

Xt-EHR T7.2 Sub-team for Imaging Reports Model

Xt-EHR Analysis Platform

Document: xt-ehr-imaging-study-elements

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Analysis based on PARROT v1.0 dataset and Xt-EHR FHIR Implementation Guide

Xt-EHR Imaging Study Data Elements Analysis

Source Model: EHDSImagingStudy v0.2.1 **Analysis Date:** October 2025 **Model Version:** Xt-EHR FHIR IG v0.2.1 (October 10, 2025)

Model Overview

The Xt-EHR Imaging Study model (EHDSImagingStudy) provides the structure for DICOM study metadata and organization within imaging reports. This model facilitates location of available images and organizes information according to the established imaging study framework.

Model Reference

fsh Logical: EHDSImagingStudy Parent: EHDSDataSet Title: "Imaging study model" Description: ""Imaging study model includes the key information about the content of an imaging study. It does not include image pixels but includes location pointers to its image content and organises this information according to the well-established model of an imaging study made of one or more series and each series made of instances or images. Composed of a set of data (DICOM KOS) that facilitates the location of all available images.""

Source: imagingStudy.fsh

Legend

Cardinality: - 1..1 = Required (exactly one) - 1..* = Required (one or more) - 0..1 = Optional (zero or one) - 0..* = Optional (zero or more) - **Base Elements:** Elements with Status="Base" (fundamental to the model)

Header Section (Required: 1..1)

Core Header Elements (Base)

Element	Path	Cardinalit y	Status	Type	Description
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Subject	`header.subject`	1..1	Base	EHDSPatient	Patient/subject information
Identifier	`header.identifier`	1..*	Base	Identifier	DICOM Study Instance UID and other identifiers
Authorship	`header.authorship`	1..*	Base	Base	Resource authoring details
Author	`header.authorship.author[x]`	1..1	Base	Choice	Author(s) who created the resource
Authoring DateTime	`header.authorship.datetime`	1..1	Base	dateTime	Date and time of authoring/issuing
Status	`header.status`	1..1	Base	CodeableConcept	Status of the resource or document

Optional Header Elements (Base)

Element	Path	Cardinality	Status	Type	Description
Last Update	`header.lastUpdate`	0..1	Base	dateTime	Date and time of the last update
Status Reason	`header.statusReason[x]`	0..1	Base	Choice	Reason for the current status
Language	`header.language`	0..1	Base	CodeableConcept	Language in which the resource is written

Study Level Elements

Core Study Information (Base)

Element	Path	Cardinality	Status	Type	Description
Modality	`modality`	0..*	Base	CodeableConcept	All distinct values for series modalities
Encounter	`encounter`	0..1	Base	EHDSEncounter	Associated encounter reference
Started	`started`	0..1	Base	dateTime	Date and time the study started
Based On	`basedOn`	0..*	Base	EHDSServiceRequest	Diagnostic requests that resulted in this study
Number of Series	`numberOfSeries`	0..1	Base	integer	Number of Series in the Study
Number of Instances	`numberOfInstances`	0..1	Base	integer	Number of SOP Instances in Study
Description	`description`	0..1	Base	string	Institution-generated description of the study
Study Custodian	`studyCustodian`	0..1	Base	EHDSEntity	Organisation information
Study Endpoint	`studyEndpoint`	0..1	Base	EHDSEndpoint	Technical details for study access

Series Level Elements (Optional: 0..*)

Core Series Information (Base)

Element	Path	Cardinality	Status	Type	Description
Series UID	`series.seriesUid`	1..1	Base	Identifier	DICOM Series Instance UID
Acquisition Modality	`series.acquisitionModality`	1..1	Base	CodeableConcept	Modality used for this series
Number	`series.number`	0..1	Base	integer	Numeric identifier of this series
Description	`series.description`	0..1	Base	string	Human readable summary of the series
Number of Instances	`series.numberOfInstances`	0..1	Base	integer	Number of Series Related Instances
Series Endpoint	`series.seriesEndpoint`	0..1	Base	EHDSEndpoint	Technical details for series access
Body Site	`series.bodySite`	0..1	Base	EHDSSBodyStructure	Body part (with laterality) examined
Specimen	`series.specimen`	0..*	Base	EHDSSpecimen	Specimen imaged

