

Digital Imaging and Communications in Medicine (DICOM)

**Supplement 160: Second Generation Radiotherapy –
Patient Setup and Delivery Instruction**

DICOM Standards Committee, Working Group 7, Radiation Therapy

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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 Treatment Preparation 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
<u>1.2.840.10008.5.1.4.1.1.481.21</u>	<u>RT Radiation Set Delivery Instruction Storage</u>	<u>Transfer</u>
<u>1.2.840.10008.5.1.4.1.1.481.22</u>	<u>RT Treatment Preparation Storage</u>	<u>Transfer</u>

Part 3 Addendum

Amend PS3.3 Section 7.14.10

7.14.10 RT Treatment Session, RT Treatment Fraction

An RT Treatment Session is a collection of RT treatment events ~~which~~that are performed in a contiguous manner without any break in-between (other than time needed for required preparations) during a single Visit. It ~~denotes~~is bound by the time period between the patient entering the treatment room and leaving the treatment room. In a treatment session one or more RT Radiation Sets (RSet in [Figure 7.14-2](#)) may be treated, **each one instructed by an RT Radiation Set Delivery Instruction**. An RT Treatment Session may also include imaging. A group of radiation deliveries that are separated by an intentional delay to accommodate radiobiological recovery effects are considered separate Treatment Sessions.

Each treatment of an RT Radiation Set is labeled as an RT Treatment Fraction (often abbreviated as Fx) with a fraction number starting with 1 at the first RT Treatment Session in which the RT Radiation Set is delivered, incremented by 1 at each subsequent treatment session.

An RT Treatment Fraction is the delivery of a portion of the total dose (whose delivery is defined by an RT Radiation Set) which has been divided equally into smaller doses to be delivered over a period of time (e.g. daily for 4-6 weeks). In radiotherapy, this division of dose over a period of time is known as dose fractionation.

...

Add the following columns in PS3.3 Section A.1.4, Table A.1-4b COMPOSITE INFORMATION OBJECT MODULES OVERVIEW – Second Generation Radiotherapy

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

Update the following in PS3.3 Annex A:

A.86 SECOND GENERATION RADIATION THERAPY

...

A.86.1.1.1 RT Second Generation Entity-Relationship Model

Replace existing Figure A.86.1.1.1-1...

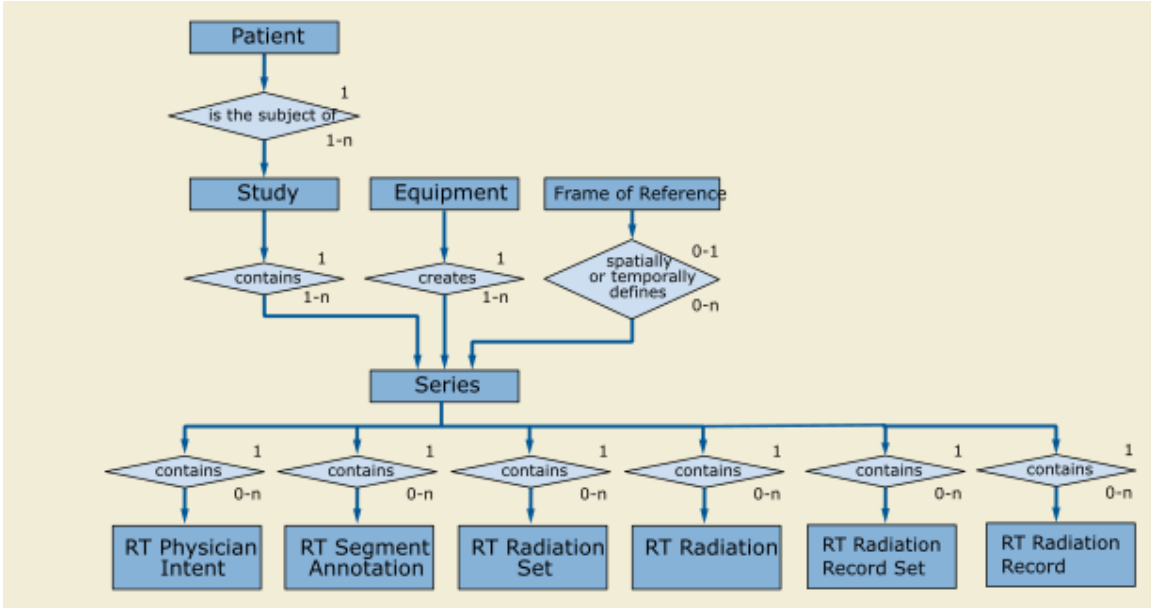


Figure A.86.1.1.1-1. RT Second Generation IOD Information Model

... with updated version (svg available in the supporting material of this Supplement):

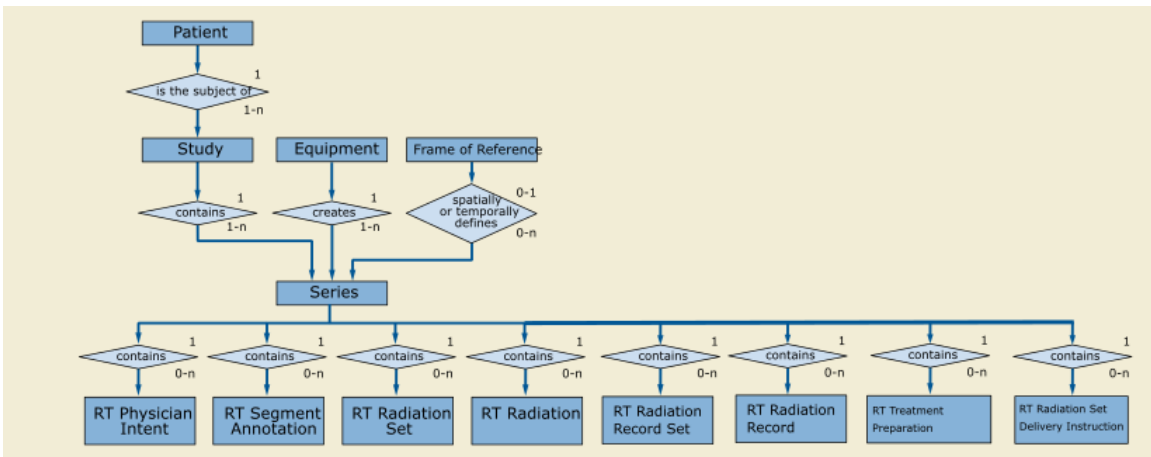


Figure A.86.1.1.1-1. RT Second Generation IOD Information Model

Add the following to PS3.3 Annex A:
--

A.86.1.13 RT Radiation Set Delivery Instruction Information Object Definition**A.86.1.13.1 RT Radiation Set Delivery Instruction IOD Description**

The RT Radiation Set Delivery Instruction IOD contains all the parameters needed to deliver a single RT Treatment Fraction of one RT Radiation Set in the scope of one RT Treatment Session. It handles either the delivery of the complete fraction of the RT Radiation Set or the continuation of a formerly treated fraction which was interrupted and not completely delivered.

