DICOM Correction Item

Tracking Information - Administration Use Only	
Correction Proposal Number	CP-1513
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Correction Number CP-1513	
Log Summary: Clarification of meaning of entrance dose	
Type of Modification Clarification	Name of Standard DICOM 2017a

Rationale for Correction:

- The current term "Entrance Dose" and "Entrance Dose in mGy" are ambiguous, because it is not clear whether it refers to air kerma, or dose to patient, or if back-scattering is included. However, for legacy reasons, it is better to add a field to clarify the meaning than replacing it with a completely new term.
- Even if the P-RDSR will have better defined dose value of interest, it is still worth to clarify the usage of the existing attributes. P-RDSR will improve but will not replace the existing objects.
- There are cases where the patient surface is used as the reference point for the IAK. Therefore, we need to add a new code in Part 16 CID 10025 "Radiation Dose Reference Points" for the patient surface.
- There is no need to add a corresponding "Entrance Exposure Derivation" to the SR construct because the "Entrance Exposure at RP" concept already specifies "Exposure measurement in air at the reference point that does not include back scatter, according to MQCM 1999." i.e. IAK

Sections of documents affected

PS3.3, PS3.6, PS3.16 2017a

Correction Wording:

Amend PS 3.3 Table C.4.16*: clarify the meaning of Entrance Dose and Entrance Dose in mGy*

Table C.4-16. Radiation Dose Module Attributes

Attribute Name	Tag	Attribute Description
…		

Attribute Name	Tag	Attribute Description
Entrance Dose	(0040,0302)	Average entrance dose value measured in dGy at the surface of the patient during this Performed Procedure Step. Note This may be an estimated value based on assumptions about the patient's body size and habitus.
Entrance Dose in mGy	(0040,8302)	Average entrance dose value measured in mGy at the surface of the patient during this Performed Procedure Step. Note This may be an estimated value based on assumptions about the patient's body size and habitus.
Entrance Dose Derivation	**(0040,8303)**	**Describes what type of dose is represented by the values of Entrance Dose (0040,0302) and Entrance Dose in mGy (0040,8302).** **Enumerated Values:** **IAK represents air kerma at the entrance surface, no backscatter included, no air kerma to tissue dose conversion applied.** **ESAK represents air kerma at the entrance surface, with backscatter included, no air kerma to tissue dose conversion applied.** **ESDBS represents absorbed dose in tissue at the entrance surface, with backscatter included.** **ESDNOBS represents absorbed dose in tissue at the entrance surface, without backscatter included.** **Only meaningful if Entrance Dose (0040,0302) or Entrance Dose in mGy (0040,8302) is present.**

Amend PS 3.3 Table C.8-33:

C.8.7.8 X-Ray Acquisition Dose Module

This Module describes the attributes related to dose delivery from an X-Ray source during the acquisition of an X-Ray image.

Table C.8-33. X-Ray Acquisition Dose Module Attributes

Attribute Name	Tag	Type	Attribute Description
…			

Attribute Name	Tag	Type	Attribute Description
Entrance Dose	(0040,0302)	3	Average entrance dose value measured in dGy at the surface of the patient during the acquisition of this image. Note This may be an estimated value based on assumptions about the patient's body size and habitus.
Entrance Dose in mGy	(0040,8302)	3	Average entrance dose value measured in mGy at the surface of the patient during the acquisition of this image. Note This may be an estimated value based on assumptions about the patient's body size and habitus.
Entrance Dose Derivation	**(0040,8303)**	**3**	**Describes what type of dose is represented by the values of Entrance Dose (0040,0302) and Entrance Dose in mGy (0040,8302).** **Enumerated Values:** **IAK represents air kerma at the entrance surface, no backscatter included, no air kerma to tissue dose conversion applied.** **ESAK represents air kerma at the entrance surface, with backscatter included, no air kerma to tissue dose conversion applied.** **ESDBS represents absorbed dose in tissue at the entrance surface, with backscatter included.** **ESDNOBS represents absorbed dose in tissue at the entrance surface, without backscatter included.** **Only meaningful if Entrance Dose (0040,0302) or Entrance Dose in mGy (0040,8302) is present.**

Amend PS 3.3 Table C.8.21.3.4-1:

C.8.21.3.4 Breast Tomosynthesis Acquisition Module

This section describes the Breast Tomosynthesis Acquisition Module.

Table C.8.21.3.4-1. Breast Tomosynthesis Acquisition Module Attributes

Attribute Name	Tag	Type	Attribute Description
X-Ray 3D Acquisition Sequence	(0018,9507)	1	Each Item represents an acquisition context related to one or more reconstructions. The values of Acquisition Index (0020,9518) may be used as index in this sequence. One or more Items shall be included in this sequence.

Attribute Name	Tag	Type	Attribute Description
…			
>Entrance Dose in mGy	(0040,8302)	3	Entrance dose value measured in mGy at the surface of the patient representing the collective total for all acquired frames described in this sequence item. Note This may be an estimated value based on assumptions about the patient's body size and habitus.
>Entrance Dose Derivation	**(0040,8303)**	**3**	**Describes what type of dose is represented by the values of Entrance Dose in mGy (0040,8302).** **Enumerated Values:** **IAK represents air kerma at the entrance surface, no backscatter included, no air kerma to tissue dose conversion applied.** **ESAK represents air kerma at the entrance surface, with backscatter included, no air kerma to tissue dose conversion applied.** **ESDBS represents absorbed dose in tissue at the entrance surface, with backscatter included.** **ESDNOBS represents absorbed dose in tissue at the entrance surface, without backscatter included.** **Only meaningful if Entrance Dose in mGy (0040,8302) is present.**
...	...	...	...
>Per Projection Acquisition Sequence	(0018,9538)	1	Sequence containing detailed acquisition context of each individual projection used in this acquisition context. One or more Items shall be included in this Sequence.
...	...	...	...
>>Entrance Dose in mGy	(0040,8302)	3	Entrance dose value measured in mGy at the surface of the patient representing the collective total for all acquired frames described in this sequence item. Note This may be an estimated value based on assumptions about the patient's body size and habitus.
>>Entrance Dose Derivation	**(0040,8303)**	**3**	**Describes what type of dose is represented by the values of Entrance Dose in mGy (0040,8302).** **Enumerated Values:** **IAK represents air kerma at the entrance surface,**

