Data Elements in DICOM Header

	Concept Name	DICOM Tag	Description
1	SOP Instance UID	(0008,0018)	Unique identifier for the Study of the Contributing SOP Instances.
2	Study Date	(0008,0020)	Date the Study started, if any previous procedure steps within the same study have already been performed.
3	Acquisition Date	(0008,022)	The date the acquisition of data that resulted in sources started.
4	Study Time	(0008,0030)	The time the acquisition of data that resulted in sources started.
5	Modality	(0008,0060)	Type of equipment that originally acquired the data used to create the images in this Series.
6	Manufacturer	(0008,0070)	Manufacturer of the equipment that produced the sources.
7	Institution Name	(0008,0080)	Institution or organization to which the identified individual is responsible or accountable.
8	Institution Address	(0008,0081)	Mailing address of the institution or organization to which the identified individual is responsible or accountable.
9	Station Name	(0008,1010)	An institution defined name for the modality on which the Scheduled Procedure Step is scheduled to be performed.
10	Study Description	(0008,1030)	Description of the Study
11	Series Description	(0008,103e)	Description of the Series
12	Manufacturer's Model Name	(0008,1090)	Manufacturer’s model name of the equipment that produced the sources.
13	Patient's Sex	(0010,0040)	Sex of the named patient. Enumerated Values: M = male F = female O = other

14	Patient's Age	(0010,1010)	Age of the Patient.
15	PatientSize	(0010,1020)	Size of the Patient.
16	PatientWeight	(0010,1030)	Weight of the Patient.
17	Body Part Examined	(0018,0015)	Text description of the part of the body examined.
18	Study Instance UID	(0020,000d)	Unique identifier for the Study of the Contributing SOP Instances.
19	Data Collection Diameter	(0018,0090)	Data Collection Diameter.
20	Series Instance	(0020,000e)	Unique identifier of the Series.
21	Series Number	(0020,0011)	A number that identifies this Series.
22	Instance Number	(0020,0013)	A number that identifies this image.

Data Elements in DICOM CT Dose SR

	Concept Name	Value Set Constraint	Description
1	X-ray Radiation Dose Report		
2	Procedure reported	Computed Tomography X-ray	
3	Has Intent	Procedure Intent	
4	Observer Context		The observer context may include both a Person Observer identification, as well as the identity of the equipment providing the values for the irradiation event (Device Observer identification), if not inherited.
5	Start of X-ray Irradiation		Start, Date Time of the first CT Irradiation Event of the accumulation
6	End of X-ray Irradiation		End, Date Time of the last CT Irradiation Event of the accumulation
7	Scope of Accumulation	Scope of Accumulation	
8	UID Types		
9	CT Accumulated Dose Data		
10	CT Irradiation Event Data		
11	Comment		
12	Source of Dose Information	Source of CT Dose Information	The primary source of information from which this dose object was constructed.
13	Person Participant	Irradiation Authorizing	The physician responsible for determining that the irradiating procedure was appropriate for the indications. The value may come from Requesting Physician (0032,1032), Requesting Physician Identification Sequence (0032,1031) or somewhere else based on hospital policies.

TID 10012
CT ACCUMULATED DOSE DATA

	Concept Name	**Value Set Constraint**	
1	CT Accumulated Dose Data		
2	Total Number of Irradiation Events	Units = events	Total Number of CT irradiation events . A CT irradiation event is one continuous irradiation procedure and is defined through consistent acquisition parameters. In the case of dose modulation the calculations are based on the effective parameters (e.g. the effective mA recorded in the Mean X-ray Tube Current), and these acquisition parameters are consistent.
3	CT Dose Length Product Total	Units =mGycm	The Dose Length Product (DLP) is calculated for every irradiation event. The Dose Length Product Total is the sum of the DLP values. The calculation is based on the $CTDI_{vol}$ result of each irradiation event.
4	CT Effective Dose Total	Units =mSv	Effective dose (E, in units of mSv) evaluated as a total over the scope is defined in Row 6 of template TID 10011. Effective dose is defined by the reference in Rows 5 or 6 of this template. It may be calculated from a product of DLP and an 'Effective Dose Conversion Factor' (E/DLP). Or it may be calculated from a product of the Mean CTDIfree air and the ratio E/CTDIfree air. The ratios E/DLP or E/CTDIfree air may be evaluated either from computer simulations applying Monte Carlo (MC) sampling techniques or from dosimetric measurements in an anthropomorphic phantom, e.g., the Alderson-Rando phantom.. The specific method used is identified in Rows 7 through 11.
5	Reference Authority		Reference of the base publication defining the Effective Dose, either as a coded value, or a textual bibliographic reference. ICRP Publications shall be referenced using their assigned coded values.
6	Reference Authority	CT Dose Reference Authority	Reference of the base publication defining the Effective Dose, either as a coded value, or a textual bibliographic reference. ICRP Publications shall be referenced using their assigned coded values.

