

ACC, HIMSS and RSNA
Integrating the Healthcare Enterprise



5

IHE Cardiology Technical Framework Supplement 2007-2008

10

Displayable Reports (DRPT) Integration Profile

**Major Revision resulting from
2005-2006 Trial Implementation**

15

Trial Implementation Version 31

20	IHE Cardiology Technical Framework.....	0
	Supplement 2007-2008.....	0
	Trial Implementation Version 31.....	0
	1. Foreword.....	4
	2. Introduction.....	5
25	2.1. Selection of a Standard.....	5
	2.2. Open Issues and Questions.....	6
	2.3. Closed Issues.....	6
	Changes to Volume I – Integration Profiles.....	8
	1.7 IHE Cardiology Current Year Scope.....	8
30	2.2.4 Displayable Reports (DRPT).....	9
	6. Displayable Reports (DRPT).....	12
	6.1 Actors/Transactions.....	12
	6.2 DRPT Integration Profile Options.....	14
	6.2.1 DICOM Storage Option.....	14
35	6.2.2 Encapsulated Reports and By-Reference Reports Options.....	15
	6.3 Process Flow.....	15
	6.4 Use Cases.....	18
	Case R1: Report manager provides local storage and distribution of reports.....	18
	Case R2: Image manager/archive provides storage and distribution of reports.....	18
40	Case R3: Multiple Reports on one Requested Procedure.....	18
	Case R4: Unverified, Preliminary, Final and Corrected Final Reports.....	19
	Case R5: Demographic Update to Stored Reports.....	19
	Appendix Y: Displayable Report Distribution Using the DRPT, RID and XDS Profiles.....	22
	Y.1 Three Repositories.....	23
45	Y.2 Two Repositories – Distributed Enterprise Storage.....	24
	Y.3 Two Repositories – Distributed Enterprise Storage, No DICOM Access.....	25
	Y.4 Two Repositories – Distributed Cross-Enterprise Storage.....	26
	Appendix Z: Displayable Report Signing.....	27
	Changes to Volume 2 – Transactions.....	28
50	4.7 Encapsulated Report Submission [CARD-7].....	28
	4.7.1 Scope.....	28
	4.7.2 Use Case Roles.....	28
	4.7.3 Referenced Standards.....	28
	4.7.4 Interaction Diagram.....	29
55	4.7.4.1 Encapsulated Report Submission.....	29
	4.7.4.1.1 Trigger Events.....	29
	4.7.4.1.2 Message Semantics.....	29
	4.7.4.1.2.1 MSH Segment.....	30
	4.7.4.1.2.2 EVN Segment.....	30
60	4.7.4.1.2.3 PID and PV1 Segments.....	31
	4.7.4.1.2.4 ORC Segment.....	31