A.86.1.13.2 RT Radiation Set Delivery Instruction IOD Entity-Relationship Model

See Figure A.86.1.1.1-1.

A.86.1.13.3 RT Radiation Set Delivery Instruction IOD Module Table

**Table A.86.1.13-1
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.36.24	M
	SOP Common	C.12.1	M
	Common Instance Reference	C.12.2	M
	Radiotherapy Common Instance	C.36.4	M

A.86.1.13.4 RT Radiation Set Delivery Instruction IOD Constraints**A.86.1.13.4.1 Modality Attribute**

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

A.86.1.14 RT Treatment Preparation Information Object Definition**A.86.1.14.1 RT Treatment Preparation IOD Description**

The RT Treatment Preparation IOD describes the setup of the patient in preparation for delivery of the therapeutic radiation within an RT Treatment Session. It may include an initial patient's position in preparation for treatment delivery, the treatment setup positions, or setup procedures along with the use of any fixation or shielding devices.

A.86.1.14.1 RT Treatment Preparation IOD Entity-Relationship Model

See Figure A.86.1.1.1-1.

A.86.1.14.3 RT Treatment Preparation IOD Module Table

**Table A.86.1.14-1
RT Treatment Preparation 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 Treatment Preparation	General Reference	C.12.4	M
	RT Treatment Preparation	C.36.25	M
	SOP Common	C.12.1	M
	Common Instance Reference	C.12.2	M
	Radiotherapy Common Instance	C.36.4	M

A.86.1.14.4 RT Treatment Preparation Information IOD Constraints**A.86.1.14.4.1 Modality Attribute**

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

Update the following in PS3.3, chapter 10:

10.12 PATIENT ORIENTATION MACRO

This section describes ~~Attributes of the Patient Orientation Macro by specifying~~ the Patient orientation related to gravity and equipment.

[Table 10-15](#) contains ~~IOD~~-Attributes that describe the Patient Orientation related to gravity and equipment.

Table 10-15
Patient Orientation Macro Attributes

Attribute Name	Tag	Type	Attribute 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 and Section C.8.11.5.1.2 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.
>>Include Table 8.8-1 "Code Sequence Macro Attributes"			Defined CID 20 "Patient Orientation Modifier"
Patient Gantry Relationship Code Sequence	(0054,0414)	3	Sequence that describes Description of the orientation of the Patient with respect to the head of the table. See Section C.8.4.6.1.3 for further explanation. Only a single Item is permitted in this Sequence.
>Include Table 8.8-1 "Code Sequence Macro Attributes"			BCID 21 "Patient Equipment Relationship"

Table 10-15a contains Attributes that describe the Patient Orientation related to gravity and the mandatory relationship to the equipment.

Table 10-15a
Patient Orientation And Equipment Relationship Macro Attributes

Attribute Name	Tag	Type	Attribute Description
Patient Orientation Code Sequence	(0054,0410)	1	Sequence that describes the orientation of the patient with respect to gravity. See

			<p><u>Section C.8.4.6.1.1 and Section C.8.11.5.1.2 for further explanation.</u></p> <p><u>Only a single item shall be included in this Sequence.</u></p>
<p><u>>Include Table 8.8-1 “Code Sequence Macro Attributes”</u></p>			<p><u>Defined CID 19 “Patient Orientation”</u></p>
<p><u>>Patient Orientation Modifier Code Sequence</u></p>	<p><u>(0054,0412)</u></p>	<p><u>1C</u></p>	<p><u>Patient Orientation Modifier.</u></p> <p><u>Required if needed to fully specify the orientation of the patient with respect to gravity.</u></p> <p><u>Only a single Item shall be included in this Sequence.</u></p>
<p><u>>>Include Table 8.8-1 “Code Sequence Macro Attributes”</u></p>			<p><u>Defined CID 20 “Patient Orientation Modifier”</u></p>
<p><u>Patient Equipment Relationship Code Sequence</u></p>	<p><u>(3010,0030)</u></p>	<p><u>1</u></p>	<p><u>Description of the orientation of the patient with respect to the equipment.</u></p> <p><u>Only a single Item shall be included in this Sequence.</u></p> <p><u>See Section C.36.6.1.8.</u></p>
<p><u>>Include Table 8.8-1 “Code Sequence Macro Attributes”</u></p>			<p><u>Defined CID 21 “Patient Equipment Relationship”</u></p>

Update the following in PS3.3 Annex C:

C.7.3.1.1.1 Modality

Defined Terms:

...

OT

Other

PLAN

Plan

Note 1: The term “PLAN” denotes Series describing planned activities. It is not be confused with radiotherapy treatment plans.

POS

Position Sensor

C.36 RT SECOND GENERATION MODULES

...

C.36.2 RT Second Generation Macros

...

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.
▶ 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.

...

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.
>>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”
Include Table 10-15a “Patient Orientation And Equipment Relationship Macro”			
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”			

Attribute Name	Tag	Type	Description
Treatment Position Sequence	(300A,063F)	1C	Patient positions during treatment, being prescribed or recorded. Required if the SOP Class of the SOP Instance including this Module is not RT Radiation Salvage Record Storage ("1.2.840.10008.5.1.4.1.1.481.17"). May be present otherwise. 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"			DCID 9553 "Treatment Points"

...

C.36.3 Enhanced RT Series Module

...

C.36.3.1 Enhanced RT Series Attribute Descriptions

C.36.3.1.1 Modality

The Modality (0008,0060) is defined for each IOD including the Enhanced RT Series Module.

Enumerated Values:

RTINTENT

Radiotherapy Intent

RTRAD

RT Radiation

RTSEGANN

Radiotherapy Segment Annotation

PLAN

Plan

Note 1: The term "PLAN" denotes Series describing planned activities. It is not be confused with radiotherapy treatment plans.

...

C.36.6 RT Enhanced Prescription Module

The RT Enhanced Prescription Module describes the delivery objectives and labels for intended treatment for a specific target, as defined by the physician.

