

medavis Interface to Dose Management Systems

Released as
V2.1

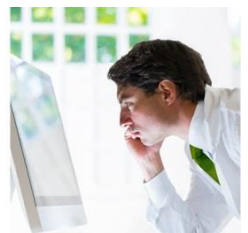
RADIOLOGY
WORKFLOW
MANAGEMENT



OPTIMISED
WORKFLOW



MAXIMUM
EFFICIENCY



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Introduction

medavis wants to assist its users in implementing the directive 2013/59/EURATOM of the Council of Europe from 05.12.2013 by integrating the registered dose values into the radiological workflow. This will result in reduced effort for registering dose values and optimize the examination quality. We believe the main functionality in this area is provided best by using an external dose management system.

This document describes the technical interface and the requirements for integrating the dose management systems available on the market.

The related IHE profiles mainly use DICOM SR. For the relevant use case - dose management to RIS communication - with the transmission of essential data for the report only full support of DICOM SR is unnecessary complexity. HL7 uses mainly a PUSH concept by design. For the use case discussed here, a PULL concept is more reasonable.

An electronic API description (swagger file) and samples are available. With this, the definition can be taken over into your software automatically.

Scope of Services

The integration of external dose management systems in medavis RIS has different parts.

- 1) Automatic integration of the dose parameters into the report when opening / Start reporting in table view
 - a) Manual query, update of the values during reporting
Realization through the dose management API described below
- 2) Call of the external system on examination and patient level via http call
 - a) For the technician carrying out the examination
 - b) For the reporting physician while dictating the report
Realization through the http interface described below
- 3) Optional - Transmission of patient data including parameters weight, age and sex to the respective dose management system. Patients have to be registered in RIS (e.g. common patient ID)
Realization through ADT interface

HL7 ADT Interface

The ADT interface allows a patient data feed from medavis RIS to the dose management system. The ADT interface is described in our separate HL7 Conformance Statement and will be set up by our support if necessary.

Http Call Interface

In RIS, buttons / shortcuts can be assigned to an http call. Most dose management systems provide a web interface. The call can transmit parameters on patient level e.g. patient name, patient ID. On examination level the StudyInstanceUID or the Accession Number. The dose management system can display the data for the respective context. Further interactions or return of values to medavis RIS are currently not planned.

Dosemanagement API (DICOM coding)

This API is a proposal for connecting Dose Information Consumer systems (e.g. RIS) to query dosis values from Dose Information Reporter systems.

Version 1.1.0

Endpoints

- `getDoseValuesByAccessionNumber`
- `getDoseValuesByPatientIdentifier`
- `getDoseValuesBySeriesInstanceUID`
- `getDoseValuesByStudyInstanceUID`

Models

- ConceptNameCodeSequence
- DoseValue
- MeasuredValueSequence
- NumericValue

Endpoints

getDoseValuesByAccessionNumber

GET

```
get /dosemanagement/accessionNumber/{accessionNumber}
```

Summary: Returns dose values for the given accession number

Description:

Parameters

Path Parameters

Name	Description	Required	Default	Pattern
accessionNumber	Accession number for which the dose values should get returned			

Responses

Status Code: 200

Message: Successful operation

Response Type
DoseValueResponse

See #models

Response Schema
<pre>{ "description": "Successful operation", "schema": { "\$ref": "#/definitions/DoseValueResponse" } }</pre>

Status Code: 400

Message: Invalid accession number supplied

Response Type

See #models

Response Schema
<pre>{ "description" : "Invalid accession number supplied" }</pre>

Status Code: 404

Message: Accession number not found

Response Type

See #models

Response Schema
<pre>{ "description" : "Accession number not found" }</pre>

getDoseValuesByPatientIdentifier

GET

```
get /dosemanagement/patient/{issuerOfPatientId}/{patientId}
```

Summary: Returns dose values for the given Patient**Description:**

Parameters

Path Parameters

Name	Description	Required	Default	Pattern
issuerOfPatientId	Organization that issued the Patient ID			
patientId	An identifier that references the patient in the Dose Information			

