

## DICOM Correction Proposal

STATUS	Letter Ballot
Date of Last Update	2016/05/20
Person Assigned	Ulrich Busch ( <a href="mailto:ulrich.busch@varian.com">ulrich.busch@varian.com</a> )
Submitter Name	Christof Schadt ( <a href="mailto:christof.schadt@brainlab.com">christof.schadt@brainlab.com</a> ) on behalf of WG-07
Submission Date	2014/07/26

Correction Number	CP-1433
Log Summary:	RT-specific KOS CIDs
Name of Standard	PS3.16

#### Rationale for Correction:

With the introduction of the Second Generation Radiotherapy Objects, the facility of directly linking instances together has been removed. Eventually, there will be the RT Course IOD (Supplement 178) which will tie together the RT instances on a higher level but also in a larger scope. For example there is not an easy way to semantically describe a certain planning state. It is foreseen that the Input Information Sequence and Scheduled Workitem Code in the Unified Procedure Step could provide the collection of objects and their semantics in a certain use case context. Until then a solution is proposed that makes use of the existing Key Object Selection (KOS) IOD to tie together a set of instances with a specific semantic context. Therefore, it is proposed by WG-07 to add new codes to Part 16 that cover states and process steps in a clinical radiotherapy workflow.

Furthermore, the KOS object can be archived and may be of use already in First Generation Radiotherapy Objects.

The addition comprises codes to represent (proposed) input for a certain process step, codes that represent input that was actually used and codes that represent the result of a process step.

The proposed CIDs are not intended to be used to derive any further semantics about which SOP Classes to include in a KOS that is using one of these codes. In addition, no assumption shall be derived from the codes regarding

- what the reason or intent was of the application that created such a KOS instance, or
- what the concrete next step of an application consuming such a KOS shall be.

These definitions are out of scope of this Correction Proposal.

#### Examples:

##### 1) Pre-Planning:

A generic contouring workstation is performing image fusion and contouring and is creating Spatial Registration and Segmentation instances. A KOS instance is created with a Key Object Document Title code "Pre-Planning Result". A Treatment Planning System may or may not use this KOS instance to identify instances; one or more of those instances may be used to create a treatment plan.

##### 2) Planning:

A TPS receives a KOS with a code "Pre-Planning Result" and imports the data for a planning procedure. Additional contouring is performed and an even newer image series is added and registered. After planning is done, the TPS will put out a KOS with a code "Treatment Planning Input Used" that references all content from the imported "Pre-Planning Result" KOS and also the image series and registration that were included. As a result, a KOS with a code "RT Planning Result" is created referencing all instances relevant to this treatment plan. In addition, another KOS that primarily references multiple beam doses for a verification step is generated with a code "For Plan Quality Assurance".

#### Correction Wording:

*Add to PS 3.16 Annex B*

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
DCM	113000	Of Interest
DCM	113001	Rejected for Quality Reasons
DCM	113002	For Referring Provider
DCM	113003	For Surgery
DCM	113004	For Teaching
DCM	113005	For Conference
DCM	113006	For Therapy
DCM	113007	For Patient
DCM	113008	For Peer Review
DCM	113009	For Research
DCM	113010	Quality Issue
DCM	113013	Best In Set
DCM	113018	For Printing
DCM	113020	For Report Attachment
DCM	113030	Manifest
DCM	113031	Signed Manifest
DCM	113032	Complete Study Content
DCM	113033	Signed Complete Study Content
DCM	113034	Complete Acquisition Content
DCM	113035	Signed Complete Acquisition Content
DCM	113036	Group of Frames for Display
DCM	113037	Rejected for Patient Safety Reasons
<b><u>DCM</u></b>	<b><u>NNN3</u></b>	<b><u>Diagnostic Source Images</u></b>
<b><u>DCM</u></b>	<b><u>NNN4</u></b>	<b><u>Segmentation Result</u></b>
<b><u>DCM</u></b>	<b><u>NNN5</u></b>	<b><u>Registration Result</u></b>
<b><u>DCM</u></b>	<b><u>NN17</u></b>	<b><u>For Diagnosis</u></b>
<b><u>DCM</u></b>	<b><u>NN40</u></b>	<b><u>Diagnosis Input Used</u></b>
<b><u>DCM</u></b>	<b><u>NN18</u></b>	<b><u>For Contouring</u></b>
<b><u>DCM</u></b>	<b><u>NN41</u></b>	<b><u>Contouring Input Used</u></b>
<b><u>DCM</u></b>	<b><u>NN21</u></b>	<b><u>For Plan Comparison</u></b>
<b><u>DCM</u></b>	<b><u>NN42</u></b>	<b><u>Plan Comparison Input Used</u></b>
<b><u>DCM</u></b>	<b><u>NN25</u></b>	<b><u>For Tumor Board</u></b>
<b><u>DCM</u></b>	<b><u>NN43</u></b>	<b><u>Tumor Board Input Used</u></b>
<b><u>DCM</u></b>	<b><u>NN30</u></b>	<b><u>For Tumor Registry</u></b>
<b><u>DCM</u></b>	<b><u>NN44</u></b>	<b><u>Tumor Registry Input Used</u></b>
<b><u>DCM</u></b>	<b><u>NN29</u></b>	<b><u>For Clinical Trial Submission</u></b>

