

DICOM Correction Proposal

STATUS	Final Text
Date of Last Update	2019/03/23
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Correction Number	CP-1835
Log Summary: Use TID for Quantity Definition	
Name of Standard PS3.3, PS3.16 2019a	
<p>Rationale for Correction:</p> <p>Real-World value units are expressed by the Rescale Type (0028,1054) attribute or Measurement Units Code Sequence (0040,08EA) in the Real-World Mapping Macro.</p> <p>The quantity of the Real World Value can be specified by the Quantity Definition Sequence (0040,9220). This specification is important in some cases, when the unit by itself is not sufficiently significant.</p> <p>The following are two examples relevant for current proceedings.</p> <p>In the context of Sup 188 (Multi-Energy CT) new units have been proposed. Amongst others, Effective Atomic Number, has been proposed as “unit”. However, Effective Atomic Number is rather a quantity with a dimensionless unit, and there are various formulas how these values are defined.</p> <p>Further on, in the same context (though not in the supplement itself) the Relative Stopping Power Ratio (RSPR) has been proposed as a unit as well. In a clean sense the unit of the Relative Stopping Power Ratio is the UCUM unit “ratio” and not some specific unit. Further on, while RSPR is well-defined, the value is dependent on the energy for what it is specified.</p> <p>Values of such units are used in calculations of therapeutic dose for Radiotherapy Ion treatments. Without a dependable specification, they are not usable as is, but will need out-of-band agreements dependent on the applications creating such data.</p> <p>To build a strong and re-usable approach to specify the way how quantities are described, the current approach of specifying some conditions in the attribute descriptions is replaced by referring to a new TID. In this TID; the second issue (RSPR at specified energy) is addressed.</p> <p>The first issue (Effective Atomic Number) may be addressed later by addition of specific codes for known definitions of that quantity.</p>	
Correction Wording:	

Make the following changes to PS3.3, Annex C:

C.7.6.16.2.11 Real World Value Mapping Macro

Table C.7.6.16-12 specifies the Attributes of the Real World Value Mapping Functional Group Macro.

Table C.7.6.16-12. Real World Value Mapping Macro Attributes

Attribute Name	Tag	Type	Attribute Description
Real World Value Mapping Sequence	(0040,9096)	1	The mapping of stored values to associated Real World values. One or more Items shall be included in this Sequence.
>Include Table C.7.6.16-12b "Real World Value Mapping Item Macro Attributes"			Defined CID for Measurement Units Code Sequence is 82, or as specified in the Macro invocation.

Table C.7.6.16-12b. Real World Value Mapping Item Macro Attributes

Attribute Name	Tag	Type	Attribute Description
...			
Real World Value Intercept	(0040,9224)	1C	The Intercept value in relationship between stored values (SV) and the Real World values. See Section C.7.6.16.2.11.1.2 for further explanation. Required if Float Pixel Data (7FE0,0008) or Double Float Pixel Data (7FE0,0009) are present or Real World Value LUT Data (0040,9212) is not present.
Real World Value Slope	(0040,9225)	1C	The Slope value in relationship between stored values (SV) and the real world values. See Section C.7.6.16.2.11.1.2 for further explanation. Required if Float Pixel Data (7FE0,0008) or Double Float Pixel Data (7FE0,0009) are present or Real World Value LUT Data (0040,9212) is not present.
...			
Measurement Units Code Sequence	(0040,08EA)	1	Units of measurement. Only a single Item shall be included in this Sequence. See Section C.7.6.16.2.11.1 for further explanation.
>Include Table 8.8-1 "Code Sequence Macro Attributes"			Defined CID 7181 "Abstract Multi-dimensional Image Model Component Units", or as specified in the Macro invocation.
Quantity Definition Sequence	(0040,9220)	3	A list of name-value pairs that describe the characteristics of the quantity represented by the Real World Value. One or more Items are permitted in this Sequence. One of the Items shall have a concept name that specifies the quantified characteristic, though it is not required that (G-C1C6, SRT, "Quantity") be used if there is a reason to use a similar concept from a different coding scheme. Other Items may be concept modifiers, such as (G-C036, SRT, "Measurement Method"). The order of the Items is not significant.
>Include Table 10-2 "Content Item Macro Attributes Description"			Baseline CID for Concept Name Code Sequence is CID 9000 "Physical Quantity Descriptors".

Attribute Name	Tag	Type	Attribute Description
			<p>Baseline CID for Concept Code Sequence for Concept Name of (G-C1C6, SRT, "Quantity") is CID 7180 "Abstract Multi-dimensional Image Model Component Semantics".</p> <p><u>Baseline TID is TID 15400 "Real-World Quantity Definition".</u></p> <p><u>Other TIDs may be defined by the IOD or application that uses this Macro.</u></p>

Add the code specified below to CID 7180 in PS3.16, Annex B:

CID 7180 ABSTRACT MULTI-DIMENSIONAL IMAGE MODEL COMPONENT SEMANTICS

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
 Type: Extensible
 Version: 2018090420190323
 UID: 1.2.840.10008.6.1.917

Table CID 7180. Abstract Multi-dimensional Image Model Component Semantics

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID	Units
<u>DCM</u>	<u>130086</u>	<u>Relative Linear Stopping Power</u>			<u>DT (ratio, UCUM, "ratio")</u>

Add the following TID to the table in PS3.16, Annex C:

TID 15400 REAL-WORLD QUANTITY DEFINITION

TID 15400

Real-World Quantity Definition

Type: Extensible Order: Non-Significant

	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1	CODE	DT (G-C1C6, SRT, "Quantity")	1	M		BCID 7180 "Abstract Multi-dimensional Image Model Component Semantics".
2	CODE	BCID 9000 "Physical Quantity Descriptors"	1-n	U		

Content Item Descriptions

Row 1	This row uses a concept name that specifies the quantified characteristic. It is not required that (G-C1C6, SRT, "Quantity") be used if there is a reason to use a similar concept.
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Row 2	May be concept modifiers, such as (G-C036, SRT, "Measurement Method").
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TID 15401 REAL-WORLD QUANTITY DEFINITION FOR X-RAY ATTENUATION PROPERTIES

TID 15401

Real-World Quantity Definition for X-Ray Attenuation Properties

Type: Extensible Order: Non-Significant

	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1	INCLUDE	DTID 15400	1	M		
2	NUMERIC	EV (DCM, 130087, "Reference Energy")	1	MC	IF TID 15400 Row 1 Quantity value is (130086, DCM, "Relative Linear Stopping Power ")	UNITS = EV ("MeV", UCUM, "Megaelectronvolt")