**Table C.36.6-1
RT Enhanced Prescription Module Attributes**

Attribute Name	Tag	Type	Description
RT Prescription Sequence	(3010,006B)	1	Prescriptions to deliver therapeutic radiation. One or more Items shall be included in this Sequence.
>RT Prescription Label	(3010,0054)	1	User-defined label for this prescription. See 10.31.1.1.
...			
>RT Treatment Technique Code Sequence	(3010,0080)	3	Treatment technique to be used. One or more Items are permitted in this Sequence.
>>>Include Table 8.8-1 "Code Sequence Macro Attributes"			<i>Defined CID 9524 "Radiotherapy Procedure Techniques".</i>
>Patient Treatment Orientation Sequence	(3010,0032)	2	Orientation of the Patient for the treatment. Zero or one Item shall be included in this Sequence.
>>Patient Orientation Code Sequence	(0054,0410)	1	Orientation of the patient with respect to gravity. See 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"			<i>Defined CID 19 "Patient Orientation".</i>
>>>Patient Orientation Modifier Code Sequence	(0054,0412)	1C	Sequence describing the orientation of the patient with respect to gravity. 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.
>>>>Include Table 8.8-1 "Code Sequence Macro Attributes"			<i>Defined CID 20 "Patient Orientation Modifier".</i>
>>Patient Equipment Relationship Code Sequence	(3010,0030)	1	Orientation of the patient with respect to equipment. Only a single Item shall be included in this Sequence. See C.36.6.1.8.
>>>>Include Table 8.8-1 "Code Sequence Macro Attributes"			<i>Defined CID 21 "Patient Equipment Relationship".</i>
>>>>Include Table 10-15a "Patient Orientation And Equipment Relationship Macro"			
>Prescription Notes Sequence	(3010,0081)	3	Annotations on aspects of the prescription, like preparation and execution of the treatment. One or more Items are permitted in this Sequence.

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. <u>Only a single Item shall be included in this Sequence.</u>
>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”.			<i>CID is specified in the IOD</i>
...			

C.36.20 RT Radiation Record Set Module

...

C.36.20.1 RT Radiation Record Set Attribute Descriptions

...

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.36.20-2
Delivery of multiple RT Radiation Set Instances**

Treatment Session	RT Radiation Set	Delivered RT Radiations	Clinical Fraction Number (300A,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)

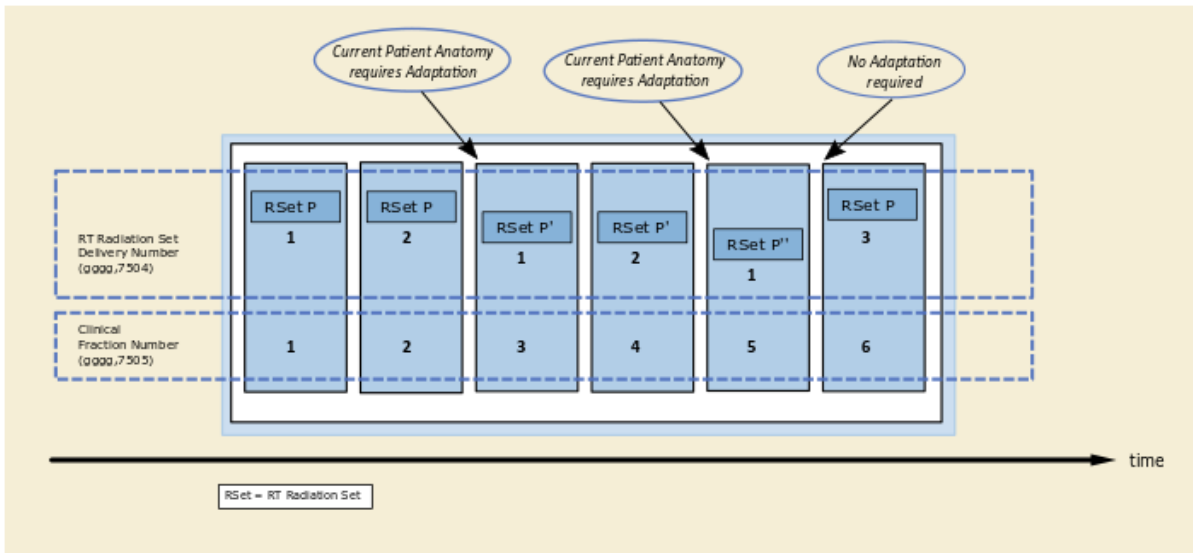


Figure C.36.20-1
Delivery of a single RT Radiation Set Instance with Adaptive Treatments

C.36.20.1.3 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 (300A,0708) of NO and have an RT Treatment Termination Status (300A,0714) of NORMAL the value of RT Radiation RT Treatment Fraction Completion Status (300A,0706) 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 (300A,7506) shall be PARTIAL.

Example

RT Radiation Set P contains RT Radiations A and B.

RT Radiation Record Sets created are W, X, Y, Z.

Table C.36.20-3
Delivery of a single RT Radiation Set Instance with Partial Treatments

Treatment Session	RT Radiation Set	Delivered RT Radiations	Treatment Delivery Continuation Flag (300A,0708)	RT Treatment Termination Status (300A,0714)	RT Radiation Record Set	RT Treatment Fraction Completion Status (300A,0706)	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

...

C.36.2 RT Second Generation Macros

...

C.36.2.3 RT Second Generation Positioning Macros

C.36.2.3.1 RT Patient Position Scope Macro

The RT Patient Position Scope Macro defines the RT Radiation Set, RT Radiation Instances or the Treatment Position Groups to which a set of positioning parameters apply.

**Table C.36.2.3.1-1
RT Patient Position Scope Macro Attributes**

Attribute Name	Tag	Type	Description
Referenced RT Radiation Sequence	(300A,0630)	1C	A set of RT Radiation Instances for which the positioning parameters apply. Required if Referenced RT Radiation Set Sequence (300A,0702) is absent. One or more Items shall be included in this Sequence.
<i>>Include Table 10-11 "SOP Instance Reference Macro Attributes"</i>			
Referenced RT Radiation Set Sequence	(300A,0702)	1C	A collection of RT Radiation Sets for which the positioning parameters apply. Required if Referenced RT Radiation Sequence (300A,0630) is absent. One or more Items shall be included in this Sequence.
<i>>Include Table 10-11 "SOP Instance Reference Macro Attributes"</i>			

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 for which the parameters apply. Required if Treatment Position Group Sequence (300A,060A) is absent and 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.
<i>>>Include Table 10-11 "SOP Instance Reference Macro Attributes"</i>			
>Treatment Position Group Sequence	(300A,060A)	1C	Treatment Position Groups defining patient positions for which the parameters apply. Required if Referenced RT Radiation Sequence (300A,0630) is absent and Treatment Position Groups to which the positioning parameters apply are defined in the referenced RT Radiation Set. One or more Items shall be included in this Sequence. See C.36.10.1.3.
>>Referenced Treatment Position Group UID	(300A,0785)	1	Referenced unique identifier of the Treatment Position Group.

