Digital Imaging and Communications in Medicine (DICOM)

Supplement 160: Second Generation Radiotherapy – Patient Setup

DICOM Standards Committee, Working Group 7, Radiation Therapy

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VERSION: Public Comment

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Open Issues for Public Comment

#	Item
1	Are there any specific IT security issues (namely in respect to Part 15) which should be addressed?

Scope and Field of Application

This Supplement specifies two IODs to support workflow management and patient setup for Radiotherapy treatment delivery sessions. The IODs are designed as part of the Second Generation Radiotherapy object framework.

This supplement introduces an RT Radiation Set Delivery Instruction IOD, which specifies the RT Radiations to be applied for treatment delivery, the order in which they are applied, and some other parameters related to the upcoming RT Treatment Session.

This supplement introduces an RT Patient Treatment Setup IOD to specify setup devices, setup procedures and other items related to the setup of the patient prior to the delivery of therapeutic radiation. The First Generation RT Plan IOD contained a Patient Setup Module with a similar content. However, this content may change between the treatment sessions, while the majority of content of the RT Plan, defining the treatment parameters, remains the same. This caused unnecessary proliferation of RT Plan SOP Instances, and compromised fraction counting within a series of dosimetrically uniform treatments. Therefore, the Second Generation RT Radiation Set and RT Radiation IODs do not include such content, but use a separate IOD for this purpose.

Part 2 Addendum

Add new SOP Classes to PS3.2 Table A.1-2 UID Values.

UID Value	UID Name	Category
1.2.840.10008.5.1.4.1.1.481.S160.1	RT Radiation Set Delivery Instruction Storage	Transfer
1.2.840.10008.5.1.4.1.1.481.S160.2	RT Patient Treatment Setup Storage	Transfer

Part 3 Addendum

Add the following columns in PS3.3 Section A.1.4, Table A.1-3 COMPOSITE INFORMATION OBJECT MODULES OVERVIEW – RADIOTHERAPY

IODs Modules	RT Radiation Set Delivery Instruction	RT Patient Treatment Setup
Patient	M	M
Clinical Trial Subject	U	U
General Study	M	M
Patient Study	U	U
Clinical Trial Study	U	U
General Series	M	M
Clinical Trial Series	U	U
Enhanced RT Series	M	M
General Equipment	M	M
Enhanced General Equipment	M	M
RT Radiation Set Delivery Instruction	M	
RT Patient Treatment Setup		M
General Reference	M	M
SOP Common	M	M
Common Instance Reference	M	M
Radiotherapy Common Instance	M	M

Add the following at the end of PS3.3 Annex A:

A.VV SECOND GENERATION RADIATION THERAPY

A.86.1.a1 RT Radiation Set Delivery Instruction Information Object Definition

A.86.1.a1.1 RT Radiation Set Delivery Instruction IOD Description

The RT Radiation Set Delivery Instruction IOD contains all the parameters needed to deliver a fraction of the RT Radiation Set. It handles delivery of the complete fraction of the RT Radiation Set as well as the continuation of a formerly treated fraction which was interrupted and not completely delivered.

A.86.1.a1.2 RT Radiation Set Delivery Instruction IOD Entity-Relationship Model

See Figure A.86.1.1.1-1.

A.86.1.a1.3 RT Radiation Set Delivery Instruction IOD Module Table

Table A.VV.2-2 illustrates modules used by the RT Radiation Set Delivery Instruction IOD.

Table A.86.1.a1-1
RT Radiation Set Delivery Instruction IOD Modules

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	M
	Clinical Trial Subject	C.7.1.3	U
Study	General Study	C.7.2.1	M
	Patient Study	C.7.2.2	U
	Clinical Trial Study	C.7.2.3	U
Series	General Series	C.7.3.1	M
	Clinical Trial Series	C.7.3.2	U
	Enhanced RT Series	C.36.3	M
Equipment	General Equipment	C.7.5.1	M
	Enhanced General Equipment	C.7.5.2	M
Plan	General Reference	C.12.4	M
	RT Radiation Set Delivery Instruction	C.36.m1	M
	SOP Common	C.12.1	M
	Common Instance Reference	C.12.2	M
	Radiotherapy Common Instance	C.36.4	M

A.86.1.a1.4 RT Radiation Set Delivery Instruction IOD Constraints

A.86.1.a1.4.1 Modality Attribute

The value of Modality (0008,0060) shall be PLAN.

A.86.1.a2 RT Patient Treatment Setup Information Object Definition

A.86.1.a2.1 RT Patient Treatment Setup IOD Description

The RT Patient Treatment Setup IOD describes the setup of the patient prior to delivery of the therapeutic radiation within an RT Treatment Session. It may include treatment setup positions, the use of any fixation or shielding devices, or setup procedures.

A.86.1.a2.1 RT Patient Treatment Setup IOD Entity-Relationship Model

See Figure A.86.1.1.1-1.

A.86.1.a2.3 RT Patient Treatment Setup IOD Module Table

Table A.86.1.a2-1
RT Patient Treatment Setup IOD Modules

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	M
	Clinical Trial Subject	C.7.1.3	U
Study	General Study	C.7.2.1	M
	Patient Study	C.7.2.2	U
	Clinical Trial Study	C.7.2.3	U
Series	General Series	C.7.3.1	M
	Clinical Trial Series	C.7.3.2	U
	Enhanced RT Series	C.36.3	M
Equipment	General Equipment	C.7.5.1	M
	Enhanced General Equipment	C.7.5.2	M
RT Patient Treatment Setup	General Reference	C.12.4	M
	RT Patient Treatment Setup	C.36.m2	M
	SOP Common	C.12.1	M
	Common Instance Reference	C.12.2	M
	Radiotherapy Common Instance	C.36.4	M

A.86.1.a2.4 RT Patient Treatment Setup Information IOD Constraints

A.86.1.a2.4.1 Modality Attribute

The value of Modality (0008,0060) shall be RTRAD.

Update the following in PS3.3, chapter 10:

10.39 PATIENT TO EQUIPMENT RELATIONSHIP MACRO

The Patient to Equipment Relationship Macro describes a position of the patient with respect to a device. The position is defined by means of a transformation matrix between a Patient Frame of Reference and an Equipment Frame of Reference.

Table 10.39-1
PATIENT TO EQUIPMENT RELATIONSHIP MACRO ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Image to Equipment Mapping Matrix	(0028,9520)	1	A rigid, homogeneous 4x4 transformation matrix that maps the patient coordinate space in the Frame of Reference used for the patient model to the coordinate system defined by the equipment. Matrix elements shall be listed in row-major order. See Section 10.39.1.1, Section 10.39.1.2 and Section C.7.6.21.1.
Frame of Reference Transformation Comment	(3006,00C8)	3	Comments entered by a human operator about the relationship between the patient frame of reference and the equipment. For display purposes only, shall not be used for other purposes.
Patient Location Coordinates Sequence	(3006,00C9)	2	Specific points in the patient coordinate system which further characterize the position of the patient with respect to the equipment. Zero or more Items shall be included in this Sequence.
>3D Point Coordinate	(0068,6590)	1	Coordinate (x,y,z) in mm describing the location in the patient Frame of Reference that will be transformed to the Equipment Frame of Reference by using the Image to Equipment Mapping Matrix (0028,9520).
>Patient Location Coordinates Code Sequence	(3006,00CA)	1	Identifies the type of Patient Location Coordinate. One or more Items shall be included in this Sequence.
>>Include Table 8.8-1 “Code Sequence Macro Attributes”			*CID is defined by invocation.*
Patient Support Position Sequence	(3006,00CB)	2	Actual Patient Support Position parameters. Shall be consistent with the Image to Equipment Mapping Matrix (0028,9520). See Section 10.39.1.2. Zero or one Item shall be included in this Sequence.

