

## DICOM Correction Proposal

STATUS	Assigned
Date of Last Update	2017/03/27
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Correction Number	CP-1635
Log Summary:	Add Isocenter Reference System to RDSR
Name of Standard	PS 3 2016a



Change in PS 3.16 2016a: Amend TID 10002 to include new content items

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		
...								
14	>	CONTAINS	INCLUDE	DTID 1021 "Device Participant"	1	MC	Required if the irradiating device is not the recording device and the dose was accumulated on a single device.	\$DeviceProcedureRole = EV (113859, DCM, "Irradiating Device")
15	≥	<u>CONTAINS</u>	<u>CODE</u>	<u>EV (CDxx01, DCM, "Equipment Landmark")</u>	<u>1</u>	<u>U</u>		<u>EV (CDxx02, DCM, "Center of Table Head")</u>
16	>>	<u>HAS PROPERTIES</u>	<u>NUM</u>	<u>EV( CDxx03, DCM, "Equipment Landmark X Position"</u>	<u>1</u>	<u>M</u>		<u>UNITS = EV (mm, UCUM, "mm")</u>
17	>>	<u>HAS PROPERTIES</u>	<u>NUM</u>	<u>EV( CDxx03B, DCM, "Equipment Landmark Z Position"</u>	<u>1</u>	<u>M</u>		<u>UNITS = EV (mm, UCUM, "mm")</u>
18	≥	<u>CONTAINS</u>	<u>CODE</u>	<u>EV (CDxx04, DCM, "Patient Location Fiducial")</u>	<u>1-n</u>	<u>U</u>		<u>DCID Clxx01 "Patient Location Fiducials"</u>
19	>>	<u>HAS PROPERTIES</u>	<u>NUM</u>	<u>EV (CDxx06, DCM, "Equipment Landmark to Patient Fiducial Z Distance")</u>	<u>1</u>	<u>M</u>		<u>UNITS = EV (mm, U, "mm")</u>

Commented [OK1]: Should we explain why the Y Position is not recorded?

Commented [OK2]: CT Protocols has a structure and codes for:  
 (128120, DCM, "Plane through Superior Extent")  
 + (T-D1120,SRT,"Vertex of Head")  
 Or  
 (128121, DCM, "Plane through Inferior Extent")  
 + (T-D9700,SRT,"Foot")

Content Item Descriptions

...	
Row 14	The device that produced the irradiation accumulated in this Template. I.e., the X-Ray source. This is not required to be present if the information is the same as that already recorded in TID 1004 "Device Observer Identifying Attributes" encoded via the inclusion of TID 1002 "Observer Context" in TID 10001 "Projection X-Ray Radiation Dose" Row 5, which in turn may be absent if identical to the content in the Enhanced General Equipment Module, or if more than one device produced the accumulated irradiation.

<b>Rows 16 and 17</b>	<b><u>These coordinates relate a visible landmark on the X-Ray table to the Table Reference Point that is arbitrarily defined by the manufacturer and not necessarily visible to the operator.</u></b>
<b>Row 19</b>	<b><u>This distance (likely recorded by the operator) locates the patient with respect to an X-Ray table landmark. The patient is assumed to be centered in the left-right axis of the X-Ray table.</u></b>

**Change in PS 3.16 2016a: Amend TID 10003C to include new content items**

**Table TID 10003C. Irradiation Event X-Ray Mechanical Data**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CODE	EV (113956, DCM, "CR/DR Mechanical Configuration")	1	U		DCID 10031 "CR/DR Mechanical Configuration"
2			NUM	EV (112011, DCM, "Positioner Primary Angle")	1	UC	XOR Row 6	UNITS = EV (deg, UCUM, "deg")
3			NUM	EV (112012, DCM, "Positioner Secondary Angle")	1	UC	XOR Row 6	UNITS = EV (deg, UCUM, "deg")
4			NUM	EV (113739, DCM, "Positioner Primary End Angle")	1	UC	IFF TID (10003) Row 7 value = (113613, DCM, "Rotational Acquisition")	UNITS = EV (deg, UCUM, "deg")
5			NUM	EV (113740, DCM, "Positioner Secondary End Angle")	1	UC	IFF TID (10003) Row 7 value = (113613, DCM, "Rotational Acquisition")	UNITS = EV (deg, UCUM, "deg")
6			NUM	EV (113770, DCM, "Column Angulation")	1	UC	XOR Rows 2, 3	UNITS = EV (deg, UCUM, "deg")
7			NUM	EV (113754, DCM, "Table Head Tilt Angle")	1	U		UNITS = EV (deg, UCUM, "deg")
8			NUM	EV (113755, DCM, "Table Horizontal Rotation Angle")	1	U		UNITS = EV (deg, UCUM, "deg")
9			NUM	EV (113756, DCM, "Table Cradle Tilt Angle")	1	U		UNITS = EV (deg, UCUM, "deg")
10			NUM	EV (111633, DCM, "Compression Thickness")	1	U		UNITS = EV (mm, UCUM, "mm")
11			NUM	DCID 10008 "Dose Related Distance Measurements"	1-n	U		UNITS = EV (mm, UCUM, "mm")