C.36.2.3.2 RT Patient Position Macro

The RT Patient Position Macro defines a patient position in a treatment delivery or imaging session. This patient position may be specified as an absolute position of the patient positioning device or as relative displacement against a specified reference location.

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

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

**Table C.36.2.3.2-1
RT Patient Position Macro Attributes**

Attribute Name	Tag	Type	Description
<i>Include Table 10-15a "Patient Orientation And Equipment Relationship Macro"</i>			

Attribute Name	Tag	Type	Description
RT Patient Position Sequence	(300A,0799)	2C	Definition of patient position. See C.36.2.3.2.1.1. Required if RT Patient Position Displacement Sequence (300A,0798) is absent. Zero or one Item shall be included in this Sequence.
>Include Table 10.39-1 "Patient to Equipment Relationship Macro Attributes"			DCID 9553 "Treatment Points"
RT Patient Position Displacement Sequence	(300A,0798)	2C	Displacement of the patient position. See C.36.2.3.2.1.2. Required if RT Patient Position Sequence (300A,0799) is absent. Zero or one Item shall be included in this Sequence.
>Displacement Reference Label	(300A,079A)	3	A user-defined label describing the reference location used for a displacement of the patient's treatment position.
>Displacement Reference Location Code Sequence	(300A,079D)	1	The reference location with respect to which the displacement is provided.
>>Include Table 8.8-1 "Code Sequence Macro Attributes"			Defined CID 9574 "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.
>>Include Table 10.34-1 "Conceptual Volume Segmentation Reference and Combination Macro Attributes"			
>Displacement Matrix	(300A,079B)	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.36.2.3.2.1.2
>Patient Support Displacement Sequence	(300A,079C)	2	Device-specific positioning parameters, derived from the Displacement Matrix (300A,079B). See C.36.2.3.2.1.3 Zero or one Item shall be included in this Sequence.

Attribute Name	Tag	Type	Description
>>Include Table 10.40-1 "Patient Support Position Macro Attributes"			Defined TID is TID 15302 "Patient Support Position Parameters".

C.36.2.3.2.1 RT Patient Position Macro Attribute Descriptions

C.36.2.3.2.1.1 RT Patient Position Sequence

This Sequence communicates a patient position as defined by the Image to Equipment Mapping Matrix (0028,9520) and may additionally contain native device parameters displayed to the user.

C.36.2.3.2.1.2 RT Patient Position Displacement Sequence

This Sequence communicates a patient 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 (300A,079B) 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.36.2.3.2.1.3 Patient Support Displacement Sequence

The Displacement Matrix (300A,079B) is the exclusive source of information to define the displacement. Positioning devices will solely derive the displacement from this matrix.

Some applications, which do not act as positioning devices and cannot decompose the Displacement Matrix (300A,079B) into device-specific parameters, may want to informatively display device-specific parameters to the user. The purpose of the Patient Support Displacement Sequence (300A,079C) is to facilitate such display. The Patient Support Displacement Sequence (300A,079C) is not a substitute for the Displacement Matrix (300A,079B).

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

C.36.24 RT Radiation Set Delivery Instruction Module

The RT Radiation Set Delivery Instruction Module contains information required by a Treatment Delivery System (TDS) to deliver an external beam radiotherapy treatment.

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

The Module provides data which are specific to the upcoming RT Treatment Session, such as the RT Radiation Set to be delivered, the fraction numbers, information about the continuation of delivery, etc. If more than one RT Radiation Set will be delivered in the upcoming RT Treatment session, treatment delivery of each RT Radiation Set will be specified by a separate instance containing this Module.

Typically, this information is supplied by a Treatment Management System to the TDS when it creates an RT Radiation Set Delivery Instruction SOP Instance so that the TDS does not require any additional information beyond the current RT Treatment Session.

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.36.24-1
RT Radiation Set Delivery Instruction Module Attributes**

Attribute Name	Tag	Type	Attribute Description
Referenced RT Radiation Set Sequence	(300A,0702)	1	Reference to a Radiation Set SOP Instance containing the Radiations to which the current SOP Instance applies. Only a single Item shall be included in this sequence.
<i>>Include Table 10-11 "SOP Instance Reference Macro Attributes"</i>			
Treatment Device Identification Sequence	(300A,063A)	2	Identifies the treatment device intended to be used for delivering the RT Radiation. See C.36.24.1.1. Zero or one Item shall be included in this Sequence.
<i>>Include Table C.36.2.2.1-1 "Treatment Device Identification Macro Attributes"</i>			
RT Radiation Set Delivery Usage	(300A,079E)	1	The intended usage of the RT Radiation Set. This value may differ from the RT Radiation Set Intent (300A,0637) within the Instance referenced by the Referenced RT Radiation Set Sequence (300A,0702). The Defined Terms are specified in C.36.10.1.1.
RT Radiation Set Delivery Number	(300A,0704)	1C	A number that indicates the RT Treatment Fraction of the referenced RT Radiation Set Instance to be delivered. Required if RT Radiation Set Delivery Usage (300A,079E) is TREATMENT. May be present otherwise. See C.36.20.1.2.
Clinical Fraction Number	(300A,0705)	1C	A number that indicates the RT Treatment Fraction to be delivered. Required if RT Radiation Set Delivery Usage (300A,079E) is TREATMENT. May be present otherwise. See C.36.20.1.2.
RT Radiation Task Sequence	(300A,0797)	1	Subset of RT Radiations to be delivered and/or to have quality assurance procedures applied.

