DICOM Correction Proposal Form

Tracking Information - Administration Use Only	
Correction Proposal Number	CP- 265
STATUS	Assigned
Date of Last Update	9/11/2001
Person Assigned	Harry Solomon
Submitter Name	Harry Solomon
Submission date	6/12/2001

Correction Number CP- 265	
Log Summary: Modify numeric measurement templates	
Type of Modification Clarification	Name of Standard PS 3.16

Rationale for Correction

The Templates specified for numeric measurement under TID 2000 do not provide for the full range of types of measurements made on images.

1. The concept categories of linear, area, and volume measurements do not provide for angle, velocity, density, counts of objects, quality ratings, and other categories of measurements that are commonly derived from images. This CP provides a general Numeric Measurements template for these other categories of measurements.
2. Measurements should be able to be inferred from referenced images without SCOORDs (which may be meaningless for particular classes of measurements, e.g., quality ratings). The proposed general Numeric Measurements template provides for inference directly from an image without an SCOORD.
3. Volumes may be represented by intersection with the identifier image, rather than projection. [Note that this may be implied by Value Multiplicity of 1-n on the Volume SCOORDs.] This CP clarifies that use.
4. The measurements do not provide for measurements across multiple images (e.g., ends of a linear path in different cross-sectional planes). This CP provides for linear paths to be defined by SCOORDs of vertices in multiple images. [Note that by virtue of the current definition of TID 1402, implementations must deal with multiple SCOORDs subsidiary to a NUM.]
5. Definition of Concept Names for SCOORDs are incomplete (Defined vs. Enumerated). Similarly in the Path defiition, "can be" might imply Defined (can be this, or can be something else) or Enumerated (can only be this). This CP clarifies those items.
6. The SCOORD content item (Row 2) in the Linear Measurement Template is specified with Requirement Type of “M”, mandatory. This is intended to be a template for general use, and there are use cases where a numeric measurement may be defined without having the capability to associate the measurement with a specific coordinate path on an image. This content item should be “U”, user optional. The corresponding SCOORD content item in TID 1401 Area Measurement Template is “MC”, required only with concept name “Area of Defined Region” for the numeric measurement, and in TID 1402 Volume Measurement Template is “U”.

7. In the linear, area, and volume measurement templates (TID 1400, 1401, 1402) defined in PS 3.16, a numeric measurement may be defined without associating the measurement with a specific coordinate path on an image. In this case, it may still be desirable to reference one or more images from which the measurement was inferred. This is also

symmetric with the proposed general measurements template
Sections of documents affected PS 3.16 Annex A and B
Correction Wording:

Update PS3.16 Annex A

TID 1400 Linear Measurement Template

TID 1400
LINEAR MEASUREMENT

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			NUM	DCID (7470) "Linear Measurements"	1	M		UNITS = DCID(7460) "Units of Linear Measurement"
2	>	INFERRED FROM	SCOORD	**DT** (121055,DCM, "Path") **or (121230,DCM, "Path Vertex")**	1-n	**M**		
3	>>	R-SELECTED FROM	IMAGE		1	MC	XOR Row 4	
4	>>	SELECTED FROM	IMAGE		1	MC	XOR Row 3	

Content Item Descriptions

Row 2 "Path**"**

Path shall be used with only a single SCOORD, and shall represent the measured path or a projection of the measured path in the image. Path ~~**can**~~ **shall** be:

- an open POLYLINE with two different points (to measure length, diameter, distance, proximity, etc),
- a CIRCLE or ELLIPSE (to measure circumference) or
- an open or closed POLYLINE (closed polygon) to measure path length (open) or perimeter (closed).