7	Measurement Method	Effective Dose Evaluation Method	Description of the method used for Effective Dose evaluations.
8	Patient Model		Description of the reference-patient mathematical or computational model used when Effective Dose is derived via Monte Carlo simulations of radiation transport in such models. Examples of publications which specify particular reference patient models are NUREG/CR-1159, ORNL/NUREG/TM-367 (1980); NRPB-R186 (1985); GSF-Bericht S-885 (1986); Fill et al., Health Physics Vol. 86 (3): 253-272 (2004).
9	Condition Effective Dose measured		Description of the condition Effective Dose measured
10	Effective Dose Phantom Type		Type of Effective Dose phantom used, e.g. Alderson-Rando
11	Dosimeter Type		Type of dosimeter used, e.g. TLD (Thermo Luminescence Dosimeter)
12	Comment		

TID 10013 CT Irradiation Event Data

A CT irradiation event is the occurrence of irradiation being applied to a patient in single continuous time-frame between the start (release) and the stop (cease) of the irradiation. Any on-off switching of the radiation source during the event shall not be treated as separate events; rather the event includes the time between start and stop of radiation as triggered by the user, e.g., a single sequence of scanning comprised of multiple slices acquired with successive tube rotations and table increments shall be treated as a single irradiation event. Depending on the examination workflow and the anatomical target region the CT irradiation event data may split into multiple instances of this template for better dose estimation. The irradiation event is the “smallest” information entity to be recorded in the realm of Radiation Dose reporting. Individual Irradiation Events are described by a set of accompanying physical parameters that are sufficient to understand the “quality” of irradiation that is being applied. This set of parameters may be different for the various types of equipment that are able to create irradiation events.

TID 10013
CT IRRADIATION EVENT DATA

	Concept Name	**Value Set Constraint**	
1	CT Acquisition		
2	Acquisition Protocol		User-defined type of clinical acquisition protocol for creating images or image-derived measurements. May be taken from Protocol Name (0018,1030) or from Performed Procedure Step Description (0040,0254).
3	Target Region	CT and MR Anatomy Imaged	The target region is the anatomy exposed.
4	CT Acquisition Type	CT Acquisition Types	Description of the method used during acquisition of this CT irradiation event, may be derived from Acquisition Type (0018,9302).
5	Procedure Context	Contrast Imaging Technique	The acquisition was performed with or without contrast medium application.
6	Irradiation Event UID		
7	CT Acquisition Parameters		
8	Exposure Time	Units = s	Total time the patient has received X-ray exposure during the irradiation event.

9	Scanning Length	Units = mm	For Spiral scanning, the scanning length is normally the table travel in mm during the tube loading. For Sequenced scanning, the scanning length is the table travel between consecutive scans times the number of scans. For Stationary and Free scanning, the scanning length is the nominal width of the total collimation.
10	Nominal Single Collimation Width	Units = mm	The value of the nominal width (referenced to the location of the isocenter along the z axis) of a single collimated slice in mm.
11	Nominal Total Collimation Width	Units = mm	The value of the nominal width (referenced to the location of the isocenter along the z axis) of the nominal total collimation in mm over the area of active X-ray detection (z-coverage).
12	Pitch Factor	Units = ratio	Pitch Factor: For Spiral Acquisition, the Pitch Factor is the ratio of the Table Feed per Rotation to the Nominal Total Collimation Width. For Sequenced Acquisition, the Pitch Factor is the ratio of the Table Feed per single sequenced scan to the Nominal Total Collimation Width.
13	Number of X-ray Sources	Units = X-ray sources	
14	CT X-ray Source Parameters		CT X-ray source parameters related to the acquisition. For each X-ray source an item must be present.
15	Identification Number of the X-ray Source		Identification Number of the X-ray source. Identifies the particular X-ray source (in a multi-source CT system) for which the set of X-ray source parameter values is reported.
16	KVP	Units = kV	KVP value as measured/recorded by system.
17	Maximum X-ray Tube Current	Units = mA	
18	X-Ray Tube Current	Units = mA	Mean tube current as measured/recorded by system.
19	Exposure Time per Rotation	Units = s	Exposure time as measured/recorded by the system per rotation.