	4.7.4.1.2.5	OBR Segment	32
	4.7.4.1.2.6	TXA Segment	33
	4.7.4.1.2.7	OBX for Study Instance UID.....	34
65	4.7.4.1.2.8	OBX for Encapsulated Report	34
	4.7.4.1.3	Expected Actions	36
	4.7.4.2	Encapsulated Report Update.....	36
	4.7.4.2.1	Trigger Events.....	36
	4.7.4.2.2	Message Semantics	37
70	4.7.4.2.2.1	TXA Segment	37
	4.7.4.2.3	Expected Actions	38
	4.7.4.3	Encapsulated Report Submission to Enterprise	38
	4.7.4.3.1	Trigger Events.....	38
	4.7.4.3.2	Message Semantics	38
75	4.7.4.3.2.1	ORC, OBR, and TXA Segments.....	38
	4.7.4.3.2.2	OBX for Study Instance UID.....	39
	4.7.4.3.3	Expected Actions	39
	4.7.4.4	Encapsulated Report Update Submission to Enterprise.....	39
	4.7.4.4.1	Trigger Events.....	39
80	4.7.4.4.2	Message Semantics	39
	4.7.4.4.3	Expected Actions	39
	4.8	Report Reference Submission [CARD-8]	40
	4.8.1	Scope.....	40
	4.8.2	Use Case Roles	40
85	4.8.3	Referenced Standards.....	40
	4.8.4	Interaction Diagram	40
	4.8.4.1	Report Reference Initial Submission	41
	4.8.4.1.1	Trigger Event	41
	4.8.4.1.2	Message Semantics	42
90	4.8.4.1.2.1	TXA Segment	42
	4.8.4.1.2.2	OBX Segment	43
	4.8.4.1.3	Expected Actions	43
	4.8.4.2	Report Reference Update Submission	44
	4.8.4.2.1	Trigger Event	44
95	4.8.4.2.2	Message Semantics	44
	4.8.4.2.2.1	TXA Segment	44
	4.7.4.2.3	Expected Actions	45
	4.9	Encapsulated Report Storage [CARD-9].....	46
	4.9.1	Scope.....	46
100	4.9.2	Use Case Roles	46
	4.9.3	Referenced Standards.....	46
	4.9.4	Interaction Diagram	46
	4.9.4.1	Report Storage	47
	4.9.4.1.1	Trigger Events.....	47
105	4.9.4.1.2	Message Semantics	47

	4.9.4.1.3	Expected Actions	48
	4.10	Encapsulated Report Query [CARD-10].....	49
	4.10.1	.....Scope	49
110	4.10.2	..... Use Case Roles	49
	4.10.3	..... Referenced Standards	49
115	4.10.4	..... Interaction Diagram	49
	4.10.4.1	Query Reports	50
	4.10.4.1.1	Trigger Events.....	50
	4.10.4.1.2	Message Semantics	50
	4.10.4.1.3	Expected Actions	51
120	4.11	Encapsulated Report Retrieve [CARD-11]	52
	4.11.1	.....Scope	52
	4.11.2	..... Use Case Roles	52
125	4.11.3	..... Referenced Standards	52
	4.11.4	..... Interaction Diagram	53
130	4.11.4.1	Retrieve Reports.....	53
	4.11.4.1.1	Trigger Events.....	53
	4.11.4.1.2	Message Semantics	53
	4.11.4.1.3	Expected Actions	54
	4.11.4.2	View Reports	54
135	4.11.4.2.1	Trigger Events.....	54
	4.11.4.2.2	Invocation Semantics	54
	4.11.4.2.3	Expected Actions	54
	Appendix D:	Coded Report Titles	55
	Appendix E:	Specializations of Transactions from other Domains	56

140

1. Foreword

145 Integrating the Healthcare Enterprise (IHE) is an initiative designed to stimulate the integration
of the information systems that support modern healthcare institutions. Its fundamental objective
is to ensure that in the care of patients all required information for medical decisions is both
correct and available to healthcare professionals. The IHE initiative is both a process and a
forum for encouraging integration efforts. It defines a technical framework for the
150 implementation of established messaging standards to achieve specific clinical goals. It includes
a rigorous testing process for the implementation of this framework. And it organizes
educational sessions and exhibits at major meetings of medical professionals to demonstrate the
benefits of this framework and encourage its adoption by industry and users.

The approach employed in the IHE initiative is not to define new integration standards, but rather
to support the use of existing standards, HL7, DICOM, IETF, and others, as appropriate in their
respective domains in an integrated manner, defining configuration choices when necessary.
155 IHE maintain formal relationships with several standards bodies including HL7, DICOM and
refers recommendations to them when clarifications or extensions to existing standards are
necessary.

The IHE Technical Frameworks for the various domains (Cardiology, Radiology, IT
Infrastructure, Laboratory, etc.) defines specific implementations of established standards to
160 achieve integration goals that promote appropriate sharing of medical information to support
optimal patient care. It is expanded annually, after a period of public review, and maintained
regularly through the identification and correction of errata. The current version for these
Technical Frameworks may be found at <http://www.ihe.net>.

