
2. (Closed) Items on new CID table were picked up from existing dose index on RDSR tables. It is not discussed if dose calibration for each item could be possible.

   A (NB): A calibration container for each item *could* be possible, though unlikely (perhaps a breast CT?). Such a scenario already exists, although the current framework wouldn't spell it out as clearly.

Editor's note:

1. Updates to TID 10002 and TID 10041 are the same.
2. New CID table, referred from both TID 10002 and 10041, contains the item "Air Kerma at Output Measurement Point" although Projection X-Ray RDSR doesn't define the way to contain the value.
3. "Intended" in name of new rows means that target of dose calibration is not strictly defined on RDSR instance. The relation is only an intension by dose calibration provider and selected on performing dose management by an interpreter of RDSR.
4. VM for new rows are 1. As described in content item description for row 3, multiple dose calibration should be contained if one dose factor could be applied to multiple dose index or irradiating condition.

Change Wording:

Add to PS3.6 Annex A, Table A-3

5 **Table A-3 CONTEXT GROUP UID VALUES**

Context UID	Context Identifier	Context Group Name
1.2.840.10008.XXXXX	TBL1	Dose Indexes for Dose Calibration

Modify PS3.16 Annex A Structured Reporting Templates (Normative) as indicated.

Table TID 10002. Accumulated X-Ray Dose

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (113702, DCM, "Accumulated X-Ray Dose Data")	1	M		
2	>	HAS CONCEPT MOD	CODE	EV (113764, DCM, "Acquisition Plane")	1	M		$Plane
3	>	CONTAINS	CONTAINER	EV (122505, DCM, "Calibration")	1-n	MC	IFF Calibration Data is available	
4	>>	HAS CONCEPT MOD	CODE	EV (113794, DCM, "Dose Measurement Device")	1	M		DCID 10010 “Dose Measurement Devices”
5	>>	CONTAINS	DATETIME	EV (113723, DCM, "Calibration DateTime")	1	M		
6	>>	CONTAINS	NUM	EV (122322, DCM, "Calibration Factor")	1	M		UNITS = EV (1, UCUM, "no units")
7	>>	CONTAINS	NUM	EV (113763, DCM, "Calibration Uncertainty")	1	M		UNITS = EV (%, UCUM, "Percent")
8	>>	CONTAINS	TEXT	EV (113724, DCM, "Calibration Responsible Party")	1	M		
9	>>	CONTAINS	TEXT	EV (113720, DCM, "Calibration Protocol")	1	U		
9a	**>>**	**CONTAINS**	**CODE**	**EV (CODE1, DCM, "Intended Dose Index for this Calibration")**	**1**	**U**		**DCID TBL1 “Dose Indexes for Dose Calibration”**
9b	**>>**	**CONTAINS**	**TEXT**	**EV (CODE2, DCM, "Intended Acquisition Protocol for this Calibration")**	**1**	**U**		

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
10	>	…	…	…	…	…	…	…

Content Item Descriptions

…	…
Row 3	**Details for each calibration stored on the system. If separate calibrations stored for different dosimetric values exist, they may be included by using multiple instances of this container. In such a case, Row 9a may be used to inform the interpreter of the RDSR how to appropriately use each calibration factor and Row 9b is used in the case of different acquisition protocols,**
…	…
Row 9a	**Intended dose index for this calibration, as determined by the Calibration Responsible Party. This value is only an intension by that Calibration Responsible Party. Users of the RDSR might use this value to determine the applicability of the calibration for the RDSR.**
Row 9b	**Intended acquisition protocol for this dose calibration, as determined the Calibration Responsible Party. This value is only an intension by that calibration responsible party. Users of the RDSR might use this value to determine the applicability of the calibration for the RDSR.** **May be related to TID 10003 row 8 EV (125203, DCM, "Acquisition Protocol").**
…	…