Attribute Name	Tag	Type	Attribute Description
			<p>One or more Items shall be included in this Sequence.</p> <p>All RT Radiation SOP Instances in the referenced RT Radiation Set shall either be in this Sequence or the Omitted Radiation Sequence (300A,0787). Correspondingly the sum of the number of Items in this Sequence and the number of Items in the Omitted Radiation Sequence (300A,0787) shall be the number of RT Radiation SOP Instances in the referenced RT Radiation Set.</p> <p>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 Radiation SOP Instances in the referenced RT Radiation Set. The Omitted Radiation Sequence (300A,0787) will not be present in this case.</p> <p>Note: The number of RT Radiation SOP Instances 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).</p>
>Referenced RT Radiation Sequence	(300A,0630)	1	<p>Reference to a single RT Radiation SOP Instance containing the parameters to be used for the delivery of the RT Radiation.</p> <p>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).</p> <p>Only a single Item shall be included in this sequence.</p>
<i>>>Include Table 10-11 "SOP Instance Reference Macro Attributes"</i>			
>RT Delivery Start Patient Position Sequence	(300A,0789)	2	<p>The position of the patient at the start of delivery of the RT Radiation referenced in the RT Radiation Sequence (300A,0630).</p>

Attribute Name	Tag	Type	Attribute Description
			<p>The content of this Sequence shall take precedence over the treatment positions specified in the referenced RT Radiation.</p> <p>Zero or one Item shall be included in this Sequence..</p>
<i>>>Include Table C.36.2.3.2-1 "RT Patient Position Macro Attributes"</i>			
>Treatment Delivery Continuation Flag	(300A,7508)	1	<p>Whether the task defines a continuation of a previously interrupted treatment delivery of the referenced RT Radiation.</p> <p>Enumerated Values:</p> <p>YES: The task represents a continuation.</p> <p>NO: The task represents a treatment delivery that starts at the first RT Control Point.</p>
>Continuation Start Meterset	(0074,0120)	1C	<p>Meterset within the RT Radiation referenced in the Referenced RT Radiation Sequence (300A,0630) at which treatment delivery starts.</p> <p>The Meterset is expressed in units specified by Radiation Dosimeter Unit Sequence (300A,0658) in the referenced RT Radiation SOP Instance.</p> <p>Required if Treatment Delivery Continuation Flag (300A,7508) is YES.</p>
>Continuation End Meterset	(0074,0121)	1C	<p>Meterset within the RT Radiation referenced in the Referenced RT Radiation Sequence (300A,0630) at which treatment delivery ends.</p> <p>The Meterset is expressed in units specified by Radiation Dosimeter Unit Sequence (300A,0658) in the referenced RT Radiation SOP Instance.</p> <p>Required if Treatment Delivery Continuation Flag (300A,7508) is YES and the Continuation End Meterset (0074,0121) is not equal to the Meterset of the last RT Control Point in the referenced RT Radiation SOP Instance.</p>
>Radiation Order Index	(300A,0786)	2	<p>Index defining the order in which the RT Radiations are to be delivered.</p>

Attribute Name	Tag	Type	Attribute Description
			The value shall start at 1, and increase monotonically by 1.
>Referenced RT Treatment Preparation Sequence	(300A,078B)	2	Reference to a RT Treatment Preparation SOP Instance that applies to this delivery. Only a single Item shall be included in this Sequence.
<i>>>Include Table 10-11 "SOP Instance Reference Macro Attributes"</i>			
<i>>Include Table 10-28 "Device Motion Control Macro Attributes"</i>			
Omitted Radiation Sequence	(300A,0787)	1C	Subset of RT Radiations that are not to be delivered. The delivery system shall not deliver any RT Radiations referenced in this Sequence. Required if one or more RT Radiation SOP Instances contained in the referenced RT Radiation Set are not to be delivered. One or more Items shall be included in this Sequence.
>Referenced RT Radiation Sequence	(300A,0630)	1	The RT Radiation SOP Instance that is not to 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.
<i>>>Include Table 10-11 "SOP Instance Reference Macro Attributes"</i>			
>Reason for Omission Code Sequence	(300A,0788)	1	Reason the RT Radiation is not to be delivered. Only a single Item shall be included in this Sequence.
<i>>>Include Table 8.8-1 "Code Sequence Macro Attributes"</i>			<i>Defined CID 9576 "Reasons for RT Radiation Treatment Omission"</i>
>Asserter Identification Sequence	(0044,0103)	1	The person or device making the assertion that the RT Radiation is omitted. Only a single Item shall be included in this Sequence.
<i>>>Include Table C.17-3b "Identified Person or Device Macro Attributes"</i>			<i>Organizational Role BCID 9562 "Radiotherapy Treatment Delivery Person Roles"</i>

Attribute Name	Tag	Type	Attribute Description
>Reason for Omission Description	(300C,0113)	3	User-defined description of why the RT Radiation is not to be delivered.

C.36.24.1 Radiation Set Delivery Attribute Description

C.36.24.1.1 Treatment Device Identification Sequence

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

C.36.25 RT Treatment Preparation Module

The RT Treatment Preparation Module contains information describing the procedures to prepare the patient for a radiotherapeutic treatment. These procedures may include aligning the patient position, setting up required accessories, such as fixation and shielding devices applied to the patient, administering medications, etc.

Table C.36.25-1
RT Treatment Preparation Module Attributes

Attribute Name	Tag	Type	Attribute Description
<i>Include Table 10.32-1 "Entity Long Labeling Macro Attributes"</i>			<i>See C.36.25.1.1.</i>
RT Patient Position Scope Sequence	(300A,0784)	1	The RT Radiation Set, RT Radiation Instances or the Treatment Position Groups to which the treatment preparation parameters apply. Only a single Item shall be included in this Sequence.
<i>>Include Table C.36.2.3.1-1 "RT Patient Position Scope Macro Attributes"</i>			
RT Treatment Preparation Patient Position Sequence	(300A,078A)	1	The position of the patient at the start of the treatment preparation. Only a single Item shall be included in this sequence.
<i>>Include Table C.36.2.3.2-1 "RT Patient Position Macro Attributes"</i>			
Patient Treatment Preparation Method Code Sequence	(300A,078D)	1	Method used to prepare the Patient for treatment. Only a single Item shall be included in this sequence.
<i>>Include Table 8.8-1 "Code Sequence Macro Attributes"</i>			<i>Baseline CID 9571 "Patient Treatment Preparation Methods"</i>
Patient Treatment Preparation Method Description	(300A,0792)	3	User-defined description of patient treatment preparation technique.
Referenced Patient Setup Photo Sequence	(300A,078C)	3	References to photos illustrating the patient setup. One or more Items are permitted in this Sequence.