>Include Table 10.40-1 “Patient Support Position Macro Attributes”	***<u>Defined TID is TID 15302 "Patient Support Position Parameters".</u>***

10.40 PATIENT SUPPORT POSITION MACRO

This Macro provides the device-specific geometric settings for the Patient Support device.

The information is intended for display to human readers and to support non-image-based patient positioning; however, the definition of the patient position with respect to the device is contained in the Image to Equipment Mapping Matrix (0028,9520).

Table 10.40-1
PATIENT SUPPORT POSITION MACRO ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient Support Position Specification Method	(300A,065C)	1	Method of specification for patient support parameters. Enumerated Values ABSENT - no parameters are specified GLOBAL – parameters are specified using a globally known method, irrespective of the device in use DEVICE_SPECIFIC – parameters are specified using a device-specific method
Patient Support Position Device Parameter Sequence	(300A,065D)	1C	Translational and rotational parameters for Patient Support devices. Required if Patient Support Position Specification Method (300A,065C) does not equal ABSENT. One or more Items shall be included in this Sequence if Patient Support Position Specification Method (300A,065C) equals DEVICE_SPECIFIC. Only one Item shall be included in this Sequence if Patient Support Position Specification Method (300A,065C) equals GLOBAL.
>Referenced Device Index	(300A,0607)	1C	The value of Device Index (3010,0039) in Patient Support Devices Sequence (300A,0686) corresponding to the Patient Support Device in use. Required if Patient Support Position Specification Method (300A,065C) equals DEVICE_SPECIFIC.
>Device Order Index	(300A,065E)	1C	Index defining the order in which the Items in the Patient Support Position Device Parameter Sequence (300A,065D) are applied. The value shall start at 1 and increase monotonically by 1.

Attribute Name	Tag	Type	Attribute Description
			Required if Patient Support Position Specification Method (300A,065C) equals DEVICE_SPECIFIC. See Section 10.40.1.
>Patient Support Position Parameter Sequence	(300A,065B)	1	Translational and rotational parameters for a particular Patient Support device. One or more Items shall be included in this Sequence.
>>Patient Support Position Parameter Order Index	(300A,065F)	1C	Index defining the order in which the Items in the Patient Support Position Parameter Sequence (300A,065B) are applied. The value shall start at 1 and increase monotonically by 1. Required if Patient Support Position Specification Method (300A,065C) equals DEVICE_SPECIFIC. See Section 10.40.1.
>>Include Table 10-2 "Content Item Macro Attributes"			***~~Defined TID is TID 15302 "Patient Support Position Parameters".~~*** ***TID is defined at invocation of macro.***

Update the following in PS3.3 Annex C:

C.36 RT SECOND GENERATION MODULES

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C.36.2 RT Second Generation Macros

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C.36.2.2 RT Second Generation Device Macros

C.36.2.2.1 Treatment Device Identification Macro

The Treatment Device Identification Macro identifies a device used to deliver radiation to the patient during a radiotherapy treatment session.

Table C.36.2.2.1-1. Treatment Device Identification Macro Attributes

Attribute Name	Tag	Type	Attribute Description
~~Treatment Device Identification Sequence~~	**~~(300A,063A)~~**	**~~1~~**	**~~Identifies treatment device.~~** **~~Only a single Item shall be included in this Sequence.~~**
>Include Table 10.35-1 "Device Model Macro Attributes".			*Identifies the device model for the Treatment Device.*

Attribute Name	Tag	Type	Attribute Description
>Manufacturer's Device Class UID	(0018,100B)	2	Manufacturer's Unique Identifier (UID) for the class of the device. A class is a manufacturer-specific grouping concept with no DICOM-defined scope or criteria. A class is independent from a marketing-defined make, model or version. A class allows definition of a group of devices with a similar set of capabilities.
>Include Table 10.36-1 “Device Identification Macro Attributes”.			*DCID 9551 “Treatment Delivery Device Types”.*
>Institution Name	(0008,0080)	3	Institution where the equipment is located.
>Institution Address	(0008,0081)	3	Mailing address of the institution where the equipment is located.
>Institutional Department Name	(0008,1040)	3	Department in the institution where the equipment is located.

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C.36.2.2.4 RT Treatment Position Macro

The RT Treatment Position Macro establishes a connection between the patient’s geometry and the treatment delivery equipment to define the treatment position. When used in an RT Radiation object, this treatment position is the prescribed position. When used in an RT Radiation Record object, this treatment position is the record of the actual position.

Table C.36.2.2.4-1
RT TREATMENT POSITION MACRO ATTRIBUTES

Attribute Name	Tag	Type	Description
Patient Orientation Code Sequence	(0054,0410)	1	Sequence that describes the orientation of the patient with respect to gravity. See Section C.8.4.6.1.1 for further explanation. Only a single item shall be included in this Sequence.
>Include Table 8.8-1 “Code Sequence Macro Attributes”			*Defined CID 19 “Patient Orientation”*
>Patient Orientation Modifier Code Sequence	(0054,0412)	1C	Patient Orientation Modifier. Required if needed to fully specify the orientation of the patient with respect to gravity. Only a single Item shall be included in this Sequence.

Attribute Name	Tag	Type	Description
>>Include Table 8.8-1 “Code Sequence Macro Attributes”			*Defined CID 20 “Patient Orientation Modifier”*
Patient Equipment Relationship Code Sequence	(3010,0030)	1	Sequence describing the orientation of the patient with respect to equipment. Only a single Item shall be included in this Sequence.
>Include Table 8.8-1 “Code Sequence Macro Attributes”			*Defined CID 21 “Patient Equipment Relationship”*
~~**Patient Setup UID**~~	~~**(300A,0650)**~~	~~**1C**~~	~~**Identifies a conceptual patient setup that may or may not be realized by one or more RT Patient Setup Instances.**~~ ~~**Required if Referenced RT Patient Setup Sequence (300A,0632) is present. May be present otherwise.**~~
~~**Referenced RT Patient Setup Sequence**~~	~~**(300A,0632)**~~	~~**1C**~~	~~**References the RT Patient Setup SOP Instance that was used as the setup instruction for the patient prior to delivery of the radiation.**~~ ~~**Required if there was a Patient Setup SOP Instance defined providing the instructions to the delivery system.**~~ ~~**Only a single Item shall be included in this Sequence.**~~
~~***>Include Table 10-11 “SOP Instance Reference Macro Attributes”***~~			
Treatment Position Sequence	(300A,063F)	1	Patient positions during treatment, being prescribed or recorded. One or more Items shall be included in this Sequence.
>Treatment Position Index	(300A,0606)	1	Index of this Item in this Sequence. The value shall start at 1 and increase monotonically by 1.
>Include Table 10.39-1 “Patient to Equipment Relationship Macro Attributes”			*Defined CID is 9553 “Treatment Points”*

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C.36.12 RT Delivery Device Common Module

The RT Delivery Device Common Module contains general information pertaining to the physical device used to deliver the treatment.