Row 2 "Path Vertex"

Path Vertices shall be ordered by the order of their SCOORD Content Items to identify the measured path through one or more images. The Graphic Type (0070,0023) of each SCOORD shall be:

- **POINT or MULTIPOINT**

TID 1401 Area Measurement Template

TID 1401
AREA MEASUREMENT

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			NUM	DCID(~~**CID**~~ 7471) "Area Measurements"	1	M		Value shall be > 0 UNITS = DCID(7461) "Units of Area Measurement"
2	>	INFERRED FROM	SCOORD	**EV** (121056,DCM, "Area Outline")	1	MC	Shall be present if concept name of Row 1 is (121202,DCM, "Area of Defined Region"). May be present otherwise.	Graphic data type shall not be MULTIPOINT

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
3	>>	R-SELECTED FROM	IMAGE		1	MC	XOR Row 4	
4	>>	SELECTED FROM	IMAGE		1	MC	XOR Row 3	

Content Item Descriptions

Row 2 "Area Outline**"**

A Graphic Data Type of POINT implies that the object is a single pixel and the object's area is the area of the pixel. Otherwise the type shall be a closed POLYLINE (start and end point the same) or a CIRCLE or an ELLIPSE.

TID 1402 Volume Measurement Template

TID 1402
VOLUME MEASUREMENT

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			NUM	DCID(~~**CID**~~ 7472) "Volume Measurements"	1	M		Value shall be > 0 UNITS = DCID(7462) "Units of Volume Measurement"
2	>	INFERRED FROM	SCOORD	**DT** (121057,DCM, "Perimeter Outline")	1-n	UC		Graphic data type shall not be MULTIPOINT
3	>>	R-SELECTED FROM	IMAGE		1	MC	XOR Row 4	
4	>>	SELECTED FROM	IMAGE		1	MC	XOR Row 3	

Content Item Descriptions

Row 2 "Perimeter Outline**"**

The two dimensional perimeter of the volume's **intersection with or** projection into the image.

A Graphic Data Type of POINT implies that the volume's **intersection or** projection in a plane is a single pixel. A single pixel projection perimeter cannot cause a volume calculation to become 0.

Otherwise the type shall be a closed POLYLINE (start and end point the same) or a CIRCLE or an ELLIPSE.

TID 1404 Numeric Measurement Template

TID 1404
NUMERIC MEASUREMENT

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			**NUM**	**No baseline CID**	**1**	**M**		**Units = DCID (82) Units of Measurement**
2	**>**	**INFERRED FROM**	**SCOORD**	**No baseline CID**	**1-n**	**U**		
3	**>>**	**R-SELECTED FROM**	**IMAGE**		**1**	**MC**	**XOR Row 4**	
4	**>>**	**SELECTED FROM**	**IMAGE**		**1**	**MC**	**XOR Row 3**	
5	**>**	**R-INFERRED FROM**	**IMAGE**	**BCID(7003) Diagnostic Imaging Report Purposes of Reference**	**1-n**	**U**		
6	**>**	**INFERRED FROM**	**IMAGE**	**BCID(7003) Diagnostic Imaging Report Purposes of Reference**	**1-n**	**U**		

Content Item Descriptions

Row 2 **The SCOORD may indicate the points or area where the measurement was taken (e.g., a POINT showing the pixel location of a density measurement, or an open POLYLINE of three points showing the calculation of an angle).**

TID 2001 Basic Diagnostic Imaging Report Observations

Individual numeric or image observations that may be useful for inclusion as individual findings or as the source of inferences in a report.

TID 2001
BASIC DIAGNOSTIC IMAGING REPORT OBSERVATIONS

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			IMAGE	BCID(7003) Diagnostic Imaging Report Purposes of Reference	1	MC	XOR Rows 2,3,4,**5**	
2			INCLUDE	TID(1400) Linear Measurements	1	MC	XOR Rows 1,3,4,**5**. Shall not be present if the NUM value type is not supported by the IOD.	
3			INCLUDE	TID(1401) Area Measurements	1	MC	XOR Rows 1,2,4,**5**. Shall not be present if the NUM value type is not supported by the IOD.	
4			INCLUDE	TID(1402) Volume Measurements	1	MC	XOR Rows 1,2,3,**5**. Shall not be present if the NUM value type is not supported by the IOD.	
5			**INCLUDE**	**TID(1404) Numeric Measurements**	**1**	**MC**	**XOR Rows 1,2,3,4.** **Shall not be present if the NUM value type is not supported by the IOD.**	

Update PS3.16 Annex D

DICOM Code Definitions (Coding Scheme Designator "DCM" Coding Scheme Version "01")

Code Value	Code Meaning	Definition
121230	**Path Vertex**	**Coordinates of point on defined path**