DICOM Correction Proposal

STATUS	Final Text
Date of Last Update	2025/03/31
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Correction Number CP-2425
Log Summary: Generalize CTDI phantom options
Name of Standard PS3.3, PS3.6, PS3.16 2025a
Rationale for Correction: Supplement 214 introduced an additional CTDI phantom size as part of CID 4052 “Dose Phantom Devices” to account for the use of a smaller, 10 cm CTDI phantom on certain systems. This CP removes the IEC restrictions on CTDI phantom sizes in the attribute descriptions, content item descriptions, and concept definition. While the vast majority of systems generating and reporting CTDI use the typical 16 and 32 cm phantoms, there is no technical reason that CTDI couldn’t be measured and reported using a different size phantom according to the same principles as defined by [IEC 60601-2-44]. The CP also creates a new CID for the CTDI-specific phantoms from those in CID 4052 to make it clear that the CTDI Phantom Type must be a CTDI-type phantom.
Correction Wording:

Modify PS3.3 as follows:

Table C.8-3. CT Image Module Attributes

Attribute Name	Tag	Type	Attribute Description
…			
CTDIvol	(0018,9345)	3	Computed Tomography Dose Index ($CTDI_{vol}$), in mGy according to **the principles described in** [IEC 60601-2-44]. It describes the average dose for this image for the selected CT conditions of operation.
CTDI Phantom Type Code Sequence	(0018,9346)	3	The type of phantom used for CTDI measurement ~~**according to [IEC 60601-2-44]**~~. Only a single Item is permitted in this Sequence.
>Include Table 8.8-1 “Code Sequence Macro Attributes”			*DCID* ~~***4052***~~***4053*** *“**CTDI** Phantom Device”*
…			

Modify PS3.3 as follows:

Table C.8-124. CT Exposure Macro Attributes

Attribute Name	Tag	Type	Attribute Description
…			
>CTDIvol	(0018,9345)	2C	Computed Tomography Dose Index ($CTDI_{vol}$), in mGy according to **the principles described in** [IEC 60601-2-44]. The $CTDI_{vol}$ describes the average dose for this frame for the selected CT conditions of operation. Required if Frame Type (0008,9007) Value 1 of this frame is ORIGINAL or Image Type (0008,0008) Value 1 is ORIGINAL. May be present otherwise.
>CTDI Phantom Type Code Sequence	(0018,9346)	3	The type of phantom used for CTDI measurement ~~**according to [IEC 60601-2-44]**~~. Only a single Item is permitted in this Sequence.
>>Include Table 8.8-1 "Code Sequence Macro Attributes"			*DCID* ~~***4052***~~***4053*** *"**CTDI** Phantom Device"*
…			

Modify PS3.3 as follows:

Table C.34.10-1. Performed CT Acquisition Module Attributes

Attribute Name	Tag	Type	Attribute Description
…			
CTDI Phantom Type Code Sequence	(0018,9346)	1C	The type of phantom used for CTDI measurement ~~**according to [IEC 60601-2-44]**~~. Required if CTDIvol (0018,9345) is present. Only a single Item is permitted in this Sequence.
>Include Table 8.8-1 "Code Sequence Macro Attributes"			*DCID* ~~***4052***~~***4053*** *"**CTDI** Phantom Device"*
…			

Modify PS3.16 as follows:

TID 10012 CT Accumulated Dose Data

Table TID 10012. CT Accumulated Dose Data

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
3a	>	CONTAINS	NUM	EV (130745, DCM, "CT Dose Length Product Sub-Total")	2-n	UC	IFF irradiation events within the scope of accumulation use different phantoms for estimating the recorded per-event DLP (i.e., the values of TID	UNITS = EV (mGy.cm, UCUM, "mGy.cm")

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
							10013 “CT Irradiation Event Data” Row 23 are not all the same).	
3b	>>	HAS PROPERTIES	CODE	EV (113835, DCM, "CTDIw Phantom Type")	1	M		DCID **~~40524~~4053** “**CTDI** Phantom Device”

Content Item Descriptions

Row 3b	The phantom used for the phantom-specific sub-total DLP estimate; shall be that specified at the irradiation event level in TID 10013 “CT Irradiation Event Data” Row 23 for the events included in the sub-total.