Table C.36.12-1. RT Delivery Device Common Module Attributes

Attribute Name	Tag	Type	Attribute Description
Treatment Device Identification Sequence	**(300A,063A)**	**1**	**Identifies treatment device.** **Only a single Item shall be included in this Sequence.**
>Include Table C.36.2.2.1-1 “Treatment Device Identification Macro Attributes”.			
Radiation Dosimeter Unit Sequence	(300A,0658)	1	Measurement units of the machine dosimeter. Only a single item shall be included in this Sequence.
>Include Table 8.8-1 “Code Sequence Macro Attributes”.			*CID is specified in the IOD*
Radiation Dosimeter Unit Sequence	(300A,0658)	1	Measurement units of the machine dosimeter. Only a single item shall be included in this Sequence.

C.36.20 RT Radiation Record Set Module

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C.36.20.1 RT Radiation Record Set Attribute Descriptions

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C.36.20.1.2 RT Radiation Set Delivery Number and Clinical Fraction Number

The Clinical Fraction Number (300A,0705) tracks the clinical progress of treatment delivery.

~~**It is a counter that represents the number of times that an RT Radiation Set Instance or any Instance derived within an adaptive radiotherapy treatment process was delivered.**~~

It is a counter that represents an ordinal count of deliveries of fractions within a radiotherapy treatment serving a given combination of prescriptions.

When it is used prospectively in instructions, the value indicates the ordinal count of the treatment fraction to be delivered in the upcoming treatment session. When the upcoming delivery of therapeutic radiation is intended to consist of the delivery of a complete RT Radiation Set serving the same combination of RT Prescriptions as the previous fraction, the value is incremented. When the upcoming delivery of therapeutic radiation is intended to resume the delivery of a previously incomplete fraction, the value is not incremented, i.e. the value is the same as that of the resumed fraction.

When it is used retrospectively in recording, the value indicates the ordinal count of the treatment fraction which has been delivered.

The RT Radiation Set Delivery Number (300A,0704) tracks the number of times a fraction specified by the referenced RT Radiation Set Instance has been delivered.

~~**The RT Radiation Set Delivery Number (300A,0704) is a counter that represents the number of times the referenced RT Radiation Set Instance has been delivered.**~~

~~**The RT Radiation Set Delivery Number (300A,0704) of the delivered RT Treatment Fraction shall start with 1 for its first fraction and increase monotonically by 1, throughout all RT Radiation Record Set Instances referencing the same RT Radiation Set Instance identified by its SOP Instance UID (0008,0018), see 7.14.10.**~~

When it is used prospectively in instructions, the value indicates the ordinal count of the treatment to be delivered by a referenced RT Radiation Set Instance. When the upcoming delivery of therapeutic radiation is intended to consist of the delivery of a complete RT Radiation Set, the value for that RT Radiation Set is incremented. When the upcoming delivery of therapeutic radiation is intended to resume the delivery of a previously incomplete fraction, the value is not incremented, i.e. the value is the same as that of the resumed fraction.

When it is used retrospectively in recording, the value indicates the ordinal count of deliveries by a referenced RT Radiation Set Instance.

~~**If the same RT Radiation Set is used for all treatments, the values of RT Radiation Set Delivery Number (300A,0704) and the Clinical Fraction Number (300A,0705) have the same values.**~~

~~**For some adaptive treatment approaches, details of the device parameters may be altered at the treatment session to accommodate the current position and shape of the patient. In this case, a new RT Radiation Set SOP Instance is used for the subsequent RT Treatment Fractions and the RT Radiation Set Delivery Number (300A,0704) re-starts at 1.**~~

~~**The Clinical Fraction Number (300A,0705) is continuously incremented to reflect the clinical progress of a therapeutic series of treatments. In the RT Radiation Record Set for the last of the intended RT Treatment Fractions, this value will be equal to the Number of Fractions (3010,007D) present in the corresponding RT Prescription.**~~

Notes:

1. **If the same RT Radiation Set is used for all treatments, the values of RT Radiation Set Delivery Number (300A,0704) and the Clinical Fraction Number (300A,0705) have the same values.**
2. **For some adaptive treatment approaches, details of the device parameters may be altered at the treatment session to accommodate the current position and shape of the patient. In this case, a new RT Radiation Set SOP Instance is used for the subsequent RT Treatment Fractions serving the same set of RT Prescriptions and the RT Radiation Set Delivery Number (300A,0704) re-starts at 1.**
3. **The Clinical Fraction Number (300A,0705) is continuously incremented to reflect the clinical progress of a therapeutic series of treatments. In the RT Radiation Record Set for the last of the intended RT Treatment Fractions, this value will usually be equal to the Number of Fractions (3010,007D) present in the corresponding RT Prescription(s).**

Example

RT Radiation Set P contains RT Radiations A, B; Adapted RT Radiations indicated by (‘) and (“); RT Radiation Sets created are P, P’ and P’’.

Table C.36.m1-3
Delivery of multiple RT Radiation Set Instances

Treatment Session	RT Radiation Set	Delivered RT Radiations	Clinical Fraction Number (gggg,7505)	RT Radiation Set Delivery Number (300A,0704)
1	P	A,B	1	1 (of P)
2	P	A,B	2	2 (of P)
3	P’	A’,B’	3	1 (of P’)
4	P’	A’,B’	4	2 (of P’)
5	P”	A”,B”	5	1 (of P”)
6	P	A,B	6	3 (of P)

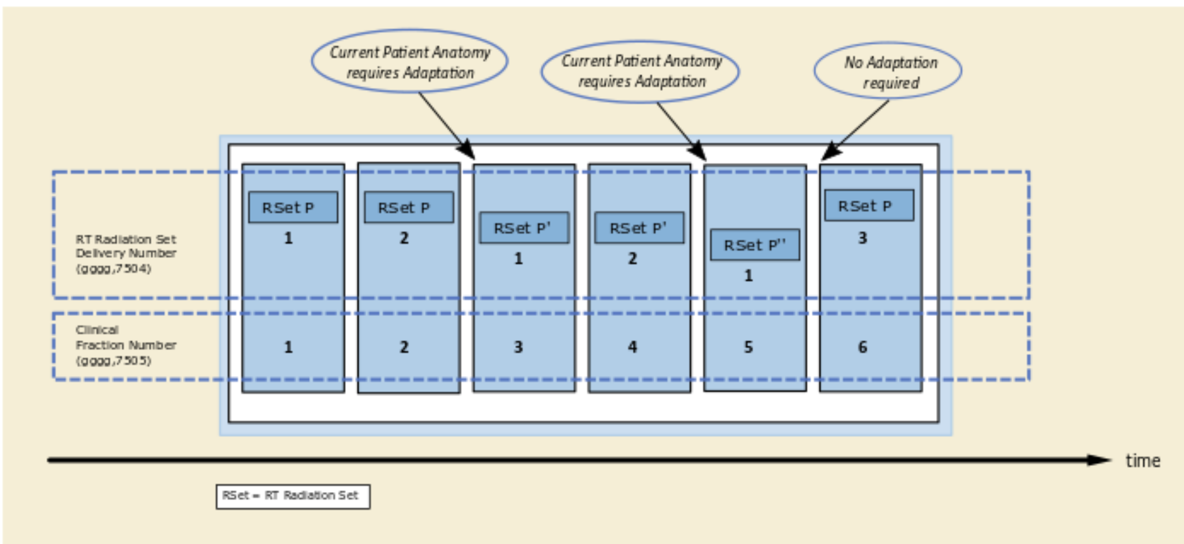

Figure C.36.m1-1
Delivery of a single RT Radiation Set Instance with Adaptive Treatments

C.36.m1.1.3 Complete versus Partial Fraction

When there is an RT Radiation Record Instance present for all of the RT Radiation Instances for this RT Treatment Fraction and they all have a Treatment Delivery Continuation Flag (gggg,7508) of NO and have an RT Treatment Termination Status (gggg,7514) of NORMAL the value of RT Radiation RT Treatment Fraction Completion Status (gggg,7506) shall be COMPLETE. The expression “all of the RT Radiation Instances” refers to the referenced Instances in the RT Radiation Set, to which this current RT Radiation Record Set refers.