Started	`series.started`	0..1	Base	dateTime	When the series started
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Instance Level Elements (Optional: 0..*)

Core Instance Information (Base)

Element	Path	Cardinality	Status	Type	Description
Instance UID	`series.instancesInTheSeries.instanceUid`	1..1	Base	Identifier	DICOM SOP Instance UID
SOP Class	`series.instancesInTheSeries.sopClass`	1..1	Base	uri	DICOM class type
Instance Title	`series.instancesInTheSeries.instanceTitle`	0..1	Base	string	Description of the instance
Instance Number	`series.instancesInTheSeries.instanceNumber`	0..1	Base	integer	Number of this instance in the series
Number of Frames	`series.instancesInTheSeries.numberOfFrames`	0..1	Base	integer	Number of frames in multiframe instance

Element Categories by Usage Level

Always Required Elements (6 elements)

header.subject (1..1) - Patient information 2. **header.identifier** (1..) - *Study identifiers including DICOM UID* 3. **header.authorship** (1..) - Authoring details 4. **header.authorship.author[x]** (1..1) - Author information 5. **header.authorship.datetime** (1..1) - Authoring timestamp 6. **header.status** (1..1) - Resource status

Conditionally Required Elements (2 elements)

series.seriesUid (1..1) - Required if series present 2. **series.acquisitionModality** (1..1) - Required if series present 3. **series.instancesInTheSeries.instanceUid** (1..1) - Required if instance present 4. **series.instancesInTheSeries.sopClass** (1..1) - Required if instance present

Optional Study-Level Elements (9 elements)

header.lastUpdate (0..1) 2. **header.statusReason[x]** (0..1) 3. **header.language** (0..1) 4. **modality** (0..) 5. **encounter** (0..1) 6. **started** (0..1) 7. **basedOn** (0..) 8. **numberOfSeries** (0..1) 9. **numberOfInstances** (0..1) 10. **description** (0..1) 11. **studyCustodian** (0..1) 12. **studyEndpoint** (0..1)

Optional Series-Level Elements (7 elements)

series.number (0..1) 2. **series.description** (0..1) 3. **series.numberofInstances** (0..1) 4. **series.seriesEndpoint** (0..1) 5. **series.bodySite** (0..1)
6. **series.specimen** (0..) 7. *series.started** (0..1)

Optional Instance-Level Elements (3 elements)

series.instancesInTheSeries.instanceTitle (0..1) 2. **series.instancesInTheSeries.instanceNumber** (0..1) 3.
series.instancesInTheSeries.numberOfFrames (0..1)

Summary Statistics

Required Elements: 6-10 elements

Always Required: 6 elements - **Conditionally Required:** 4 elements (when hierarchical levels are present)

Optional Elements: 21 elements

Study Level Optional: 12 elements - **Series Level Optional:** 6 elements - **Instance Level Optional:** 3 elements

Total Base Elements: ~27 elements

Usage Characteristics

Technical/Metadata Elements (High Priority)

Study, Series, and Instance UUIDs - Modality information - Timestamps - Patient identification - Status information

Administrative Elements (Medium Priority)

Encounter references - Service requests - Organization information - Endpoints for data access

Descriptive Elements (Lower Priority)

Descriptions and titles - Numbers and counts - Additional metadata

Clinical Context Elements (Variable Priority)

Body site information - Specimen details - Clinical associations

Notes

The model follows DICOM hierarchy: Study → Series → Instance - Required elements focus on core identification and technical metadata - Many optional elements provide enhanced metadata for interoperability - DICOM UIDs are critical for technical implementation - Series and Instance levels may be completely absent in summary use cases - Model is more technical/metadata-focused compared to the clinical focus of ImagingReport