<b>DCM</b>	<b>NN45</b>	<b>Clinical Trial Submission Input Used</b>
<i>Include CID 70N1 'RT Process Output Codes'</i>		
<i>Include CID 70N2 'RT Process Input Codes'</i>		
<i>Include CID 70N3 'RT Process Used Input Codes'</i>		

**CID 70N1 RT Process Output Codes****Context ID 70N1****RT Process Output Codes****Type: Extensible Version: YYYYMMDD**

<b><u>Coding Scheme Designator</u></b> <b><u>(0008,0102)</u></b>	<b><u>Code Value</u></b> <b><u>(0008,0100)</u></b>	<b><u>Code Meaning</u></b> <b><u>(0008,0104)</u></b>
<b><u>DCM</u></b>	<b><u>NNN6</u></b>	<b><u>Pre-Planning Result</u></b>
<b><u>DCM</u></b>	<b><u>NNN7</u></b>	<b><u>RT Prescription Result</u></b>
<b><u>DCM</u></b>	<b><u>NNN8</u></b>	<b><u>Dose Calculation Reference Image Series</u></b>
<b><u>DCM</u></b>	<b><u>NNN9</u></b>	<b><u>Coordinate Alignment Image Series</u></b>
<b><u>DCM</u></b>	<b><u>NN10</u></b>	<b><u>RT Treatment Simulation Result</u></b>
<b><u>DCM</u></b>	<b><u>NN11</u></b>	<b><u>RT Planning Result</u></b>
<b><u>DCM</u></b>	<b><u>NN12</u></b>	<b><u>Dosimetric Result</u></b>
<b><u>DCM</u></b>	<b><u>NN13</u></b>	<b><u>Patient Setup Verification Result</u></b>
<b><u>DCM</u></b>	<b><u>NN14</u></b>	<b><u>RT Treatment Session Result</u></b>
<b><u>DCM</u></b>	<b><u>NN15</u></b>	<b><u>RT Treatment Course Summary</u></b>
<b><u>DCM</u></b>	<b><u>NN16</u></b>	<b><u>RT Treatment QA Result</u></b>

Note: The concepts in the CID are intended to be a declarative statement to represent the output of an operation, without implying that this operation was part of a particular workflow or that the output will be used in any future operation.

**CID 70N2 RT Process Input Codes****Context ID 70N2****RT Process Input Codes****Type: Extensible Version: YYYYMMDD**

<b><u>Coding Scheme Designator</u></b> <b><u>(0008,0102)</u></b>	<b><u>Code Value</u></b> <b><u>(0008,0100)</u></b>	<b><u>Code Meaning</u></b> <b><u>(0008,0104)</u></b>
<b><u>DCM</u></b>	<b><u>NNN1</u></b>	<b><u>For RT Workflow</u></b>
<b><u>DCM</u></b>	<b><u>NN19</u></b>	<b><u>For RT Prescription</u></b>
<b><u>DCM</u></b>	<b><u>NN20</u></b>	<b><u>For Treatment Planning</u></b>
<b><u>DCM</u></b>	<b><u>NN22</u></b>	<b><u>For RT Plan Summation</u></b>
<b><u>DCM</u></b>	<b><u>NN23</u></b>	<b><u>For Physician Review</u></b>
<b><u>DCM</u></b>	<b><u>NN24</u></b>	<b><u>For Physicist Review</u></b>
<b><u>DCM</u></b>	<b><u>NN26</u></b>	<b><u>For Plan Quality Assurance</u></b>
<b><u>DCM</u></b>	<b><u>NN27</u></b>	<b><u>For Machine Quality Assurance</u></b>
<b><u>DCM</u></b>	<b><u>NN28</u></b>	<b><u>For Patient Setup Verification</u></b>

Note: The concepts in the CID are intended to be a declarative statement to represent the potential input of an operation, without implying that this operation is part of a particular workflow, that this input will be used at all in any subsequent operation, that only parts of the referenced instances will be used, or that instances other than those referenced will be used as input.