Table TID 10041. Accumulated Dose Data

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (113702, DCM, "Accumulated X-Ray Dose Data")	1	M		
2	>	CONTAINS	TEXT	EV (113832, DCM, "Identification of the X-Ray Source")	1	M		
3	>	CONTAINS	CONTAINER	EV (122505, DCM, "Calibration")	1-n	MC	IFF Calibration Data is available	
4	>>	HAS CONCEPT MOD	CODE	EV (113794, DCM, "Dose Measurement Device")	1	M		DCID 10010 “Dose Measurement Devices” DCID 7026 “Radiotherapeutic Dose Measurement Device”
5	>>	CONTAINS	DATETIME	EV (113723, DCM, "Calibration DateTime")	1	M		
6	>>	CONTAINS	NUM	EV (122322, DCM, "Calibration Factor")	1	M		UNITS = EV (1, UCUM, "no units")
7	>>	CONTAINS	NUM	EV (113763, DCM, "Calibration	1	M		UNITS = EV (%, UCUM, "Percent")

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
				Uncertainty")				
8	>>	CONTAINS	TEXT	EV (113724, DCM, "Calibration Responsible Party")	1	M		
9	>>	CONTAINS	TEXT	EV (113720, DCM, "Calibration Protocol")	1	U		
9a	**>>**	**CONTAINS**	**CODE**	**EV (CODE1, DCM, "Intended Dose Index for this Calibration")**	**1**	**U**		**DCID TBL1 “Dose Indexes for Dose Calibration”**
9b	**>>**	**CONTAINS**	**TEXT**	**EV (CODE2, DCM, "Intended Acquisition Protocol for this Calibration")**	**1**	**U**		
10	>	…	…	…	…	…	…	…

Content Item Descriptions

…	…
Row 3	**Details for each calibration stored on the system. If separate calibrations stored for different dosimetric values exist, they may be included by using multiple instances of this container. In such a case, row 9a may be used to inform the interpreter of the RDSR how to appropriately use each calibration factor. And row 9b is used for for case of different acquisition protocols,**
…	…
Row 9a	**Intended dose index for this calibration, as determined by the Calibration Responsible Party. This value is only an intension by that Calibration Responsible Party. Users of the RDSR might use this value to determine the applicability of the calibration for the RDSR.**
Row 9b	**Intended acquisition protocol for this dose calibration, as determined the Calibration Responsible Party. This value is only an intension by that calibration responsible party. Users of the RDSR might use this value to determine the applicability of the calibration for the RDSR.** **May be related to TID 10054 Row 8 EV (125203, DCM, "Acquisition Protocol").**
…	…

Add PS3.16 Annex B. DCMR Context Groups (Normative) as indicated.

CID TBL1 Dose Indexes for Dose Calibration

Resources: **HTML | FHIR JSON | FHIR XML | IHE SVS XML**
Type: **Extensible**
Version: **yyyyMMdd**
UID: **1.2.840.10008.XXXX**

Table CID TBL1. Dose Index for Dose Calibration

Coding Scheme Designator	Code Value	Code Meaning
DCM	111631	Average Glandular Dose
DCM	113738	Dose (RP)
DCM	113830	Mean CTDIvol
DCM	113837	Mean CTDIfreeair
DCM	113838	DLP
DCM	122130	Dose Area Product
DCM	130515	Air Kerma at Output Measurement Point

Modify PS3.16 Annex D DICOM Controlled Terminology Definitions (Normative) as indicated.

Table D-1. DICOM Controlled Terminology Definitions (Coding Scheme Designator "DCM" Coding Scheme Version "01")

Code Value	Code Meaning	Definition	Notes
...	…	…	…
CODE1	**Intended Dose Index for this Calibration**	**Intended dose index for this calibration, as determined by the Calibration Responsible Party.**	
CODE2	**Intended Acquisition Protocol for this Calibration**	**Intended acquisition protocol for this dose calibration, as determined the Calibration Responsible Party.**	