	Reporter system. (PatientID, e.g. \"ID-567\")			
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Responses

Status Code: 200

Message: Successful operation

Response Type
DoseValueResponse

See #models

Response Schema
<pre>{ "description": "Successful operation", "schema": { "\$ref": "#/definitions/DoseValueResponse" } }</pre>

Status Code: 400

Message: Invalid PatientIdentifier supplied

Response Type

See #models

Response Schema
<pre>{ "description": "Invalid PatientIdentifier supplied" }</pre>

Status Code: 404

Message: Patient not found

Response Type

See #models

Response Schema
<pre>{</pre>

```
"description" : "Patient not found"
}
```

getDoseValuesBySeriesInstanceUID

GET

```
get /dosemanagement/series/{seriesInstanceUID}
```

Summary: Returns dose values for the given SeriesInstanceUID

Description:

Parameters

Path Parameters

Name	Description	Required	Default	Pattern
seriesInstanceUID	SeriesInstanceUID for which the dose values should get returned			

Responses

Status Code: 200

Message: Successful operation

Response Type
DoseValueResponse

See #models

Response Schema
<pre>{ "description" : "Successful operation", "schema" : { "\$ref" : "#/definitions/DoseValueResponse" } }</pre>

Status Code: 400

Message: Invalid SeriesInstanceUID supplied

Response Type

See #models

Response Schema

```
{
  "description": "Invalid SeriesInstanceUID supplied"
}
```

Status Code: 404

Message: Series not found

Response Type

See #models

Response Schema

```
{
  "description": "Series not found"
}
```

getDoseValuesByStudyInstanceUID

GET

```
get / dosemanagement/study/{studyInstanceUID}
```

Summary: Returns dose values for the given StudyInstanceUID**Description:**

Parameters

Path Parameters

Name	Description	Required	Default	Pattern
studyInstanceUID	StudyInstanceUID for which the dose values should get returned			

Responses

Status Code: 200

Message: Successful operation

Response Type

DoseValueResponse

See #models

Response Schema

```
{
  "description" : "Successful operation",
  "schema" : {
    "$ref" : "#/definitions/DoseValueResponse"
  }
}
```

Status Code: 400

Message: Invalid StudyInstanceUID supplied

Response Type

See #models

Response Schema
<pre>{ "description" : "Invalid StudyInstanceUID supplied" }</pre>