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
12			NUM	EV (CDxx07, DCM, "Positioner Isocenter Primary Angle")	1	<u>U</u>		UNITS = EV (deg, UCUM, "deg")
13			NUM	EV (CDxx08, DCM, "Positioner Isocenter Secondary Angle")	1	<u>U</u>		UNITS = EV (deg, UCUM, "deg")
14			NUM	EV (CDxx09, DCM, "Positioner Isocenter Detector Rotation Angle")	1	<u>U</u>		UNITS = EV (deg, UCUM, "deg")
15			NUM	EV (CDxx10, DCM, "Positioner Isocenter Primary End Angle")	1	<u>U</u>		UNITS = EV (deg, UCUM, "deg")
16			NUM	EV (CDxx11, DCM, "Positioner Isocenter Secondary End Angle")	1	<u>U</u>		UNITS = EV (deg, UCUM, "deg")
17			NUM	EV (CDxx12, DCM, "Positioner Isocenter Detector Rotation End Angle")	1	<u>U</u>		UNITS = EV (deg, UCUM, "deg")
18			NUM	EV (CDxx13, DCM, "Table Head Tilt End Angle")	1	<u>U</u>		UNITS = EV (deg, UCUM, "deg")
19			NUM	EV (CDxx14, DCM, "Table Horizontal Rotation End Angle")	1	<u>U</u>		UNITS = EV (deg, UCUM, "deg")
20			NUM	EV (CDxx15, DCM, "Table Cradle Tilt End Angle")	1	<u>U</u>		UNITS = EV (deg, UCUM, "deg")

Content Item Descriptions

<u>Rows 12 to 20</u>	Refer to the definitions of the X-Ray Isocenter Reference System (PS 3.3 Section C.8.19.6.13).
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Change in PS 3.16 2016a: Add CID to include Patient Location Fiducials

### CID Clxx01 Patient Location Fiducials

Type: Extensible  
Version: 2016xxxx

#### Table CID Clxx01 Patient Location Fiducials

Coding Scheme Designator	Code Value	Code Meaning
<u>DCM</u>	<u>CDxx05</u>	<u>Plane at Top of Patient's Head</u>
<u>DCM</u>	<u>CDxx05B</u>	<u>Plane at Bottom of Patient's Feet</u>

Change in PS 3.16 2016a: Amend CID 10008 to include six new codes for table Isocenter positions

### CID 10008 Dose Related Distance Measurements

Type: Extensible  
Version: 201310102017xxxx

Table CID 10008. Dose Related Distance Measurements

Coding Scheme Designator	Code Value	Code Meaning
DCM	113748	Distance Source to Isocenter
DCM	113737	Distance Source to Reference Point
DCM	113750	Distance Source to Detector
DCM	113751	Table Longitudinal Position
DCM	113752	Table Lateral Position
DCM	113753	Table Height Position
DCM	113792	Distance Source to Table Plane
DCM	113759	Table Longitudinal End Position
DCM	113760	Table Lateral End Position
DCM	113761	Table Height End Position
<u>DCM</u>	<u>CDxx16</u>	<u>Table X Position to Isocenter</u>
<u>DCM</u>	<u>CDxx17</u>	<u>Table Y Position to Isocenter</u>
<u>DCM</u>	<u>CDxx18</u>	<u>Table Z Position to Isocenter</u>
<u>DCM</u>	<u>CDxx19</u>	<u>Table X End Position to Isocenter</u>
<u>DCM</u>	<u>CDxx20</u>	<u>Table Y End Position to Isocenter</u>
<u>DCM</u>	<u>CDxx21</u>	<u>Table Z End Position to Isocenter</u>