20	X-ray Filter Aluminum Equivalent	Units = mm	Thickness of an equivalent filter constructed from aluminum, in case of multi source CT systems AND if Row 4 is not present
21	CT Dose		CT Dose for one acquisition
22	Mean CTDIvol	Units = mGy	"Mean $CTDI_{vol}$" refers to the average value of the $CTDI_{vol}$ applied within this acquisition. $CTDI_{vol}$ is the volume $CTDI_w$, where $CTDI_w$ is the weighted computed tomography dose index 100 as defined in IEC 60601-2-44. For Sequenced and Spiral scanning, $CTDI_{vol} = CTDI_w$/Pitch Factor. For Stationary and Free scanning, $CTDI_{vol} = CTDI_w \times$ Cumulative Exposure Time/ Exposure Time Per Rotation. According to IEC 60601-2-44 Ed 3 for Constant Angle Acquisition may be calculated as CTDIvol = (CTDIw / Current Time Product (mAs)) x X-ray Tube Current (mA) x (Nominal Total Collimation Width (mm) / Table Speed (mm/s)). Note: The ratio CTDIw / Current Time Product is evaluated independently of the Constant Angle Acquisition but with the same settings of tube voltage and Total Collimation Width as those of the Constant Angle Acquisition. See also CTDIvol (0018,9345) and Spiral Pitch Factor (0018,9311) in the Enhanced CT Information Object Description (PS 3.3).
23	CTDIw Phantom Type	Phantom Devices	The type of phantom used for CTDI measurement according to IEC 60601-2-44 (e.g. Head 16 cm diameter PMMA, Body 32 cm diameter PMMA).
24	CTDIfreeair Calculation Factor	Units = mGy/mAs	The $CTDI_{free\ air}$ Calculation Factor is the $CTDI_{free\ air}$ per mAs, expressed in units of mGy/mAs. The $CTDI_{free\ air}$ Calculation Factor may be used in one method calculating Dose. For example, for this acquisition, Effective Dose = Mean X-ray Tube Current $\times$ Cumulative Exposure Time $\times$ $CTDI_{free\ air}$ Calculation Factor $\times$ (Effective Dose/ $CTDI_{free\ air}$).
25	Mean CTDIfreeair	Units = mGy	Mean $CTDI_{free\ air}$ is the mean CTDI for this acquisition, evaluated free-in-air according to IEC 60601-2-44. Mean $CTDI_{free\ air}$ = Mean X-ray Tube Current $\times$ Cumulative Exposure Time $\times$ $CTDI_{free\ air}$ Calculation Factor. The $CTDI_{free\ air}$ may be used in one method of calculating Effective Dose.

26	DLP	Units = mGycm	For Spiral scanning, DLP = $CTDI_{vol} \times$ Scanning Length. For Sequenced scanning, DLP = $CTDI_{vol} \times$ Nominal Total Collimation Width $\times$ Cumulative Exposure Time / Exposure Time per Rotation. For Stationary and Free scanning, DLP = $CTDI_{vol} \times$ Nominal Total Collimation Width (according to IEC 60601-2-44).
27	Effective Dose	Units = mSv	Effective Dose in mSv of the single continuous time-frame of the irradiation computed as described in TID 10012.
28	Measurement Method	Effective Dose Evaluation Method	
29	Effective Dose Conversion Factor	Units = mSv/mGycm	The Effective Dose Conversion Factor is the ratio of the Effective Dose to the DLP, expressed in units of mSv/mGycm, and it is used as a factor in one method of estimating Effective Dose. Monte Carlo Simulations (or dosimetric measurements in an anthropomorphic phantom, e.g., the Alderson-Rando phantom) may be used as a basis for the evaluation of Effective Dose Conversion Factors.
30	X-ray Modulation Type		The type of exposure modulation. May use the value of Exposure Modulation Type (0018,9323) from CT Exposure Macro or from CT Image Module.
31	Comment		
32	Person Participant	Irradiation Administering	People responsible for the administration of the radiation reported in the irradiation event. May include values which would appear in Performing Physicians' Name (0008,1050), Performing Physician Identification Sequence (0008,1052), Operators' Name (0008,1070) and/or Operator Identification Sequence (0008,1072).
33	Device Participant	Irradiating Device	The device which produced the irradiation in this Irradiation Event. I.e. the CT scanner.