Attribute Name	Tag	Type	Attribute Description
<i>>Include Table 10-11 "SOP Instance Reference Macro Attributes"</i>			
>Patient Setup Photo Description	(300A,0794)	2	User-defined description of patient setup photo.
>Referenced Patient Setup Procedure Index	(300A,0796)	1C	The value of Patient Treatment Preparation Procedure Index (300A,0795) from Patient Treatment Preparation Procedure Sequence (300A,0790) corresponding to the Patient Treatment Preparation Procedure to which this Sequence Item refers. Required if this Patient Setup Photo is associated with a Patient Treatment Preparation Procedure.
Patient Treatment Preparation Procedure Sequence	(300A,0790)	2	Procedures for preparing for the treatment of the patient. Zero or more Items shall be included in this Sequence.
>Patient Treatment Preparation Procedure Index	(300A,0795)	1	Index of the Patient Treatment Preparation Procedure in this Sequence. The value shall start at 1 and increase monotonically by 1.
>Patient Treatment Preparation Procedure Code Sequence	(300A,0791)	1	Procedure performed to prepare the patient for treatment. Only a single Item shall be present in this Sequence.
<i>>>Include Table 8.8-1 "Code Sequence Macro Attributes"</i>			Baseline CID 9577 "Patient Treatment Preparation Procedures"
>Patient Treatment Preparation Device Sequence	(300A,078F)	3	Devices used for preparing the patient for treatment. Only a single Item is permitted in this Sequence.
<i>>>Include Table C.36.2.2.3-1 "RT Accessory Device Identification Macro Attributes"</i>			Baseline CID 9573 "Patient Treatment Preparation Devices"
>Patient Treatment Preparation Procedure Parameter Description	(300A,078E)	2	User-defined description of patient treatment preparation procedure parameter(s).
>Patient Treatment Preparation Procedure Parameter Sequence	(300A,0793)	2	Parameters for the Patient Treatment Preparation Procedure. Zero or more Items shall be included in this Sequence.
<i>>>Include Table 10.2.1-1. "Content Item with Modifiers Macro Attributes"</i>			See C.36.25.1.2.for Baseline TID.

C.36.25.1 RT Treatment Preparation Attribute Description

C.36.25.1.1 Treatment Preparation Instruction Description

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

C.36.25.1.2 Patient Treatment Preparation Procedure

In Table C.36.25-2, if the Patient Treatment Preparation Procedure Code Sequence (300A,0791) has the code value specified in the left column, the Template for Patient Treatment Preparation Procedure Parameter Sequence (300A,0793) shall be the one specified in the right column.

**Table C.36.25-2
RT Treatment Preparation Module Attributes**

Patient Treatment Preparation Procedure Code Sequence (300A,0791)	Patient Treatment Preparation Procedure Parameter Sequence (300A,0793)
(72641008, SCT, "Patient Sedation")	BTID 8182 "Exogenous Substance Administration"
(130637, DCM, "Patient Fixation Setup")	BTID 15305 "Patient Setup Fixation Device Parameters"
(130638, DCM, "Patient Alignment Setup")	BTID 15306 "Patient Setup Alignment Device Parameters"
All others	No Baseline TID defined

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)
<u>RT Radiation Set Delivery Instruction Storage</u>	<u>1.2.840.10008.5.1.4.1.1.481.21</u>	<u>RT Radiation Set Delivery Instruction IOD</u>
<u>RT Treatment Preparation Storage</u>	<u>1.2.840.10008.5.1.4.1.1.481.22</u>	<u>RT Treatment Preparation IOD</u>

Part 6 Addendum

6 REGISTRY OF DICOM DATA ELEMENTS

Update the following data elements in PS3.6:

Tag	Name	Keyword	VR	VM	
(300A,0632)	Referenced RT Patient Setup Sequence	ReferencedRTPatientSetupSequence	SQ	1	RET (2021c)
(300A,0650)	Patient Setup UID	PatientSetupUID	UI	1	RET (2021c)

Add the following data elements to PS3.6:
--

Tag	Name	Keyword	VR	VM	
(300A,0784)	RT Patient Position Scope Sequence	RTPatientPositionScopeSequence	SQ	1	
(300A,0785)	Referenced Treatment Position Group UID	ReferencedTreatmentPositionGroupUID	UI	1	
(300A,0786)	Radiation Order Index	RadiationOrderIndex	US	1	
(300A,0787)	Omitted Radiation Sequence	OmittedRadiationSequence	SQ	1	
(300A,0788)	Reason for Omission Code Sequence	ReasonforOmissionCodeSequence	SQ	1	
(300A,0789)	RT Delivery Start Patient Position Sequence	RTDeliveryStartPatientPositionSequence	SQ	1	
(300A,078A)	RT Treatment Preparation Patient Position Sequence	RTTreatmentPreparationPatientPositionSequence	SQ	1	
(300A,078B)	Referenced RT Treatment Preparation Sequence	ReferencedRTTreatmentPreparationSequence	SQ	1	
(300A,078C)	Referenced Patient Setup Photo Sequence	ReferencedPatientSetupPhotoSequence	SQ	1	
(300A,078D)	Patient Treatment Preparation Method Code Sequence	PatientTreatmentPreparationMethodCodeSequence	SQ	1	
(300A,078E)	Patient Treatment Preparation Procedure Parameter Description	PatientTreatmentPreparationProcedureParameterDescription	LT	1	

Tag	Name	Keyword	VR	VM
(300A,078F)	Patient Treatment Preparation Device Sequence	PatientTreatmentPreparationDeviceSequence	SQ	1
(300A,0790)	Patient Treatment Preparation Procedure Sequence	PatientTreatmentPreparationProcedureSequence	SQ	1
(300A,0791)	Patient Treatment Preparation Procedure Code Sequence	PatientTreatmentPreparationProcedureCodeSequence	SQ	1
(300A,0792)	Patient Treatment Preparation Method Description	PatientTreatmentPreparationMethodDescription	LT	1
(300A,0793)	Patient Treatment Preparation Procedure Parameter Sequence	PatientTreatmentPreparationProcedureParameterSequence	SQ	1
(300A,0794)	Patient Setup Photo Description	PatientSetupPhotoDescription	LT	1
(300A,0795)	Patient Treatment Preparation Procedure Index	PatientTreatmentPreparationProcedureIndex	US	1
(300A,0796)	Referenced Patient Setup Procedure Index	ReferencedPatientSetupProcedureIndex	US	1
(300A,0797)	RT Radiation Task Sequence	RTRadiationTaskSequence	SQ	1
(300A,0798)	RT Patient Position Displacement Sequence	RTPatientPositionDisplacementSequence	SQ	1
(300A,0799)	RT Patient Position Sequence	RTPatientPositionSequence	SQ	1
(300A,079A)	Displacement Reference Label	DisplacementReferenceLabel	LO	1
(300A,079B)	Displacement Matrix	DisplacementMatrix	FD	16
(300A,079C)	Patient Support Displacement Sequence	PatientSupportDisplacementSequence	SQ	1
(300A,079D)	Displacement Reference Location Code Sequence	DisplacementReferenceLocationCodeSequence	SQ	1
(300A,079E)	RT Radiation Set Delivery Usage	RTRadiationSetDeliveryUsage	CS	1

