

STATUS	Assigned
Date of Last Update	2014/06/11
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Submission Date	2014/03/03

Correction Number CP-1392
Log Summary: Addition of Quantity Descriptors and Measurements for PET
Name of Standard PS3.16 2013
Rationale for Correction:  The "Abstract Multi-dimensional Image Model Component Semantics" and related units context groups are lacking in PET concepts, and should reuse information in other context groups.  Add new concepts and refactor other groups that can be reused.
Editor's Notes:
Correction Wording:

Amend DICOM PS3.16 - Content Mapping Resource - Context Groups to add the following new Context Groups (factored out but otherwise unchanged):

## CID cc2c4 SUV Units

Type: Extensible

Version: yyyyymmdd

Table CID cc2c4. SUV Units

Coding Scheme Designator	Code Value	Code Meaning
UCUM	{SUVbw}g/ml	Standardized Uptake Value body weight
UCUM	{SUVlbm}g/ml	Standardized Uptake Value lean body mass
UCUM	{SUVbsa}cm2/ml	Standardized Uptake Value body surface area
UCUM	{SUVibw}g/ml	Standardized Uptake Value ideal body weight

### Note

The formulas for the determination of SUVbw, SUVbsa, SUVlbm and SUVibw are defined in Sugawara et al. *Reevaluation of the Standardized Uptake Value for FDG: Variations with Body Weight and Methods for Correction*. Radiology, 1999 at <http://radiology.rsna.org/content/213/2/521>. The patient size correction factors are summarized here, where weight is in kg and height is in cm:

SUVbw: males & females: weight

SUVlbm: males:  $1.10 * \text{weight} - 120 * (\text{weight}/\text{height})^2$

females:  $1.07 * \text{weight} - 148 * (\text{weight}/\text{height})^2$

SUVbsa: males & females:  $\text{weight}^{0.425} * \text{height}^{0.725} * 0.007184$

SUVibw: males:  $48.0 + 1.06 * (\text{height} - 152)$

females:  $45.5 + 0.91 * (\text{height} - 152)$

Amend DICOM PS3.16 - Content Mapping Resource - Context Groups to amend the following context groups to add new values:

## CID 84 PET Units ~~For Real World Value Mapping~~

Type: Extensible

Version: ~~20121105~~yyyyymmdd

Table CID 84. PET Units ~~for Real World Value Mapping~~

Coding Scheme Designator	Code Value	Code Meaning
<b><u>Include CID cc2c4 "SUV Units"</u></b>		
UCUM	{counts}	Counts
UCUM	{counts}/s	Counts per second
<del>UCUM</del>	<del>{SUVbw}g/ml</del>	<del>Standardized Uptake Value body weight</del>
<del>UCUM</del>	<del>{SUVlbm}g/ml</del>	<del>Standardized Uptake Value lean body mass</del>
<del>UCUM</del>	<del>{SUVbsa}cm2/ml</del>	<del>Standardized Uptake Value body surface area</del>
<del>UCUM</del>	<del>{SUVibw}g/ml</del>	<del>Standardized Uptake Value ideal body weight</del>
UCUM	{propcounts}	Proportional to counts

Coding Scheme Designator	Code Value	Code Meaning
UCUM	{propcounts}/s	Proportional to counts per second
UCUM	cm2	Centimeter**2
UCUM	%	Percent
UCUM	Bq/ml	Becquerels/milliliter
UCUM	mg/min/ml	Milligrams/minute/milliliter
UCUM	umol/min/ml	Micromole/minute/milliliter
UCUM	ml/min/g	Milliliter/minute/gram
UCUM	ml/g	Milliliter/gram
UCUM	/cm	/Centimeter
UCUM	umol/ml	Micromole/milliliter

**Note**

The formulas for the determination of SUVbw, SUVbsa, SUVlbm and SUVibw are defined in Sugawara et al. *Reevaluation of the Standardized Uptake Value for FDG: Variations with Body Weight and Methods for Correction*. Radiology, 1999 at <http://radiology.rsna.org/content/213/2/521>. The patient size correction factors are summarized here, where weight is in kg and height is in cm:

**SUVbw: males & females: weight**

**SUVlbm: males:  $1.10 * \text{weight} - 120 * (\text{weight}/\text{height})^2$**

**females:  $1.07 * \text{weight} - 148 * (\text{weight}/\text{height})^2$**

**SUVbsa: males & females:  $\text{weight}^0.425 * \text{height}^0.725 * 0.007184$**

**SUVibw: males:  $48.0 + 1.06 * (\text{height} - 152)$**

**females:  $45.5 + 0.91 * (\text{height} - 152)$**

**CID 7180 Abstract Multi-dimensional Image Model Component Semantics**

Type: Extensible  
Version: 20100825yyyyymmdd

**Table CID 7180. Abstract Multi-Dimensional Image Model Component Semantics**

Coding Scheme Designator	Code Value	Code Meaning
...	...	...
DCM	110855	Fractional Occupancy Segmentation
<u>DCM</u>	<u>dd7dd1</u>	<u>Standardized Uptake Value</u>
<u>DCM</u>	<u>dd7dd2</u>	<u>SUVbw</u>
<u>DCM</u>	<u>dd7dd3</u>	<u>SUVlbm</u>
<u>DCM</u>	<u>dd7dd4</u>	<u>SUVbsa</u>
<u>DCM</u>	<u>dd7dd5</u>	<u>SUVibw</u>