**CID 70N3      RT Process Used Input Codes**

**Context ID 70N2**

**RT Process Used Input Codes**

**Type: Extensible Version: YYYYMMDD**

<b><u>Coding Scheme Designator</u></b> <b>(0008,0102)</b>	<b><u>Code Value</u></b> <b>(0008,0100)</b>	<b><u>Code Meaning</u></b> <b>(0008,0104)</b>
<b><u>DCM</u></b>	<b><u>NN31</u></b>	<b><u>RT Workflow Input Used</u></b>
<b><u>DCM</u></b>	<b><u>NN32</u></b>	<b><u>RT Prescription Input Used</u></b>
<b><u>DCM</u></b>	<b><u>NN33</u></b>	<b><u>Treatment Planning Input Used</u></b>
<b><u>DCM</u></b>	<b><u>NN34</u></b>	<b><u>RT Plan Summation Input Used</u></b>
<b><u>DCM</u></b>	<b><u>NN35</u></b>	<b><u>Physician Review Input Used</u></b>
<b><u>DCM</u></b>	<b><u>NN36</u></b>	<b><u>Physicist Review Input Used</u></b>
<b><u>DCM</u></b>	<b><u>NN37</u></b>	<b><u>Plan Quality Assurance Input Used</u></b>
<b><u>DCM</u></b>	<b><u>NN38</u></b>	<b><u>Machine Quality Assurance Input Used</u></b>
<b><u>DCM</u></b>	<b><u>NN39</u></b>	<b><u>Patient Setup Verification Input Used</u></b>

Note: The concepts in the CID are intended to be a declarative statement to represent input that has been used in an operation, without implying that this operation was part of a particular workflow or how this input was collected.

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

**ANNEX D DICOM CONTROLLED TERMINOLOGY DEFINITIONS (NORMATIVE)**

<b>Code Value</b>	<b>Code Meaning</b>	<b>Definition</b>	<b>Notes</b>
<b><u>NNN1</u></b>	<b><u>For RT Workflow</u></b>	<b><u>Instances available as input for a general RT workflow.</u></b>	
<b><u>NNN3</u></b>	<b><u>Diagnostic Source Images</u></b>	<b><u>Instances used to make a diagnosis.</u></b>	
<b><u>NNN4</u></b>	<b><u>Segmentation Result</u></b>	<b><u>Instances that are the result of a segmentation session.</u></b>	
<b><u>NNN5</u></b>	<b><u>Registration Result</u></b>	<b><u>Instances that are the result of a geometric registration.</u></b>	
<b><u>NNN6</u></b>	<b><u>Pre-Planning Result</u></b>	<b><u>Instances that are the result of preparation prior to planning.</u></b>	
<b><u>NNN7</u></b>	<b><u>RT Prescription Result</u></b>	<b><u>Instances created for prescription of a radiotherapeutic treatment.</u></b>	
<b><u>NNN8</u></b>	<b><u>Dose Calculation Image Series</u></b>	<b><u>Image instances that represent an image series that is intended to be the primary input for the actual dose calculation. Any parameters required for dose calculation (such as electron density) is derived from this series.</u></b>	
<b><u>NNN9</u></b>	<b><u>Coordinate Alignment Image Series</u></b>	<b><u>Image instances that represent an image series from which the display coordinate system for an RT treatment planning is derived. Typically this series does not provide the parameters required for the actual dose calculation.</u></b>	
<b><u>NN10</u></b>	<b><u>RT Treatment Simulation Result</u></b>	<b><u>Instances created during the simulation of a radiotherapeutic treatment delivery session. May also include input objects actually used.</u></b>	
<b><u>NN11</u></b>	<b><u>RT Planning Result</u></b>	<b><u>Instances created during the planning of a radiotherapeutic treatment. May also include input objects actually used.</u></b>	
<b><u>NN12</u></b>	<b><u>Dosimetric Result</u></b>	<b><u>Instances created during the creation of the dosimetric result of a radiotherapeutic treatment plan. May also include input objects actually used.</u></b>	
<b><u>NN13</u></b>	<b><u>Patient Setup Verification Result</u></b>	<b><u>Instances that were created during the verification of the patient's treatment position. May also include input objects actually used.</u></b>	