Otherwise the value of RT Treatment Fraction Completion Status (gggg,7506) shall be PARTIAL.

Example

RT Radiation Set P contains RT Radiations A, B. RT Radiation Record Sets created are W, X, Y, Z.

Table C.36.m1-2
Delivery of a single RT Radiation Set Instance with Partial Treatments

Treatment Session	RT Radiation Set	Delivered RT Radiations	Treatment Delivery Continuation Flag (gggg,7508)	RT Treatment Termination Status (gggg,7514)	RT Radiation Record Set	RT Treatment Fraction Completion Status (gggg,7506)	Clinical Fraction Number (300A,0705)	RT Radiation Set Delivery Number (300A,0704)
1	P	A	NO	NORMAL	W	PARTIAL	1	1
		B	NO	ABNORMAL				
2	P	B	YES	NORMAL	X	PARTIAL	1	1
		A	NO	NORMAL	Y	COMPLETE	2	2
		B	NO	NORMAL				
3	P	A	NO	NORMAL	Z	COMPLETE	3	3
		B	NO	NORMAL				

Add the following to PS3.3 Annex C:

C.36 RT SECOND GENERATION MODULES

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C.36.2 RT Second Generation Macros

C.36.2.1 RT Second Generation General Purpose Macros

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C.36.2.1.X1 Referenced RT Radiation Instance Macro

The RT Radiation Instance Macro allows to define a specific RT Radiation Instance within an RT Radiation Set.

Table C.36.2.1.X1-1
Referenced RT Radiation Instance Macro Attributes

Attribute Name	Tag	Type	Description
Referenced RT Radiation Set Sequence	(300A,0702)	1	A collection of RT Radiation Sets. One or more Items shall be included in this Sequence.
>Include Table 10-11 ”SOP Instance Reference Macro Attributes”			

Attribute Name	Tag	Type	Description
>Referenced RT Radiation Sequence	(300A,0630)	1C	A subset of the SOP Instances referenced in the RT Radiation Set SOP Instance. Required if the scope is limited to a subset of RT Radiation SOP Instances of the referenced RT Radiation Set. One or more Items shall be included in this Sequence. The maximum number of Items is one less than the number of RT Radiation SOP Instances in the referenced RT Radiation Set SOP Instance.
>>Include Table 10-11 "SOP Instance Reference Macro Attributes"			

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C.36.2.2 RT Second Generation Device Macros

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C.36.2.2.X3 RT Radiation Instance and Treatment Position Group Reference Macro

The RT Radiation Instance and Treatment Position Group Reference Macro defines the RT Radiation Instances or the Treatment Position Groups to which a set of positioning parameters apply.

Table C.36.2.2.X3-1
RT Radiation Instance and Treatment Position Group Reference Macro Attributes

Attribute Name	Tag	Type	Description
Include Table C.36.2.1.X1-1 "Referenced RT Radiation Instance Macro Attributes"			
Treatment Position Group Sequence	(300A,060A)	1C	Treatment Position Groups defining patient positions for which the parameters apply. Required, if the Referenced RT Radiation Sequence (300A,0630) is not present and Treatment Position Groups are defined in the referenced RT Radiation Set and the parameters apply to all RT Radiation Sets and RT Radiation Instances which refer to this Treatment Position Groups. One or more Items shall be included in this Sequence. See C.36.10.1.2.

Attribute Name	Tag	Type	Description
>Referenced Treatment Position Group UID	(gggg,B731)	1	Referenced unique identifier of the Treatment Position Group.

C.36.2.2.X4 RT Treatment Setup Position Macro

The RT Treatment Setup Position Macro defines the patient's position when setting up the patient in preparation for treatment delivery. This setup position may be specified as an absolute position of the patient positioning device or as relative displacement against a specified reference location.

The setup position specified may be based on recorded positions used in previous treatments, or based on a position marked on the patient during a CT acquisition prior to treatment planning and delivery, or on other procedures.

The setup position approximates the desired patient position during radiation delivery. These attributes do not affect the original relationship between the RT Radiations and the planning image patient anatomy.

Table C.36.2.2.X4-1
RT Treatment Setup Position Macro Attributes

Attribute Name	Tag	Type	Description
Treatment Position Sequence	(300A,063F)	2	Definition of treatment position. See C.36.2.2.X4.1.1. Only a single Item shall be included in this sequence.
>Include Table 10.39-1 "Patient to Equipment Relationship Macro Attributes"			*Defined CID 9553 "Treatment Points"*
Treatment Position Displacement Sequence	(gggg,BC03)	2	Displacement of the patient position. See C.36.2.2.X4.1.2. Only a single Item shall be included in this sequence.
>Displacement Reference Label	(gggg,BC05)	3	A user-defined label describing the reference location used for a displacement of the patient's treatment position.
>Displacement Reference Location Code Sequence	(gggg,BC09)	1	The reference location with respect to which the displacement is provided.
>>Include Table 8.8-1 "Code Sequence Macro Attributes"			*Defined CID SUP160004 " Patient Position Displacement Reference Points"*
>Conceptual Volume Sequence	(3010,0025)	2	References a Conceptual Volume that describes the geometry and properties of the Displacement Reference. See Section C.36.2.2.16.1.1. Zero or one Item shall be included in this Sequence.

Attribute Name	Tag	Type	Description
>>Include Table 10.34-1 "Conceptual Volume Segmentation Reference and Combination Macro Attributes"			
>Displacement Matrix	(gggg,BC06)	1	A rigid, homogeneous 4x4 transformation matrix that expresses the patient's treatment position displacement in the patient coordinate space. Matrix elements shall be listed in row-major order. See C.36.2.2.X4.1.2
>Patient Support Displacement Sequence	(gggg,BC07)	2	Device-specific positioning parameters, derived from the Displacement Matrix (gggg,BC06). See C.36.2.2.X4.1.3 Zero or one Item shall be included in this Sequence.
>>Include Table 10.40-1 "Patient Support Position Macro Attributes"			*Defined TID is TID 15302 "Patient Support Position Parameters".*

C.36.2.2.X4.1 RT Treatment Setup Position Macro Attribute Descriptions

C.36.2.2.X4.1.1 Treatment Position Sequence

This sequence communicates an treatment setup position by as defined by the Image to Equipment Mapping Matrix (0028,9520) and may additional contain native device parameters displayed to the user.

C.36.2.2.X4.1.2 Treatment Position Displacement Sequence

This sequence communicates an treatment setup position by specifying a displacement of the position with respect to a reference location. The reference location may be, for example, a set of skin markers used to align the patient using room lasers.

The Displacement Matrix (gggg,BC06) describes a relative displacement in the Patient Frame of Reference. The Patient Frame of Reference is aligned with the coordinate system of the patient support system (i.e., the axes are parallel). This specification is independent of the mechanical nature and readout of the patient support device. The calculation of the native parameters for the patient support system is specific to the current device.