TID 10013 CT Irradiation Event Data

Table TID 10013. CT Irradiation Event Data

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (113819, DCM, "CT Acquisition")	1	M		
…								
21	>	CONTAINS	CONTAINER	EV (113829, DCM, "CT Dose")	1	MC	IF Row 4 does not equal (113805, DCM, "Constant Angle Acquisition")	
22	>>	CONTAINS	NUM	EV (113830, DCM, "Mean CTDIvol")	1	M		UNITS = EV (mGy, UCUM, "mGy")
23	>>	CONTAINS	CODE	EV (113835, DCM, "CTDIw Phantom Type")	1	M		DCID **~~4052~~4053** “**CTDI** Phantom Device”
…								

Content Item Descriptions

…	
Row 22	"Mean $CTDI_{vol}$" refers to the average value of the $CTDI_{vol}$ applied within this acquisition. $CTDI_{vol}$ is the volume $CTDI_w$, where $CTDI_w$ is the weighted computed tomography dose index 100 as defined **according to the principles described** in [IEC 60601-2-44]. For Sequenced and Spiral scanning, $CTDI_{vol}$ = $CTDI_w$ / Pitch Factor.

	For Stationary and Free scanning, $CTDI_{vol}$ = $CTDI_w$ × Number of Rotations. For Shuttle Mode scanning, $CTDI_{vol}$ = $CTDI_w$ × Number of Rotations for Entire Scan Series × Nominal Total Collimation Width / (Nominal Total Collimation Width + Distance Between the Two Scan Positions). According to [IEC 60601-2-44] Ed 3 for Constant Angle Acquisition may be calculated as $CTDI_{vol}$ = ($CTDI_w$ / Current Time Product (mAs)) × X-Ray Tube Current (mA) x (Nominal Total Collimation Width (mm) / Table Speed (mm/s)). Note The ratio $CTDI_w$ / Current Time Product is evaluated independently of the Constant Angle Acquisition but with the same settings of tube voltage and Total Collimation Width as those of the Constant Angle Acquisition. See also CTDIvol (0018,9345) and Spiral Pitch Factor (0018,9311) in the “Enhanced CT Image IODs” in PS3.3.
Row 23	The type of phantom used for CTDI measurement ~~**according to IEC 60601-2-44**~~ (e.g., Head 16 cm diameter PMMA, Body 32 cm diameter PMMA**, etc.**).
…	

Modify PS3.16 as follows:

TID 10041 Accumulated Dose Data

Table TID 10041. Accumulated Dose Data

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
26a	>	CONTAINS	NUM	EV (130745, DCM, "CT Dose Length Product Sub-Total")	1-n	U		UNITS = EV (mGy.cm, UCUM, "mGy.cm")
26b	>>	HAS PROPERTIES	CODE	EV (113835, DCM, "CTDIw Phantom Type")	1	M		DCID ~~**405**~~**24053** “**CTDI** Phantom Device”

Content Item Descriptions

Row 26b	The phantom used for the phantom-specific sub-total DLP estimate; shall be that specified at the irradiation event level in TID 10042 “Irradiation Event Summary Data” Row 29 for the events included in the sub-total.

TID 10042 Irradiation Event Summary Data

Table TID 10042. Irradiation Event Summary Data

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (130501, DCM, "Irradiation Event Summary Data")	1	M		
…								
27	>	CONTAINS	CONTAINER	EV (113829, DCM, "CT Dose")	1	U		
28	>>	CONTAINS	NUM	EV (113830, DCM, "Mean CTDIvol")	1	M		UNITS = EV (mGy, UCUM, "mGy")
29	>>	CONTAINS	CODE	EV (113835, DCM, "CTDIw Phantom Type")	1	M		DCID ~~4052~~**4053** “**CTDI** Phantom Device”
…								

Content Item Descriptions

…	
Row 28	"Mean $CTDI_{vol}$" refers to the average value of the $CTDI_{vol}$ applied within this acquisition. $CTDI_{vol}$ is the volume $CTDI_w$, where $CTDI_w$ is the weighted computed tomography dose index 100 as defined **according to the principles described** in [IEC 60601-2-44]. For Sequenced and Spiral scanning, $CTDI_{vol}$ = $CTDI_w$ / Pitch Factor. For Stationary and Free scanning, $CTDI_{vol}$ = $CTDI_w$ × Number of Rotations. For Shuttle Mode scanning, $CTDI_{vol}$ = $CTDI_w$ × Number of Rotations for Entire Scan Series × Nominal Total Collimation Width / (Nominal Total Collimation Width + Distance Between the Two Scan Positions). According to [IEC 60601-2-44] Ed 3 for Constant Angle Acquisition may be calculated as $CTDI_{vol}$ = ($CTDI_w$ / Current Time Product (mAs)) × X-Ray Tube Current (mA) x (Nominal Total Collimation Width (mm) / Table Speed (mm/s)). Note The ratio CTDIw / Current Time Product is evaluated independently of the Constant Angle Acquisition but with the same settings of tube voltage and Total Collimation Width as those of the Constant Angle Acquisition. See also CTDIvol (0018,9345) and Spiral Pitch Factor (0018,9311) in the “Enhanced CT Image IODs” in PS3.3.
Row 29	The type of phantom used for CTDI measurement ~~**according to IEC 60601-2-44**~~ (e.g., Head 16 cm diameter PMMA, Body 32 cm diameter PMMA**, etc.**).
…	

