

## DICOM Correction Item

Correction Number      CP-490	
Log Summary: RT Referenced Setup Images	
Type of Modification	Name of Standard
Omission	PS 3 2004
<p>Rationale for Correction:</p> <p>Patient Photos:</p> <p>When setting up the patient for treatment, it is useful for the therapist if he/she could visualize the exact position of the patient required for the setup. Typically, before the start of the first treatment session or during simulation, the therapist would setup the patient for treatment and then capture digital images (photographs) of the setup. These images could be stored as SC or VL images and referenced from the RT Patient Setup module. In subsequent treatments, at the time of patient setup, the system could display these images to allow visual verification of the setup.</p> <p>RT Images:</p> <p>With increasing conformality of dose delivery, patient position verification in radiotherapy becomes more and more important. Therefore a variety of new procedures for position verification and correction is evolving, especially exploiting the capabilities of new imaging devices. E.g. one important driver is the introduction of KV imaging at linear accelerators, where verification images are not directly related to a specific treatment beam any more. Moreover, also MV images may be used for verification from directions, which do not match treatment beams. Conceptually, many modern verification procedures of the patient position aim for the positioning of the patient for whole plan (maybe even the whole session), by increasingly taking into account 3D information - while in the past, matching was mainly done in 2D and related to treatment beams. For upcoming procedures, relations of reference images to a specific treatment beam (as it is currently forced in DICOM) therefore does not reflect the nature of those procedures and distracts the perspective from the essentials of the procedure and introduces an unnecessary burden.</p> <p>A facility of referencing reference images on plan level rather than beam level is needed. This removes the need to create artificial portal / setup beams just for the purpose of referencing reference images. This indirection is unnecessary, because the RT Image already contains all parameters needed to define the geometry etc. . Further more, Imaging procedures often differs from day to day. Removing the necessity of artificial imaging beams stabilizes the RT Plan data, which are critical in terms of proper interpretation. Therefore the RT Plan object can remain stable avoiding changing imaging beams (currently, imaging beams have to be added or removed as imaging procedures have been planned for the specific treatment day). Last not least, some kV imaging systems are not attached to the gantry at all – so that a beam relation is obviously a fake construct.</p> <p>This CP therefore introduces the ability to add references to RT Images serving as reference images directly on plan level. Doing this, the available reference images are always present in the specific plan, and it is up to the application capabilities and the user's choice of the concrete imaging process for the actual treatment session of a certain date, under which procedures and how reference images are used for verification. The day-today variations of imaging procedures should be handled by DICOM Worklist, and not by RT Plan changes. This brings back the essential purpose the RT Plan of defining therapeutic dose delivery by focussing on the treatment beams only.</p>	
<p>Sections of documents affected</p> <p>PS 3.3, C.8.8 (Radiotherapy modules)</p> <p>PS 3.6 Section 6 (Registry of DICOM Data Elements)</p>	
Correction Wording:	

***In PS 3.3, C.8-48 (RT Patient Setup Module Attributes) add the following attributes immediately after Patient Additional Position (300A,0184):***

Attribute Name	Tag	Type	Attribute Description
Patient Setup Sequence	(300A,0180)	1	Introduces sequence of patient setup data for current plan. One or more items
....			
<b><u>&gt;Referenced Setup Image Sequence</u></b>	<b><u>(300A,0401)</u></b>	<b><u>3</u></b>	<b><u>Introduces sequence of setup verification images for this patient setup. One or more items may be included in this sequence. See C.8.8.12.1.1</u></b>
<b><u>&gt;&gt;Setup Image Comment</u></b>	<b><u>(300A,0402)</u></b>	<b><u>3</u></b>	<b><u>Comment on the Setup Image.</u></b>
<b><u>&gt;&gt;Include 'Image SOP Instance Reference Macro' Table 10-3</u></b>			

***In PS 3.3, C.8.8.12 RT Patient Setup Module, add the following section after Table C.8-48:***

**Images with modality SC or VL serve as visible light photos for visual setup control. Images with modality RTIMAGE serve as reference images on plan level. RT Images present in this sequence shall not be referenced in the Referenced Reference Image Sequence (300C,0042) of the RT Beams module.**

***In PS3.6, Section 6, add the following new attributes:***

Tag	Name	VR	VM
<b><u>(300A,0401)</u></b>	<b><u>Referenced Setup Image Sequence</u></b>	<b><u>SQ</u></b>	<b><u>1</u></b>
<b><u>(300A,0402)</u></b>	<b><u>Setup Image Comment</u></b>	<b><u>ST</u></b>	<b><u>1</u></b>