C.36.2.2.X4.1.3 Patient Support Displacement Sequence

The Displacement Matrix (gggg,BC06) is the exclusive source of information to define the displacement. Positioning devices will solely derive the displacement by this matrix.

Some applications, which do not act as positioning devices and cannot de-compose the Displacement Matrix (gggg,BC06) into device-specific parameters, may want to informatively display device-specific parameters to the user. The purpose of the Patient Support Displacement Sequence (gggg,BC07) is to facilitate such display. The Patient Support Displacement Sequence (gggg,BC07) is not a substitute for the Displacement Matrix (gggg,BC06).

Add the following Modules to PS3.3, Appendix C:

C.36.m1 RT Radiation Set Delivery Instruction Module

The RT Beams Delivery Instruction Module contains additional information required by a Treatment Delivery System (TDS) when specifying delivery of an external beam radiotherapy treatment.

The Module provides data which are not part of the RT Radiation Set and referenced SOP Instances issued at the time of treatment planning. The content does not alter the planned amount and location of dose.

It provides data which are specific to the upcoming RT Treatment Session for the referenced RT Radiation Set such as the current fraction numbers. If more than one RT Radiation Set will be delivered in an upcoming RT Treatment session, each set´s treatment delivery will be specified by a separate instance containing this Module.

Typically, this information is supplied by a Treatment Management System when it creates an RT Radiation Set Delivery Instruction SOP Instance.

The content of the RT Radiation Set Delivery Instruction Module applies to all or a subset of the RT Radiations specified in the referenced RT Radiation Set.

Table C.36.m1-1
RT Radiation Set Delivery Instruction Module Attributes

Attribute Name	Tag	Type	Attribute Description
Referenced RT Radiation Set Sequence	(300A,0702)	1	Reference to a single Radiation Set SOP Instance containing the Radiations to which the current SOP Instance applies. Only a single Item shall be included in this sequence.
>Include Table 10-11 "SOP Instance Reference Macro Attributes"			
Treatment Device Identification Sequence	(300A,063A)	2	Identifies the treatment device intended to be used for delivering the radiotherapeutic treatment. See C.36.m1.1.1. Zero or one Item shall be included in this Sequence.
>Include Table C.36.2.2.1-1 "Treatment Device Identification Macro Attributes"			
RT Radiation Set Delivery Number	(300A,0704)	1C	A number that indicates the next RT Treatment Fraction of the referenced RT Radiation Set Instance to be delivered. Required if Referenced RT Radiation Set Sequence (300A,0702) is present and RT Radiation Set Usage (gggg,7507) is TREATMENT. May be present otherwise. See C.36.20.1.2.
Clinical Fraction Number	(300A,0705)	1C	A number that indicates the next RT Treatment Fraction to be delivered.

Attribute Name	Tag	Type	Attribute Description
			Required if Referenced RT Radiation Set Sequence (300A,0702) is present and RT Radiation Set Usage (gggg,7507) is TREATMENT. May be present otherwise. See C.36.20.1.2.
RT Radiation Task Sequence	(gggg,BC01)	1	Radiations to be delivered and/or to have quality assurance procedures applied. One or more Items shall be included in this Sequence. The sum of the number of Items in this Sequence and the number of Items in the Omitted Radiation Sequence (gggg,B761) shall be the number of RT Radiations in the referenced RT Radiation Set. If a complete fraction (no continuation of a previously interrupted treatment) is to be delivered, the number of Items in the Sequence shall be the number of RT Radiations in the referenced RT Radiation Set. The Omitted Radiation Sequence (gggg,B761) will not present in this case. Note: The number of RT Radiations in the referenced RT Radiation Set is the number of SOP Instances contained in the Referenced RT Radiation Sequence (300A,0630) of the Radiation Set SOP Instance referenced in the Referenced RT Radiation Set Sequence (300A,0702).
>Referenced RT Radiation Sequence	(300A,0630)	1	Reference to a single RT Radiation SOP Instance containing the parameters to be used for the therapeutic radiation. The reference shall contain an RT Radiation SOP Instance that has been referenced in the RT Radiation Set SOP Instance in the Referenced RT Radiation Set Sequence (300A,0702). Only a single Item shall be included in this sequence.

Attribute Name	Tag	Type	Attribute Description
>>Include Table 10-11 "SOP Instance Reference Macro Attributes"			
>RT Radiation Usage	(300A,0701)	1	Indication how the RT Radiation is to be used. The Defined Terms are specified in C.36.10.1.1.
>Treatment Delivery Continuation Flag	(gggg,7508)	1	Indicates whether the task requests a continuation of a previously interrupted treatment delivery of the referenced RT Radiation. Enumerated Values: YES: The task represents a continuation. NO: The task represents a treatment delivery that was started at the first RT Control Point.
>Continuation Start Meterset	(0074,0120)	1C	Meterset within RT Radiation referenced in the Referenced RT Radiation Sequence (300A,0630) at which treatment delivery starts. The Meterset is expressed in units specified by Radiation Dosimeter Unit Sequence (300A,0658) in the referenced RT Radiation SOP Instance. Required if Treatment Delivery Continuation Flag (gggg,7508) is YES.
>Continuation End Meterset	(0074,0121)	1C	Meterset within Radiation referenced in the Referenced RT Radiation Sequence (300A,0630) at which treatment delivery ends. The Meterset is expressed in units specified by Radiation Dosimeter Unit Sequence (300A,0658) in the referenced RT Radiation SOP Instance. Required if Treatment Delivery Continuation Flag (gggg,7508) is YES.
>Radiation Order Index	(gggg,B752)	2	Identifies required ordering of radiations to be delivered. The value shall start at 1, and increase monotonically by 1.
>Referenced RT Patient Setup Sequence	(300A,0632)	2	Reference to a RT Patient Setup SOP Instance.

Attribute Name	Tag	Type	Attribute Description
			Only a single Item shall be included in this sequence.
>>Include Table 10-11 "SOP Instance Reference Macro Attributes"			
>Include Table C.36.2.2.X4-1 "RT Treatment Setup Position Macro Attributes"			
>Include Table 10-28 "Device Motion Control Macro Attributes"			
Omitted Radiation Sequence	(gggg,B761)	1C	RT Radiation SOP Instances that shall not be delivered. Required if one or more RT Radiations contained in the referenced RT Radiation Set shall not be delivered. The number of Items shall be the number of RT Radiation Instances, which shall not be delivered during the treatment session.
>Referenced RT Radiation Sequence	(300A,0630)	1	The RT Radiation SOP Instance that shall not be delivered. The reference shall contain an RT Radiation SOP Instance that has been referenced in the RT Radiation Set SOP Instance in the Referenced RT Radiation Set Sequence (300A,0702). Only a single Item shall be included in this sequence.
>>Include Table 10-11 "SOP Instance Reference Macro Attributes"			
>Reason for Omission Code Sequence	(gggg,B762)	1	Reason for Omission.
>>Include Table 8.8-1 "Code Sequence Macro Attributes"			*Defined CID SUP160020 "Reasons for RT Radiation Treatment Omission"*
>Reason for Omission Description	(300C,0113)	3	Description of reason for omission.