Modify PS3.16 as follows:

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

Code Value	Code Meaning	Definition	Notes
…	…	…	…
113830	Mean CTDIvol	"Mean CTDIvol" refers to the average value of the CTDIvol associated with this acquisition.	
113835	CTDIw Phantom Type	A label describing the type of phantom used for CTDI~~W~~**w** measurement ~~**according to [IEC 60601-2-44] (Head 16 cm diameter PMMA, Body 32 cm diameter PMMA)**~~.	
…	…	…	…
113690	IEC **160mm** Head **CT** Dosimetry Phantom	A phantom used for CTDI measurement in head modes according to [IEC 60601-2-44], Ed.2.1 (Head 16 cm diameter Polymethyl methacrylate PMMA).	
113691	IEC **320mm** Body **CT** Dosimetry Phantom	A phantom used for CTDI measurement in body modes according to [IEC 60601-2-44], Ed.2.1 (Body 32cm diameter Polymethyl methacrylate PMMA).	
130541	10**0** ~~**e**~~**m**m **Pediatric Head CT** Dosimetry Phantom	A dosimetry phantom consisting of a 100 mm diameter polymethyl methacrylate (PMMA) cylinder. The phantom will be at least 140 mm in length. The phantom will be longer than the length of the sensitive volume of the radiation detector used for measurements. The phantom will have five holes just large enough to accept a radiation detector and will be parallel to the axis of symmetry: one hole at the center, and four holes with their centers 10 mm below the surface of the phantom at 90° intervals. For the holes not used during a measurement, properly fitting insert parts made of PMMA will be used.	

Modify PS3.16 as follows:

CID 4052 Phantom Device

Resources: **HTML | FHIR JSON | FHIR XML | IHE SVS XML**
Keyword: **PhantomDevice**
FHIR Keyword: **dicom-cid-4052-PhantomDevice**
Type: Extensible
Version: **20221224**
UID: 1.2.840.10008.6.1.315

Table CID 4052. Phantom Device

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
Include CID 4053 "CTDI Phantom Device"				
SCT	706342009	Phantom	R-FE0C7	
DCM	113682	ACR Accreditation Phantom - CT		
DCM	113683	ACR Accreditation Phantom - MR		
DCM	113684	ACR Accreditation Phantom - Mammography		
DCM	113685	ACR Accreditation Phantom - Stereotactic Breast Biopsy		
DCM	113686	ACR Accreditation Phantom - ECT		
DCM	113687	ACR Accreditation Phantom - PET		
DCM	113688	ACR Accreditation Phantom - ECT/PET		
DCM	113689	ACR Accreditation Phantom - PET Faceplate		
~~**DCM**~~	~~**113690**~~	~~**IEC Head Dosimetry Phantom**~~		
~~**DCM**~~	~~**113691**~~	~~**IEC Body Dosimetry Phantom**~~		
DCM	113692	NEMA XR21-2000 Phantom		
~~**DCM**~~	~~**130541**~~	~~**10 cm Dosimetry Phantom**~~		

Add to PS3.16 as follows:

CID 4053 CTDI Phantom Device

Keyword: **CTDIPhantomDevice**
FHIR Keyword: **dicom-cid-4053-CTDIPhantomDevice**
Type: **Extensible**
Version: **20250331**
UID: **1.2.840.10008.6.1.1513**

Table CID 4053. CTDI Phantom Device

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
DCM	113690	IEC **160mm** Head **CT** Dosimetry Phantom		
DCM	113691	IEC **320mm** Body **CT** Dosimetry Phantom		
DCM	130541	10**0** ~~cm~~m **Pediatric Head CT** Dosimetry Phantom		

Add to PS3.6 as follows:

Table A-3. Context Group UID Values

Context Group UID	Context Group Identifier	Context Group Name	Comment
1.2.840.10008.6.1.1513	CID 4053	CTDI Phantom Device	