Add the following UIDs 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
<u>1.2.840.10008.5.1.4.1.1.48 1.21</u>	<u>RT Radiation Set Delivery Instruction Storage</u>	<u>RTRadiationSetDeliver yInstructionStorage</u>	<u>SOP Class</u>	<u>PS 3.4</u>
<u>1.2.840.10008.5.1.4.1.1.48 1.22</u>	<u>RT Treatment Preparation Storage</u>	<u>RTTreatmentPreparati onStorage</u>	<u>SOP Class</u>	<u>PS 3.4</u>

**Table A-3
CONTEXT GROUP UID VALUES**

Context UID	Context Identifier	Context Group Name
<u>1.2.840.10008.6.1.1418</u>	<u>9571</u>	<u>Patient Treatment Preparation Methods</u>
<u>1.2.840.10008.6.1.1419</u>	<u>9572</u>	<u>Patient Shielding Devices</u>
<u>1.2.840.10008.6.1.1420</u>	<u>9573</u>	<u>Patient Treatment Preparation Devices</u>
<u>1.2.840.10008.6.1.1421</u>	<u>9574</u>	<u>Patient Position Displacement Reference Points</u>
<u>1.2.840.10008.6.1.1422</u>	<u>9575</u>	<u>Patient Alignment Devices</u>
<u>1.2.840.10008.6.1.1423</u>	<u>9576</u>	<u>Reasons for RT Radiation Treatment Omission</u>
<u>1.2.840.10008.6.1.1424</u>	<u>9577</u>	<u>Patient Treatment Preparation Procedures</u>
<u>1.2.840.10008.6.1.1425</u>	<u>9578</u>	<u>Motion Management Setup Devices</u>

Part 15 Addendum

Adapt the following definition in PS3.15, Annex E:

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
Patient Setup UID	(300A,0650)	<u>NY</u>	<u>YN</u>	U		K								

Add the following definitions PS3.15, Annex E:

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
Referenced Treatment Position Group UID	(300A,0785)	N	Y	U		K								
Patient Treatment Preparation Procedure Parameter Description	(300A,078E)	N	Y	X								C		
Patient Treatment Preparation Method Description	(300A,0792)	N	Y	X								C		

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: 20210906

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		
<u>DCM</u>	<u>130653</u>	<u>Breast Bridge</u>		
<u>DCM</u>	<u>130654</u>	<u>Abdominal Compression Belt</u>		
<u>DCM</u>	<u>130655</u>	<u>Abdominal Compression Arch</u>		
<u>DCM</u>	<u>130656</u>	<u>Head Fixation Board</u>		

CID 9515 RT PATIENT SUPPORT DEVICES

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

Type: Extensible

Version: 20210906

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	A-17310	C0150789
SCT	224727009	Wall	A-00435	C0677535
SCT	709280007	Floor	A-A23F4	C0016249

Add the following new CIDs to PS3.16, Annex B:
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CID 9571 PATIENT TREATMENT PREPARATION METHODS

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

Type: Extensible

Version: 20210906

UID: 1.2.840.10008.6.1.1418

Coding Scheme Designator	Code Value	Code Meaning
DCM	130630	Isocentric Setup Method
DCM	130631	Controlled SSD Setup Method
DCM	130632	TBI Setup Method
DCM	130633	Stereotactic Setup Method
DCM	130634	Skin Apposition Setup Method
DCM	130635	Ocular Gaze Setup Method

CID 9572 PATIENT SHIELDING DEVICES

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

Type: Extensible

Version: 20210906

UID: 1.2.840.10008.6.1.1419

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
SCT	470204007	Gonad radiation shield	R-FD178	C3881517
SCT	469266003	Eye radiation shield	R-FCAEF	C3878290

DCM	130640	Cavity radiation shield		
DCM	130641	Independent radiation shield		

CID 9573 PATIENT TREATMENT PREPARATION DEVICES**Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML****Type: Extensible****Version: 20210906****UID: 1.2.840.10008.6.1.1420**

Coding Scheme Designator	Code Value	Code Meaning
<i>Include CID 9513 Fixation Devices</i>		
<i>Include CID 9575 Patient Alignment Devices</i>		
<i>Include CID 9572 Patient Shielding Devices</i>		
<i>Include CID 9578 Motion Management Setup Devices</i>		

CID 9574 PATIENT POSITION DISPLACEMENT REFERENCE POINTS**Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML****Type: Extensible****Version: 20210906****UID: 1.2.840.10008.6.1.1421**

Coding Scheme Designator	Code Value	Code Meaning
<i>Include CID 9553 "Treatment Points"</i>		
DCM	130069	Patient Setup Point
DCM	130070	Room Laser Patient Setup Point
DCM	130071	Moveable Laser Patient Setup Point

CID 9575 PATIENT ALIGNMENT DEVICES**Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML****Type: Extensible****Version: 20210906****UID: 1.2.840.10008.6.1.1422**

Coding Scheme Designator	Code Value	Code Meaning
DCM	128151	Laser Cross-hairs
DCM	130642	Optical Distance Meter
DCM	130643	Mechanical Pointer
DCM	130644	Radiofrequency Transponder

DCM	OSS	Optical Surface Scanner
DCM	LS	Laser Surface Scan
DCM	130645	Infrared Marker
DCM	130646	Radioactive Marker
DCM	130647	Thermal Imager
DCM	130648	Combined Structured Light/Thermal Imager
DCM	130649	Ocular Fixation Light

CID 9576 REASONS FOR RT RADIATION TREATMENT OMISSIONResources: [HTML](#) | [FHIR JSON](#) | [FHIR XML](#) | [IHE SVS XML](#)

Type: Extensible

Version: 20210906

UID: 1.2.840.10008.6.1.1423

Coding Scheme Designator	Code Value	Code Meaning
DCM	130663	RT Radiation previously delivered
DCM	130664	Treatment unnecessary
DCM	130665	Treatment exceeds patient tolerance

CID 9577 PATIENT TREATMENT PREPARATION PROCEDURESResources: [HTML](#) | [FHIR JSON](#) | [FHIR XML](#) | [IHE SVS XML](#)