C.36.m1.1 Radiation Set Delivery Attribute Description

C.36.m1.1.1 Treatment Device Identification Sequence

The RT Radiation Set Delivery Instruction Module may specify a distinct treatment device to be used for radiation delivery. This treatment device may differ from the device specified in the referenced RT Radiation Instances.

C.36.m2 RT Patient Treatment Setup Module

The RT Patient Treatment Setup Module contains information describing the physical setup of the patient, including any fixation and shielding devices applied to the patient.

Table C.36.m2-1
RT Patient Treatment Setup Module Attributes

Attribute Name	Tag	Type	Attribute Description
Include Table 10.32-1 “Entity Long Labeling Macro Attributes”			
Patient Setup Sequence	(300A,0180)	1	Sequence of patient setups. One or more items shall be included in this sequence.
>RT Positioning Scope Sequence	(gggg,B730)	1	The RT Radiation Instances or the Treatment Position Groups to which a set of positioning parameters apply. One or more Items shall be included in this Sequence.
>>Include Table C.36.2.2.X3-1 “RT Radiation Instance and Treatment Position Group Reference Macro Attributes”			
>Patient Orientation Code Sequence	(0054,0410)	1	Sequence that describes the orientation of the patient with respect to gravity. See C.8.4.6.1.1 for further explanation. Only one item shall be present.
>>Include Table 8.8-1 “Code Sequence Macro Attributes”			*Defined CID 19 “Patient Orientation”*
>Patient Orientation Modifier Code Sequence	(0054,0412)	1	Sequence describing the orientation of the patient with respect to gravity. Only one item shall be present.
>>Include Table 8.8-1 “Code Sequence Macro Attributes”			*Defined CID 20 “Patient Orientation Modifier”*
>Patient Gantry Relationship Code Sequence	(0054,0414)	1	Sequence describing the orientation of the patient with respect to gantry. Only one item shall be present.
>>Include Table 8.8-1 “Code Sequence Macro Attributes”			*Defined CID 21 “Patient Equipment Relationship”*
>Patient Setup Method Code Sequence	(gggg,B802)	1	Methods used for Patient Setup. Only a single Item shall be included in this sequence.
>>Include Table 8.8-1 “Code Sequence Macro Attributes”			*Baseline CID SUP160001 “Patient Setup Methods”*
>Patient Setup Method Description	(gggg,B808)	3	User-defined description of patient setup technique.
>Referenced Patient Setup Photo Sequence	(gggg,B801)	3	User-defined photos illustrating the patient setup. One or more Items shall be included in this sequence.
>>Include Table 10-3b “Referenced Instances and Access Macro Attributes”			
>Patient Setup Device Sequence	(gggg,B804)	2	Devices utilized during or for setting up the patient on the patient support device.

Attribute Name	Tag	Type	Attribute Description
			Zero or more Items shall be included in this Sequence.
>>Device Index	(3010,0039)	1	Index of the Device in this Sequence. The value shall start at 1 and increase monotonically by 1.
>>Patient Setup Device Category Code Sequence	(gggg,B805)	3	Category of the Patient Setup Device. Only a single Item is permitted in this Sequence.
>>>Include Table 8.8-1 "Code Sequence Macro Attributes"			*Baseline CID SUP160022 "Patient Setup Device Categories"*
>>Include Table C.36.2.2.3-1 "RT Accessory Device Identification Macro Attributes"			*Baseline CID SUP160003 "Patient Setup Devices"*
>>Patient Setup Device Parameter Sequence	(gggg,B803)	2	Parameters associated with the setup device. Zero or more Items shall be included in this sequence.
>>>Include Table 10-2 "Content Item Macro Attributes"			*Defined TID is TID SUP160T01 "Patient Setup Device Parameters"*
>Patient Setup Procedure Sequence	(gggg,B806)	2	Procedures associated with the patient setup. Zero or more Items are permitted in this sequence.
>>Referenced Device Index	(300A,0607)	1C	The value of Device Index (3010,0039) from the Patient Setup Device Sequence (gggg,B804) corresponding to the Patient Setup Device used in this Item. Required if a Patient Setup Device is associated with this procedure.
>>Patient Setup Procedure Code Sequence	(gggg,B807)	1	Procedure performed with the patient setup.
>>>Include Table 8.8-1 "Code Sequence Macro Attributes"			*Baseline CID SUP160021 "Patient Setup Procedures"*
>>Patient Setup Procedure Parameter Sequence	(gggg,B809)	2	Parameters for the Patient Setup Procedure.
>>>Include Table 10-2 "Content Item Macro Attributes"			*No Baseline TID defined.*
Patient Setup Displacement Parameters Sequence	(gggg,BC08)	3	Displacement parameters for treatment positions. One or more Items are permitted in this Sequence.
>Include Table C.36.2.1.X1-1 "Referenced RT Radiation Instance Macro Attributes"			
>Include Table C.36.2.2.X4-1 "RT Treatment Setup Position Macro Attributes"			

C.36.m2.1 RT Patient Treatment Setup Attribute Description

C.36.m2.1.1 Setup Instruction

A free-text description of the setup instruction, if present, shall be encoded in attribute Entity Description (3010,0037) of the RT Entity Labeling Macro.

Part 4 Addendum

Add the following to PS3.4, Appendix B.5, Table B.5-1

SOP Class Name	SOP Class UID	IOD Spec (defined in PS 3.3)
RT Radiation Set Delivery Instruction Storage	1.2.840.10008.5.1.4.1.1.481.S160.1	RT Radiation Set Delivery Instruction IOD
RT Patient Treatment Setup Storage	1.2.840.10008.5.1.4.1.1.481.S160.2	RT Patient Treatment Setup IOD

Part 6 Addendum

6 REGISTRY OF DICOM DATA ELEMENTS

Update the following data elements in PS3.6:

Tag	Name	Keyword	VR	VM	
(300A,0650)	Patient Setup UID	PatientSetupUID	UI	1	**RET (2020)**

Add the following data elements to PS3.6:

Tag	Name	Keyword	VR	VM
(gggg,B730)	RT Positioning Scope Sequence	RTPositioningScopeSequence	SQ	1
(gggg,B731)	Referenced Treatment Position Group UID	ReferencedTreatmentPositionGroupUID	UI	1
(gggg,B752)	Radiation Order Index	RadiationOrderIndex	US	1
(gggg,B761)	Omitted Radiation Sequence	OmittedRadiationSequence	SQ	1
(gggg,B762)	Reason for Omission Code Sequence	ReasonforOmissionCodeSequence	SQ	1
(gggg,B801)	Referenced Patient Setup Photo Sequence	ReferencedPatientSetupPhotoSequence	SQ	1
(gggg,B802)	Patient Setup Method Code Sequence	PatientSetupMethodCodeSequence	SQ	1
(gggg,B803)	Patient Setup Device Parameter Sequence	PatientSetupDeviceParameterSequence	SQ	1
(gggg,B804)	Patient Setup Device Sequence	PatientSetupDeviceSequence	SQ	1
(gggg,B805)	Patient Setup Device Category Code Sequence	PatientSetupDeviceCategoryCodeSequence	SQ	1
(gggg,B806)	Patient Setup Procedure Sequence	PatientSetupProcedureSequence	SQ	1
(gggg,B807)	Patient Setup Procedure Code Sequence	PatientSetupProcedureCodeSequence	SQ	1
(gggg,B808)	Patient Setup Method Description	PatientSetupMethodDescription	LT	1