Code Value	Code Meaning	Definition	Notes
<b><u>NN14</u></b>	<b><u>RT Treatment Session Result</u></b>	<b><u>Instances created during the treatment session. May also include input objects actually used.</u></b>	
<b><u>NN15</u></b>	<b><u>RT Treatment Course Summary</u></b>	<b><u>Instances created during a treatment course. May also include input objects actually used.</u></b>	
<b><u>NN16</u></b>	<b><u>RT Treatment QA Result</u></b>	<b><u>Instances created during evaluation of the treatment delivery quality. May also include input objects actually used.</u></b>	
<b><u>NN17</u></b>	<b><u>For Diagnosis</u></b>	<b><u>Instances available to make a diagnosis.</u></b>	
<b><u>NN18</u></b>	<b><u>For Segmentation</u></b>	<b><u>Instances available for a segmentation.</u></b>	
<b><u>NN19</u></b>	<b><u>For RT Prescription</u></b>	<b><u>Instances available for prescribing a radiotherapeutic treatment delivery.</u></b>	
<b><u>NN20</u></b>	<b><u>For Treatment Planning</u></b>	<b><u>Instances available for creating a radiotherapeutic treatment plan.</u></b>	
<b><u>NN21</u></b>	<b><u>For Plan Comparison</u></b>	<b><u>Instances available for comparing plans.</u></b>	
<b><u>NN22</u></b>	<b><u>For RT Plan Summation</u></b>	<b><u>Instances available to combine radiotherapeutic plans or doses.</u></b>	
<b><u>NN23</u></b>	<b><u>For Physician Review</u></b>	<b><u>Instances available for review by a physician.</u></b>	
<b><u>NN24</u></b>	<b><u>For Physicist Review</u></b>	<b><u>Instances available for review by a physicist.</u></b>	
<b><u>NN25</u></b>	<b><u>For Tumor Board</u></b>	<b><u>Instances available for review of a tumor board.</u></b>	
<b><u>NN26</u></b>	<b><u>For Plan Quality Assurance</u></b>	<b><u>Instances available to perform quality assurance of a radiotherapeutic treatment delivery plan.</u></b>	
<b><u>NN27</u></b>	<b><u>For Machine Quality Assurance</u></b>	<b><u>Instances available to perform quality assurance of one of the hardware or software components involved in a radiotherapeutic treatment delivery.</u></b>	
<b><u>NN28</u></b>	<b><u>For Patient Setup Verification</u></b>	<b><u>Instances available for verification of the patient treatment position.</u></b>	
<b><u>NN29</u></b>	<b><u>For Clinical Trial Submission</u></b>	<b><u>Instances available for submission for a clinical trial study.</u></b>	
<b><u>NN30</u></b>	<b><u>For Tumor Registry</u></b>	<b><u>Instances available for submission to a tumor registry.</u></b>	
<b><u>NN31</u></b>	<b><u>RT Workflow Input Used</u></b>	<b><u>Instances used as an input of a general RT workflow.</u></b>	
<b><u>NN32</u></b>	<b><u>RT Prescription Input Used</u></b>	<b><u>Instances used for prescribing a radiotherapeutic treatment delivery.</u></b>	
<b><u>NN33</u></b>	<b><u>Treatment Planning Input Used</u></b>	<b><u>Instances used to create a radiotherapeutic treatment plan.</u></b>	
<b><u>NN34</u></b>	<b><u>RT Plan Summation Input Used</u></b>	<b><u>Instances used to combine radiotherapeutic plans or doses.</u></b>	



<b>Code Value</b>	<b>Code Meaning</b>	<b>Definition</b>	<b>Notes</b>
<b><u>NN35</u></b>	<b><u>Physician Review Input Used</u></b>	<b><u>Instances used for review by a physician.</u></b>	
<b><u>NN36</u></b>	<b><u>Physicist Review Input Used</u></b>	<b><u>Instances used for review by a physicist.</u></b>	
<b><u>NN37</u></b>	<b><u>Plan Quality Assurance Input Used</u></b>	<b><u>Instances used to perform quality assurance of a radiotherapeutic treatment delivery plan.</u></b>	
<b><u>NN38</u></b>	<b><u>Machine Quality Assurance Input Used</u></b>	<b><u>Instances used to perform quality assurance of one of the hardware or software components involved in a radiotherapeutic treatment delivery.</u></b>	
<b><u>NN39</u></b>	<b><u>Patient Setup Verification Input Used</u></b>	<b><u>Instances used during verification of the patient treatment position.</u></b>	
<b><u>NN40</u></b>	<b><u>Diagnosis Input Used</u></b>	<b><u>Instances used to make a diagnosis.</u></b>	
<b><u>NN41</u></b>	<b><u>Contouring Input Used</u></b>	<b><u>Instances used for segmentation.</u></b>	
<b><u>NN42</u></b>	<b><u>Plan Comparison Input Used</u></b>	<b><u>Instances used for comparing plans.</u></b>	
<b><u>NN43</u></b>	<b><u>Tumor Board Input Used</u></b>	<b><u>Instances used for review of a tumor board.</u></b>	
<b><u>NN44</u></b>	<b><u>Tumor Registry Input Used</u></b>	<b><u>Instances used for submission to a tumor registry.</u></b>	
<b><u>NN45</u></b>	<b><u>Clinical Trial Submission Input Used</u></b>	<b><u>Instances used for submission for a clinical trial study.</u></b>	