**CID 7181 Abstract Multi-dimensional Image Model Component Units**

Type: Extensible  
Version: 20100825yyyyymmdd

**Table CID 7181. Abstract Multi-Dimensional Image Model Component Units**

Coding Scheme Designator	Code Value	Code Meaning
...		
<i>Include CID 7462 "Units of Volume Measurement"</i>		
<b><u>Include CID 84 "PET Units For Real World Value Mapping"</u></b>		
UCUM	1	no units
UCUM	{ratio}	ratio
UCUM	[hnsfU]	Hounsfield Unit
UCUM	{counts}	Counts
UCUM	{counts}/s	Counts per second
UCUM	[arb'U]	arbitrary unit
UCUM	cm/s	centimeter/second
...	...	...

*Amend DICOM PS3.16 - Content Mapping Resource - Controlled Terminology Definitions to add the following new concepts:*

**Table D-1. DICOM Controlled Terminology Definitions**

Code Value	Code Meaning	Definition	Notes
dd7dd1	Standardized Uptake Value	A ratio of locally measured radioactivity concentration versus the injected radioactivity distributed evenly throughout the whole body.  This general concept encompasses all specific methods of calculating the whole body volume of distribution, such as using body weight, lean body mass, body surface area, etc.	
dd7dd2	SUVbw	Standardized Uptake Value calculated using body weight.  Defined in Sugawara et al. <i>Reevaluation of the Standardized Uptake Value for FDG: Variations with Body Weight and Methods for Correction</i> . Radiology, 1999 at <a href="http://radiology.rsna.org/content/213/2/521">http://radiology.rsna.org/content/213/2/521</a>	
dd7dd3	SUVlbm	Standardized Uptake Value calculated using lean body mass.  Defined in Sugawara et al. <i>Reevaluation of the Standardized Uptake Value for FDG: Variations with Body Weight and Methods for Correction</i> . Radiology, 1999 at <a href="http://radiology.rsna.org/content/213/2/521">http://radiology.rsna.org/content/213/2/521</a>	
dd7dd4	SUVbsa	Standardized Uptake Value calculated using body surface area.  Defined in Sugawara et al. <i>Reevaluation of the Standardized Uptake Value for FDG: Variations with Body Weight and Methods for Correction</i> . Radiology, 1999 at <a href="http://radiology.rsna.org/content/213/2/521">http://radiology.rsna.org/content/213/2/521</a>	
dd7dd5	SUVibw	Standardized Uptake Value calculated using ideal body weight.  Defined in Sugawara et al. <i>Reevaluation of the Standardized Uptake Value for FDG: Variations with Body Weight and Methods for Correction</i> . Radiology, 1999 at <a href="http://radiology.rsna.org/content/213/2/521">http://radiology.rsna.org/content/213/2/521</a>	
dd7d22	SUV body weight calculation method	Method of calculating Standardized Uptake Value using body weight.  Defined in Sugawara et al. <i>Reevaluation of the Standardized Uptake Value for FDG: Variations with Body Weight and Methods for Correction</i> . Radiology, 1999 at <a href="http://radiology.rsna.org/content/213/2/521">http://radiology.rsna.org/content/213/2/521</a>	

Code Value	Code Meaning	Definition	Notes
dd7d23	SUV lean body mass calculation method	Method of calculating Standardized Uptake Value using lean body mass.  Defined in Sugawara et al. <i>Reevaluation of the Standardized Uptake Value for FDG: Variations with Body Weight and Methods for Correction</i> . Radiology, 1999 at <a href="http://radiology.rsna.org/content/213/2/521">http://radiology.rsna.org/content/213/2/521</a>	
dd7d24	SUV body surface area calculation method	Method of calculating Standardized Uptake Value using body surface area.  Defined in Sugawara et al. <i>Reevaluation of the Standardized Uptake Value for FDG: Variations with Body Weight and Methods for Correction</i> . Radiology, 1999 at <a href="http://radiology.rsna.org/content/213/2/521">http://radiology.rsna.org/content/213/2/521</a>	
dd7d25	SUV ideal body weight calculation method	Method of calculating Standardized Uptake Value using ideal body weight.  Defined in Sugawara et al. <i>Reevaluation of the Standardized Uptake Value for FDG: Variations with Body Weight and Methods for Correction</i> . Radiology, 1999 at <a href="http://radiology.rsna.org/content/213/2/521">http://radiology.rsna.org/content/213/2/521</a>	