Tag	Name	Keyword	VR	VM
(gggg,B809)	Patient Setup Procedure Parameter Sequence	PatientSetupProcedureParameterSequence	SQ	1
(gggg,BC01)	RT Radiation Task Sequence	RTRadiationTaskSequence	SQ	1
(gggg,BC02)	Radiation Task Type	RadiationTaskType	CS	1
(gggg,BC03)	Treatment Position Displacement Sequence	TreatmentPositionDisplacementSequence	SQ	1
(gggg,BC05)	Displacement Reference Label	DisplacementReferenceLabel	LO	1
(gggg,BC06)	Displacement Matrix	DisplacementMatrix	FD	16
(gggg,BC07)	Patient Support Displacement Sequence	PatientSupportDisplacementSequence	SQ	1
(gggg,BC08)	Patient Setup Displacement Parameters Sequence	PatientSetupDisplacementParametersSequence	SQ	1
(gggg,BC09)	Displacement Reference Location Code Sequence	DisplacementReferenceLocationCodeSequence	SQ	1

Add the following data elements to PS3.6, Annex A:

ANNEX A REGISTRY OF DICOM UNIQUE IDENTIFIERS (UID) (NORMATIVE)

Table A-1
UID VALUES

UID Value	UID Name	UIDKeyword	UID Type	Part
1.2.840.10008.5.1.4.1.1.481.S160.1	RT Radiation Set Delivery Instruction Storage	RTRadiationSetDeliveryInstructionStorage	SOP Class	PS 3.4
1.2.840.10008.5.1.4.1.1.481.S160.2	RT Patient Treatment Setup Storage	RTPatientTreatmentSetupStorage	SOP Class	PS 3.4

Table A-3
CONTEXT GROUP UID VALUES

Context UID	Context Identifier	Context Group Name
1.2.840.10008.6.1.S160.1	SUP160001	Patient Setup Methods
1.2.840.10008.6.1.S160.2	SUP160002	Positioning Shielding Devices
1.2.840.10008.6.1.S160.3	SUP160003	Patient Setup Devices
1.2.840.10008.6.1.S160.4	SUP160004	Patient Position Displacement Reference Points
1.2.840.10008.6.1.S160.14	SUP160014	Patient Alignment Devices
1.2.840.10008.6.1.S160.20	SUP160020	Reasons for RT Radiation Treatment Omission
1.2.840.10008.6.1.S160.21	SUP160021	Patient Setup Procedures
1.2.840.10008.6.1.S160.22	SUP160022	Patient Setup Device Categories
1.2.840.10008.6.1.S160.24	SUP160024	Motion Management Setup Devices

Part 15 Addendum

Add the following definitions PS3.15, Annex E:

The table will be populated in the version for Letter Ballot.

Table E.1-1. Application Level Confidentiality Profile Attributes

Attribute Name	Tag	Retired (from PS3.6)	In Std. Comp. IOD (from PS3.3)	Basic Profile	Retain Safe Private Option	Retain UIDs Option	Retain Device Ident. Option	Retain Inst. Ident. Option	Retain Patient Chars. Option	Retain Long. Full Dates Option	Retain Long. Modif. Dates Option	Clean Desc. Option	Clean Struct. Cont. Option	Clean Graph. Option

Part 16 Addendum

Modify the following CIDs in PS3.16, Annex B:

CID 9513 FIXATION DEVICES

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML

Type: Extensible

Version: yyyymmdd

UID: 1.2.840.10008.6.1.1223

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
SCT	228745001	Bite block	A-01105	C0179321
DCM	130110	Headframe		
DCM	130111	Head Mask		
DCM	130112	Head and Neck Mask		
DCM	130113	Mold		
DCM	130114	Cast		
SCT	706683002	Headrest	R-FEEC3	C0181130
DCM	130116	Breast Board		
DCM	130117	Body Frame		
DCM	130118	Vacuum Mold		
DCM	130119	Whole Body Pod		
DCM	130120	Rectal Balloon		
DCM	130121	Vaginal Cylinder		
99SUP160	**S160290**	**Breast Bridge**		
99SUP160	**S160291**	**Abdominal Compression Belt**		
99SUP160	**S160292**	**Abdominal Compression Arch**		

CID 9515 RT PATIENT SUPPORT DEVICES

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML

Type: Extensible

Version: yyyymmdd

UID: 1.2.840.10008.6.1.1225

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
SCT	86407004	Table	A-17350	C0039224
SCT	706699008	Chair	R-FE814	C0179847
SCT	**89149003**	**Stretcher**		
99SUP160	**S160000**	**Patient Treatment Seating Device**		
SCT	**224728004**	**Internal Wall**		
SCT	**709280007**	**Floor**		

Add the following new CIDs to PS3.16, Annex B:

CID SUP160001 PATIENT SETUP METHODS

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML

Type: Extensible

Version: yyyymmdd

UID: 1.2.840.10008.6.1.S160.001

Coding Scheme Designator	Code Value	Code Meaning
99SUP160	S160140	Isocentric Setup Method
99SUP160	S160141	Controlled SSD Setup Method
99SUP160	S160142	TBI Setup Method
99SUP160	S160143	Stereotactic Setup Method
99SUP160	S160144	Skin Apposition Setup Method
99SUP160	S160145	Ocular Gaze Setup Method

CID SUP160002 PATIENT SHIELDING DEVICES

Resources: HTML I FHIR JSON I FHIR XML I IHE SVS XML

Type: Extensible

Version: yyyymmdd

UID: 1.2.840.10008.6.1.S160.2

Coding Scheme Designator	Code Value	Code Meaning
SCT	470204007	Gonad radiation shield
SCT	469266003	Eye radiation shield
99SUP160	S160210	Cavity radiation shield
99SUP160	S160211	Surface radiation shield
99SUP160	S160212	Independent radiation shield

CID SUP160003 PATIENT SETUP DEVICES

Resources: HTML I FHIR JSON I FHIR XML I IHE SVS XML

Type: Extensible

Version: yyyymmdd

UID: 1.2.840.10008.6.1.S160.03

Coding Scheme Designator	Code Value	Code Meaning
Include CID 9513 Fixation Devices		
Include CID SUP160014 Patient Alignment Devices		
Include CID SUP160002 Patient Shielding Devices		
Include CID SUP160024 Motion Management Setup Devices		

CID SUP160004 PATIENT POSITION DISPLACEMENT REFERENCE POINTS

Resources: HTML I FHIR JSON I FHIR XML I IHE SVS XML

Type: Extensible

Version: yyyymmdd

UID: 1.2.840.10008.6.1.S160.2

Coding Scheme Designator	Code Value	Code Meaning
Include CID 9553 “Treatment Points”		
DCM	130069	Patient Setup Point
DCM	130070	Room Laser Patient Setup Point
DCM	130071	Moveable Laser Patient Setup Point

CID SUP160014 PATIENT ALIGNMENT DEVICES

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML

Type: Extensible

Version: yyyymmdd

UID: 1.2.840.10008.6.1.S160.14

Coding Scheme Designator	Code Value	Code Meaning
DCM	128151	Laser Cross-hairs
99SUP160	S160220	Distance Meter
99SUP160	S160221	Mechanical Pointer
99SUP160	S160222	Radiofrequency Transponders
99SUP160	S160223	Optical Surface Scanner
99SUP160	S160224	Infrared Markers
99SUP160	S160225	Radioactive Markers
99SUP160	S160226	Thermal Surface Scanner
99SUP160	S160227	Combined Structured Light/Thermal Surface Scanner
99SUP160	S160228	Ocular Fixation Light