Type: Extensible

Version: 20210906

UID: 1.2.840.10008.6.1.1424

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
SCT	72641008	Sedation	P1-C0B00	C0344106
DCM	130652	Collision Checks		
SCT	304495004	Vital signs monitoring	P0-00820	C2739811
SCT	68894007	Placing restraint	PA-10130	C0204738
DCM	130636	Patient Shielding Procedure		
DCM	130637	Patient Fixation Procedure		
DCM	130638	Patient Alignment Procedure		
DCM	130639	Patient Motion Management Setup Procedure		

CID 9578 MOTION MANAGEMENT SETUP DEVICES

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

Type: Extensible

Version: 20210906

UID: 1.2.840.10008.6.1.1425

Coding Scheme Designator	Code Value	Code Meaning
DCM	130650	Coaching Device
DCM	130651	Patient Distraction Device

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

TID 15305 PATIENT SETUP FIXATION DEVICE PARAMETERS

Type: Extensible

Order: Non-Significant

Root: No

	NL	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1		TEXT	EV (130657, DCM, "Couch Index Label")	1	U		
2		NUMERIC	EV (130658, DCM, "Fixation Device Angle")	1	U		Units = EV (deg, UCUM, "deg")
3		NUMERIC	EV (130659, DCM, "Abdominal Compression Plate Position Number")	1	U		UNIT = EV (1, UCUM, "no units")
4		NUMERIC	EV (130660, DCM, "Abdominal Compression Belt Length")	1	U		Units = EV (mm, UCUM, "mm")
5		NUMERIC	EV (130661, DCM, "Abdominal Compression Belt Pressure")	1	U		Units = EV (Pa, UCUM, "Pa")

Row 2	The values of this row refers to angles that are device-specific and are not defined based on a standardized coordinate system.
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TID 15306 PATIENT SETUP ALIGNMENT DEVICE PARAMETERS**Type: Extensible****Order: Non-Significant****Root: No**

	NL	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1		TEXT	EV (130657, DCM, "Couch Index Label")	1	U		
2		COMPOSITE	EV (130662, DCM, "Referenced Patient Alignment Reference")	1-n	U		
3		CODE	EV (130666, DCM, "Radiotherapy Fiducial")	1	U		BCID 7112 "Radiotherapy Fiducials"

Content Item Descriptions

Row 2	Composite Instances to be used by a treatment setup device, such as a reference surface mesh to be used by an optical surface scanner.
Row 3	Fiducials used in radiotherapy procedures e.g. as a reference location during laser setup.

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

DICOM CONTROLLED TERMINOLOGY DEFINITIONS (NORMATIVE)

Code Value	Code Meaning	Definition	Notes
130630	Isocentric Setup Method	Method to position the patient such that the device isocenter is at a specific location in the patient. For a radiotherapeutic treatment, this allows rotational delivery of radiation treatment fields that maintain a focus on that location.	
130631	Controlled SSD Setup Method	Method to position the patient such that the distance between the radiation source and the patient skin is a specific value.	
130632	TBI Setup Method	Method to position the patient at an extended distance from the radiation source, typically 2-6 meters, to create a large treatment field for total body irradiation (TBI).	

130633	Stereotactic Setup Method	Method to position the patient using high-accuracy localization imaging from multiple angles. Typically combined with rigorous fixation to reduce patient motion.	
130634	Skin Apposition Setup Method	Method to position the patient using three-dimensional skin surface registration.	
130635	Ocular Gaze Setup Method	Method to set up the patient for ocular treatments by focusing the patient's gaze on a particular location.	
130636	Patient Shielding Procedure	Preparation procedure to set up devices to shield parts of the patient from radiation.	
130637	Patient Fixation Procedure	Preparation procedure to set up devices to fixate parts of the patient. Fixation involves both preventing motion of the patient part and putting the patient part into an intended configuration.	
130638	Patient Alignment Procedure	Preparation procedure to orient and position parts of the patient with respect to a physical reference.	
130639	Patient Motion Management Setup Procedure	Preparation procedure for controlling or compensating for motion of parts of the patient.	
130640	Cavity radiation shield	Device to protect anatomical structures within a body cavity.	
130641	Independent radiation shield	A radiation shielding device that is not in contact with the patient or the treatment delivery device.	
130642	Optical Distance Meter	An optical distance measuring device.	
130643	Mechanical Pointer	A mechanical distance measuring device.	
130644	Radiofrequency Transponder	Radiofrequency-based positioning beacon that responds to interrogation.	
130645	Infrared Marker	A device that reflects infrared light. Often used to position patients.	
130646	Radioactive Marker	A device that emits radiation from a radioactive source. Often used to position patients.	
130647	Thermal Imager	A device that produces a temperature map.	

130648	Combined Structured Light/Thermal Imager	A device that projects a controlled pattern of light and captures data based on infrared and visible light measurements.	
130649	Ocular Fixation Light	A light to which the patient's gaze is aligned.	
130650	Coaching Device	Device to help patients to follow certain instructions.	
130651	Patient Distraction Device	Device to hold the attention of the patient. May be used to reduce the anxiety or discomfort of the patient during a procedure.	
130652	Collision checks	Procedure to minimize risk of collision between a primary device, the patient, and associated devices.	
130653	Breast Bridge	Device used to position the breast.	
130654	Abdominal Compression Belt	Belt used to limit abdominal motion by compressing the abdomen.	
130655	Abdominal Compression Arch	Arch-shaped device used to limit abdominal motion by maintaining pressure on the abdomen.	
130656	Head Fixation Board	A board to which the patient's head is fixed to prevent the patient from moving relative to the tabletop. Typically the patient's head is fixed with a mask.	
130657	Couch Index Label	A label designating a specific location on an patient support table top.	
130658	Fixation Device Angle	Positioning angle on a fixation device with a single degree of angular freedom.	
130659	Abdominal Compression Plate Position Number	The number indicating the position of the plate of an abdominal compression device.	
130660	Abdominal Compression Belt Length	Length of the part of the abdominal compression belt being used to compress the abdomen.	
130661	Abdominal Compression Belt Pressure	Pressure applied to the abdomen by the abdominal compression belt.	
130662	Referenced Patient Alignment Reference	References to SOP Instances providing the basis for patient alignment. May contain the intended orientation. The basis for alignment is also referred to as the alignment reference.	

130663	RT Radiation previously delivered	The RT Radiation has been already delivered in a previous Treatment Session.	
130664	Treatment unnecessary	It has been assessed that the delivery of the Treatment is unnecessary to meet the current treatment goals.	
130665	Treatment exceeds patient tolerance	It has been assessed that the delivery of the Treatment would result in effects that exceed the physical or psychological tolerance of the patient.	
130666	Radiotherapy Fiducial	Fiducial defined or used during a radiotherapeutic procedure, e.g. treatment planning or positioning.	