Status Code: 404

Message: Study not found

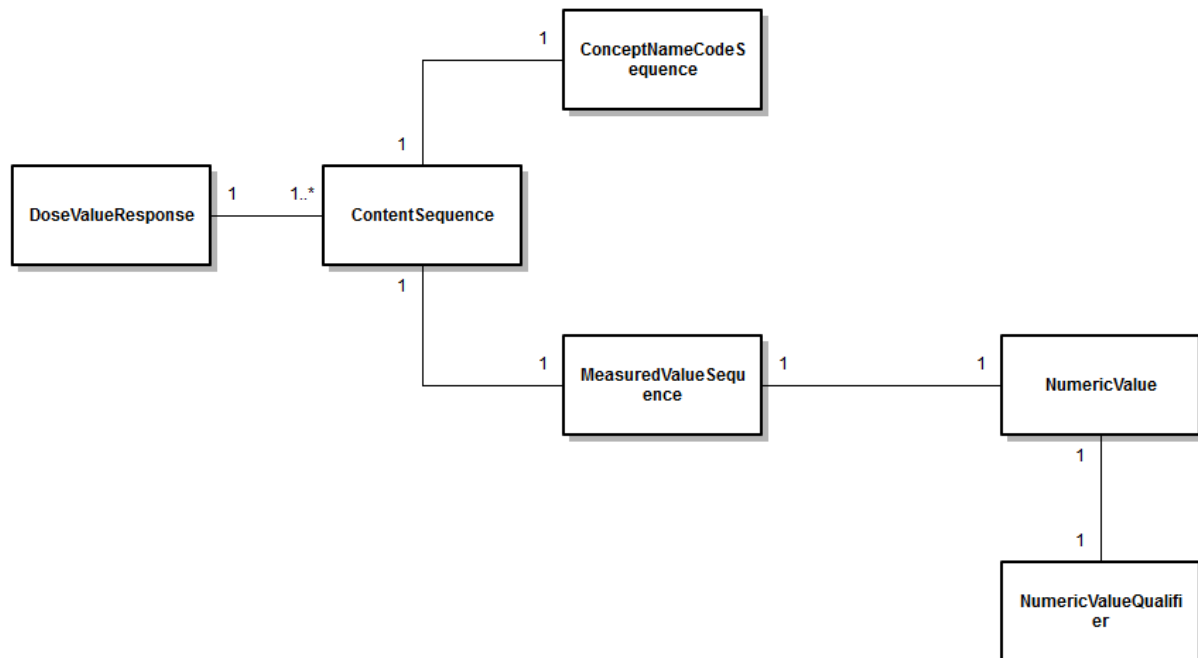
Response Type

See #models

Response Schema
<pre>{ "description" : "Study not found" }</pre>

Models

Naming is close to DICOM SR. However we do not define a complete DICOM SR here!



DoseValueResponse

Field Name	Required	Type	Description
doseValues	R	Array of ContentSequence	

ContentSequence

Field Name	Required	Type	Description
conceptNameCodeSequence	R	ConceptNameCodeSequence	
measuredValueSequence	R	MeasuredValueSequence	

ConceptNameCodeSequence

Field Name	Required	Type	Description
codeMeaning	O	String	Meaning of the code sequences e.g. 'Entrance Exposure at RP', may be used for display

codeValue	R	String	Subset of DICOM CID 10050 e.g. '111636' (see DICOM Part 16) see*
codeSchemeDesignator	R	String	DCM
codeSchemeVersion	O	String	Version of code sequence e.g. '20150324'

* For the radiology report we expect one of the following codes, display name may be English or German:

113507: ADisplayName := 'Applizierte Aktivität';

111636: ADisplayName := 'Eingangsdosis';

111637: ADisplayName := 'Mittlere Parenchyndosis (AGD)';

113722: ADisplayName := 'Dosisflächenprodukt (DAP)';

113813: ADisplayName := 'Dosislängenprodukt (DLP)';

113839: ADisplayName := 'Effektive Dosis';

MeasuredValueSequence

Field Name	Required	Type	Description
codeMeaning	O	String	Name of the unit of the measured value e.g. 'mGy', may be used for display.
codeValue	R	String	DICOM CID 82 Units of Measurement e.g. 'mGy'
codeSchemeDesignator	O	String	System of code (always 'UCUM')
codeSchemeVersion	O	String	Version of Code Sequence e.g. '1.4'
start	R	String	Start of X-ray irradiation, format: date/time as defined in https://tools.ietf.org/html/rfc3339#section-5.6 (is quite similar to: DICOM Value Representation DT See Part 5)
end	O	String	End of X-Ray Irradiation, format: date/time as defined in https://tools.ietf.org/html/rfc3339#section-5.6 (is quite similar to: DICOM Value Representation DT See Part 5)
value	R	Numeric Value	

NumericValue

Field Name	Required	Type	Description
numericValueQualifier	C*	Numeric ValueQualifier	
codeSchemeVersion	O	String	Version of numeric value qualifier e.g. '20020114'
numericValue	R	String	Measured value e.g. '8009.54'

*In case there is no numericValue available the idea is to add a code like "114010 Value unknown" and send an empty string in numericValue.

NumericValueQualifier

Field Name	Required	Type	Description
codeMeaning	O	String	Alternative for numeric value in case no reasonable numeric value is available. e.g. 'Positive Infinity', may be used to be displayed.
codeValue	R	String	From DICOM CID 42 Numeric Value Qualifier
codeSchemeDesignator	R	String	DCM