CID SUP160020 REASONS FOR RT RADIATION TREATMENT OMISSION

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML

Type: Extensible

Version: yyyymmdd

UID: 1.2.840.10008.6.1.S160.20

Coding Scheme Designator	**Code Value**	**Code Meaning**
99SUP160	S160800	Treatment in a previous Treatment Session
99SUP160	S160801	Treatment omitted based on Physician’s assessment

CID SUP160021 PATIENT SETUP PROCEDURES

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML

Type: Extensible

Version: yyyymmdd

UID: 1.2.840.10008.6.1.S160.21

Coding Scheme Designator	Code Value	Code Meaning
SCT	72641008	Patient Sedation
99SUP160	S160250	Collision Checks
SCT	78823007	Life Support
SCT	304495004	Vital signs monitoring
SCT	68894007	Placing restraint

CID SUP160022 PATIENT SETUP DEVICE CATEGORIES

Resources: HTML I FHIR JSON I FHIR XML I IHE SVS XML

Type: Extensible

Version: yyyymmdd

UID: 1.2.840.10008.6.1.S160.22

Coding Scheme Designator	Code Value	Code Meaning
99SUP160	S160200	Patient Shielding Device
99SUP160	S160201	Patient Fixation Device
99SUP160	S160202	Patient Alignment Device
99SUP160	S160203	Patient Motion Management Device

CID SUP160024 MOTION MANAGEMENT SETUP DEVICES

Resources: HTML I FHIR JSON I FHIR XML I IHE SVS XML

Type: Extensible

Version: yyyymmdd

UID: 1.2.840.10008.6.1.S160.24

Coding Scheme Designator	Code Value	Code Meaning
99SUP160	S160240	Coaching Device
99SUP160	S160241	Patient Distraction Device

Add the following template to PS3.16, Annex C:

TID SUP160T01 PATIENT SETUP DEVICE PARAMETERS

Type: Extensible
Order: Non-Significant
Root: No

	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1	TEXT	EV (S160600, DCM, “Couch Index Label”)	1	U		
2	NUMERIC	EV (S160601, DCM, “Fixation Device Angle”)	1	U		Units = EV (deg, UCUM, "deg")
3	TEXT	EV (S160602, DCM, “Headrest Label”)	1	U		
4	NUMERIC	EV (S160603, DCM, “Abdominal Compression Plate Number”)	1	U		UNIT = EV (1, UCUM, "no units")
5	NUMERIC	EV (S160604, DCM, “Abdominal Compression Belt Length”)	1	U		Units = EV (mm, UCUM, "mm")
6	NUMERIC	EV (S160605, DCM, “Abdominal Compression Belt Pressure”)	1	U		Units = EV (Pa, UCUM, "Pa")
7	NUMERIC	EV (S160606, DCM, “Gaze Angle)	1	U		Units = EV (deg, UCUM, "deg")

Content Item Descriptions

Row 2, 7	The values of these rows refer to angles, which are device-specific and are not defined based on a standardized coordinate system.

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

DICOM CONTROLLED TERMINOLOGY DEFINITIONS (NORMATIVE)

Code Value	Code Meaning	Definition	Notes
S160000	Patient Treatment Seating Device	A seating device on which the patient sits and receives radiation treatments.	

S160140	Isocentric Setup Method	Method to set up the patient such that the device isocenter is positioned to a specific location in the patient. This allows rotational delivery of radiation treatment fields that maintain a focus to that location.	
S160141	Controlled SSD Setup Method	Method to set up the patient at specified source-to-skin distance.	
S160142	TBI Setup Method	Method to set up the patient at an extended distance, typically 2-6 meters, to create a large field for total body treatment. The patient may be on a stretcher or in a positioning device design for total body treatment.	
S160143	Stereotactic Setup Method	Method to set up the patient using localization imaging from mulitple angles to position the patient with a high degree of certainty. Typically done using rigorous fixation to reduce patient motion.	
S160144	Skin Apposition Setup Method	Method to set up the patient using three dimensional skin surface registration.	
S160145	Ocular Gaze Setup Method	Method to set up the patient for ocular treatments where the patient's gaze is focused to a particular location. This method is used to minimize motion of the eye, allowing a tighter radiation field to the target volume and potentially reducing radiation to other ocular structures.	
S160200	Patient Shielding Device	Device providing radiation shielding for the patient.	
S160201	Patient Fixation Device	Device to fixate the patient position.	
S160202	Patient Alignment Device	Device used to guide the alignment of the patient.	
S160203	Patient Motion Management Device	Device with which motion of the patient can be controlled or compensated for.	
S160210	Cavity radiation shield	A radiation shielding device to protect volumes within a body cavity.	
S160211	Surface radiation shield	A patient-specific radiation shielding device placed on the patient's surface.	
S160212	Independent radiation shield	Radiation shielding devices not attached to the patient or the treatment delivery device.	

S160220	Distance Meter	A device for positioning the patient based on an optical source-to-surface distance measuring tool.	
S160221	Mechanical Pointer	A device for positioning the patient based on mechanical source-to-surface distance measuring tool.	
S160222	Radiofrequency Transponders	Devices for positioning the patient based on beacon(s) responding uniquely after being interrogated on a specific frequency.	
S160223	Optical Surface Scanner	A device for positioning the patient based on scanning the surface using a known projected pattern.	
S160224	Infrared Markers	Devices for positioning the patient that reflect infrared light to detection cameras.	
S160225	Radioactive Markers	Devices for positioning the patient that emit radiation.	
S160226	Thermal Surface Scanner	A device for positioning the patient based on scanning the surface using thermal information.	
S160227	Combined Structured Light/Thermal Surface Scanner	A device for positioning the patient based on scanning the surface using a combination of a known projected pattern and thermal information.	
S160228	Ocular Fixation Light	Aligning the patient’s ocular motion based on a guidance device.	
S160240	Coaching Device	Device to guide patients to follow certain instructions.	
S160241	Patient Distraction Device	Device to distract the attention of the patient during the procedure.	
S160250	Collision checks	Procedure to evaluate risk of collision between the treatment delivery device and the patient and associated devices.	
S160290	Breast Bridge	Device used to limit the radiation field targeting the breast by blocking the beam in a certain direction, usually in the direction of the central beam axis. The bridge creates a block near the patient's surface, reducing the radiation penumbra.	
S160291	Abdominal Compression Belt	Belt used to limit the abdominal motion by compressing the abdomen.	
S160292	Abdominal Compression Arch	Arch device limit the abdominal motion by maintaining pressure on the abdomen.	

S160600	Couch Index Label	A label designating an indexed location on an patient support table top.	
S160601	Fixation Device Angle	Positioning angle on a fixation device.	
S160602	Headrest Label	A label that expresses the size of a patient headrest.	
S160603	Abdominal Compression Plate Number	The number indicating the position of the plate of an abdominal compression device.	
S160604	Abdominal Compression Belt Length	Length of the abdominal compression belt.	
S160605	Abdominal Compression Belt Pressure	Pressure applied by the abdominal pressure belt.	
S160606	Gaze Angle	The directional angle at which the patient gazes.	
S160800	Treatment in a previous Treatment Session	The RT Radiation has been already delivered in a previous Treatment Session.	
S160801	Treatment omitted based on Physician's assessment	The RT Radiation has not yet been delivered, but delivery has been assessed to be no longer required.	