Change in PS 3.16 2016a: Amend Annex D by needed codes

Table D-1. DICOM Controlled Terminology Definitions

Code Value	Code Meaning	Definition	Notes
...			
<u>CDxx01</u>	<u>Equipment Landmark</u>	<u>A well-known landmark of the equipment that is visible by the operator.</u>	
<u>CDxx02</u>	<u>Center of Table Head</u>	<u>An equipment landmark on the X-Ray Table head located on the table top plane, centered in the left-right direction of the table.</u>	
<u>CDxx03</u>	<u>Equipment Landmark X Position</u>	<u>The X coordinate of the Equipment Landmark in the Table Coordinate System.</u>	
<u>CDxx03B</u>	<u>Equipment Landmark Z Position</u>	<u>The Z coordinate of the Equipment Landmark in the Table Coordinate System.</u>	
<u>CDxx04</u>	<u>Patient Location Fiducial</u>	<u>A patient fiducial used to establish the patient location relative to equipment.</u>	
<u>CDxx05</u>	<u>Plane at Top of Patient's Head</u>	<u>A transverse plane located at the top of the patient's head.</u>	
<u>CDxx05B</u>	<u>Plane at Bottom of Patient's Feet</u>	<u>A transverse plane located at the bottom of the patient's feet.</u>	
<u>CDxx06</u>	<u>Equipment Landmark to Patient Fiducial Z Distance</u>	<u>The distance in the Z direction from the Equipment Landmark to the Patient Location Fiducial in the Table Coordinate System.</u>  <u>Positive when the direction from the Equipment Landmark to the Patient Location Fiducial lies in the positive Z direction.</u>	
<u>CDxx07</u>	<u>Positioner Isocenter Primary Angle</u>	<u>Position of the X-Ray center beam in the isocenter reference system in the X direction (deg). See PS 3.3 Section C.8.19.6.13.1.2.</u>	<b>Commented [OK3]:</b> Not sure "position in the x direction" is the right way to describe an angle
<u>CDxx08</u>	<u>Positioner Isocenter Secondary Angle</u>	<u>Position of the X-Ray center beam in the isocenter reference system in the Z direction (deg). See PS 3.3 Section C.8.19.6.13.1.2.</u>	
<u>CDxx09</u>	<u>Positioner Isocenter Detector Rotation Angle</u>	<u>Rotation of the X-Ray detector plane (deg). See PS 3.3 Section C.8.19.6.13.1.2.</u>	
<u>CDxx10</u>	<u>Positioner Isocenter Primary End Angle</u>	<u>Position of the X-Ray center beam in the isocenter reference system in the X direction</u>	

Code Value	Code Meaning	Definition	Notes
		<u>(deg) at the end of an irradiation event. See (CDxx07,DCM,"Positioner Isocenter Primary Angle").</u>	
<u>CDxx11</u>	<u>Positioner Isocenter Secondary End Angle</u>	<u>Position of the X-Ray center beam in the isocenter reference system in the Z direction (deg) at the end of an irradiation event. See (CDxx08,DCM,"Positioner Isocenter Secondary Angle").</u>	
<u>CDxx12</u>	<u>Positioner Isocenter Detector Rotation End Angle</u>	<u>Rotation of the X-Ray detector plane (deg) at the end of an irradiation event. See (CDxx09,DCM,"Positioner Isocenter Detector Rotation Angle").</u>	
113754	Table Head Tilt Angle	Angle of the head-feet axis of the table in degrees relative to the horizontal plane. Positive values indicate that the head of the table is upwards. <u>See PS 3.3 Section C.8.19.6.13.1.3.</u>	
113755	Table Horizontal Rotation Angle	Rotation of the table in the horizontal plane (clockwise when looking from above the table). <u>See PS 3.3 Section C.8.19.6.13.1.3.</u>	
113756	Table Cradle Tilt Angle	Angle of the left-right axis of the table in degrees relative to the horizontal plane. Positive values indicate that the left of the table is upwards. <u>See PS 3.3 Section C.8.19.6.13.1.3.</u>	
<u>CDxx13</u>	<u>Table Head Tilt End Angle</u>	<u>Angle of the head-feet axis of the table (deg) relative to the horizontal plane at the end of an irradiation event. See (113754, DCM,"Table Head Tilt Angle").</u>	
<u>CDxx14</u>	<u>Table Horizontal Rotation End Angle</u>	<u>Rotation of the table in the horizontal plane (deg) at the end of an irradiation event. See (113755, DCM,"Table Horizontal Rotation Angle").</u>	
<u>CDxx15</u>	<u>Table Cradle Tilt End Angle</u>	<u>Angle of the left-right axis of the table (deg) relative to the horizontal plane at the end of an irradiation event. See (113756, DCM,"Table Cradle Tilt Angle").</u>	
<u>CDxx16</u>	<u>Table X Position to Isocenter</u>	<u>X position of the Table Reference Point with respect to the Isocenter (mm). See PS 3.3 Section C.8.19.6.13.1.3.</u>	
<u>CDxx17</u>	<u>Table Y Position to Isocenter</u>	<u>Y position of the Table Reference Point with respect to the Isocenter (mm). See PS 3.3 Section C.8.19.6.13.1.3.</u>	
<u>CDxx18</u>	<u>Table Z Position to Isocenter</u>	<u>Z position of the Table Reference Point with respect to the Isocenter (mm). See PS 3.3 Section C.8.19.6.13.1.3.</u>	
<u>CDxx19</u>	<u>Table X End Position to Isocenter</u>	<u>X position of the Table Reference Point with respect to the Isocenter (mm) at the end of an irradiation event. See (CDxx16,DCM,"Table X Position to Isocenter")</u>	



Code Value	Code Meaning	Definition	Notes
<u>CDxx20</u>	<u>Table Y End Position to Isocenter</u>	<u>Y position of the Table Reference Point with respect to the Isocenter (mm) at the end of an irradiation event. See (CDxx17,DCM,"Table Y Position to Isocenter")</u>	
<u>CDxx21</u>	<u>Table Z End Position to Isocenter</u>	<u>Z position of the Table Reference Point with respect to the Isocenter (mm) at the end of an irradiation event. See (CDxx18,DCM,"Table Z Position to Isocenter")</u>	