Attribute Name	Tag	Type	Attribute Description
			no backscatter included, no air kerma to tissue dose conversion applied. **ESAK represents air kerma at the entrance surface, with backscatter included, no air kerma to tissue dose conversion applied.** **ESDBS represents absorbed dose in tissue at the entrance surface, with backscatter included.** **ESDNOBS represents absorbed dose in tissue at the entrance surface, without backscatter included.** **Only meaningful if Entrance Dose in mGy (0040,8302) is present.**

Amend PS 3.3 Table C.8.31-1:

C.8.31 Breast Projection Image Modules

C.8.31.1 Enhanced Mammography Image Module

Table C.8.31-1 specifies the Attributes that identify and describe general information about the Enhanced Mammography Image Module.

Table C.8.31-1. Enhanced Mammography Image Module Attributes

Attribute Name	Tag	Type	Attribute Description
…			
Entrance Dose in mGy	(0040,8302)	1	Entrance dose value measured in mGy at the surface of the patient representing the collective total for all acquired frames. Note This may be an estimated value based on assumptions about the patient's body size and habitus.
Entrance Dose Derivation	**(0040,8303)**	**3**	**Describes what dose is represented by the values of Entrance Dose in mGy (0040,8302).** **Enumerated Values:** **IAK represents air kerma at the entrance surface, no backscatter included, no air kerma to tissue dose conversion applied.** **ESAK represents air kerma at the entrance surface, with backscatter included, no air kerma to tissue dose**

Attribute Name	Tag	Type	Attribute Description
			conversion applied. **ESDBS represents absorbed dose in tissue at the entrance surface, with backscatter included.** **ESDNOBS represents absorbed dose in tissue at the entrance surface, without backscatter included.**

Amend PS 3.3 Table C.8.31.5-1:

C.8.31.5 Breast X-Ray Acquisition Dose Macro

Table C.8.31.5-1 specifies the Attributes of the X-Ray Acquisition Dose Functional Group Macro.

Table C.8.31.5-1. Breast X-Ray Acquisition Dose Macro Attributes

Attribute Name	Tag	Type	Attribute Description
X-Ray Acquisition Dose Sequence	(0018,9542)	1	Sequence containing the X-Ray exposure information for this frame. Only a single Item shall be included in this sequence.
…			
>Entrance Dose in mGy	(0040,8302)	1	Average entrance dose value measured in mGy at the surface of the patient during the acquisition of this image. Note This may be an estimated value based on assumptions about the patient's body size and habitus.
>Entrance Dose Derivation	**(0040,8303)**	**3**	**Describes what dose is represented by the values of Entrance Dose in mGy (0040,8302).** **Enumerated Values:** **IAK represents air kerma at the entrance surface, no backscatter included, no air kerma to tissue dose conversion applied.** **ESAK represents air kerma at the entrance surface, with backscatter included, no air kerma to tissue dose conversion applied.** **ESDBS represents absorbed dose in tissue at the entrance surface, with backscatter included.** **ESDNOBS represents absorbed dose in tissue at the entrance surface, without backscatter included.**

Amend PS 3.6, Section 6:

Tag	Name	Keyword	VR	VM
(0040,8303)	**Entrance Dose Derivation**	**EntranceDoseDerivation**	**CS**	**1**

Amend PS 3.16 Table CID 10025:

CID 10025 Radiation Dose Reference Points

Type: **Extensible**
Version: ~~**20120406**~~**20170416**

Table CID 10025. Radiation Dose Reference Points

Coding Scheme Designator	Code Value	Code Meaning
DCM	113860	15cm from Isocenter toward Source
DCM	113861	30cm in Front of Image Input Surface
DCM	113862	1cm above Tabletop
DCM	113863	30cm above Tabletop
DCM	113864	15cm from Table Centerline
DCM	113865	Entrance exposure to a 4.2 cm breast thickness
DCM	113941	In Detector Plane
DCM	**113964**	**At Surface of Patient**

Amend PS 3.16 Table D-1. DICOM Controlled Terminology Definitions:

Table D-1. DICOM Controlled Terminology Definitions

Code Value	Code Meaning	Definition	Notes
113863	30cm above Tabletop	30cm above the patient tabletop of cradle; See FDA Federal Performance Standard for Diagnostic X-Ray Systems §1020.32(d) (3).	

113864	15cm from Table Centerline	15cm from the centerline of the X-Ray table and in the direction of the X-Ray source; See FDA Federal Performance Standard for Diagnostic X-Ray Systems §1020.32(d) (3).	
113865	Entrance exposure to a 4.2 cm breast thickness	Standard breast means a 4.2 centimeter (cm) thick compressed breast consisting of 50 percent glandular and 50 percent adipose tissue. See Department of Health and Human Services, Food and Drug Administration. Mammography quality standards; final rule. Federal Register. Oct. 28, 1997; 68(208):55852-55994; see 900.2(uu).	
113941	In Detector Plane	A segmented region of the detector surface within the irradiated area (but might not be near the center of the detector).	
113964	**At Surface of Patient**	**A point at the surface of the patient within the irradiated area where the X-Ray beam enters the patient (i.e. towards the tube).**	