165 **This supplement to the IHE Cardiology Technical Framework v2.1 is submitted for Trial
Implementation through 2008.**

Comments on this document may be submitted to:

**<http://forums.rsna.org> under the “*IHE - Integrating the Healthcare
Enterprise*” forum**

170 **Select the “*Cardiology Technical Framework Supplements 2007-2008 for Trial
Implementation*” sub-forum.**

**The IHE Cardiology Technical Committee will address comments arising from Trial
Implementation, and will publish a Final Text version in or after June 2008.**

175

2. Introduction

A 2005 Supplement to the IHE Cardiology Technical Framework defined a new Displayable Reports Integration Profile (DRPT). It described a means to distribute “display ready” cardiology clinical reports from the department to the enterprise and beyond.

180 During the Trial Implementation period of June 2005 through March 2006, inconsistencies were noted between the Profile and current understandings for the use of the HL7 Standard. Indeed, finding such inconsistencies is precisely the point of the Trial Implementation period. Therefore, the IHE Cardiology Technical Committee has decided to reissue the Supplement with major changes to the DRPT Profile.

185 Because this reissued Supplement introduces substantive changes to the Profile’s Transactions, the DRPT Profile Connectathon results for 2006 will have a note that the Trial Implementation version of the Profile for that year is substantially different from the Profile in 2007 and subsequent years. It is important to note the following statement in the IHE Cardiology Technical Framework (Vol. 1, Section 1.10.3):

190 Products implemented based on Trial Implementation text are expected to review the subsequent Final Text and update their products as necessary.

2.1. Selection of a Standard

The 2005-2006 Trial Implementation version of this Profile specified that PDF formatted reports would be exchanged using the HL7 v2.3.1 ORU (unsolicited observation) message. However, 195 new in the HL7 v2.5 standard was this language:

If the observation being reported meets one or more of the following criteria, then the content would qualify as a medical document management message (MDM) rather than an observation message (ORU). The reader is referred to the MDM message type in Chapter 9.

- 200
- Documents/reports that require succession management to reflect the evolution of both document addenda and replacement documents. Document succession management is described in HL7 v2.5 Section 9.6.1.17.
 - Documents/reports where the Sender wants to indicate the availability of the report for use in patient care using the availability status present in the TXA segment, as described in Chapter 9.
- 205

...

Using these criteria, the following examples of documents/reports would typically qualify as medical document management (MDM) messages. Note that as clinical content, the following documents/reports typically require succession management and/or report availability, thus would require an MDM message even if the payload utilizes CDA.

210

- History and Physical
- Consultation reports

- 215
- Discharge summaries
 - Surgical/anatomic pathology reports
 - Diagnostic imaging reports
 - Cardio-diagnostic reports
 - Operative reports

220 It was therefore a fundamental error to use ORU rather than MDM for the purposes of this Profile. And, in fact, there were also technical deficiencies with the use of ORU in regard to report document identifiers and document succession. This revised Profile therefore uses the MDM message, which is similar to the ORU, but adds a TXA segment.

225 A second major issue with the 2005-2006 Trial Implementation version of this Profile was the absence of a use case and mechanism for demographic updates to be applied to documents in the repository. While the Radiology Patient Information Reconciliation (PIR) Profile had specified some transactions for this purpose, the more recent IT Infrastructure Patient Administration Management (PAM) Profile specifies a more robust use of HL7 v2.5 ADT messages for this purpose. The revised DRPT Profile therefore requires the grouping of the Report Repository actor with the PAM Patient Demographics Consumer actor for the purpose of these update
230 transactions.

Finally, PDF in its native form cannot guarantee long-term reproducibility of stored documents, therefore recent initiatives to define the format of long term storage of PDF documents has led to a new Standard governing electronic document archiving:
235 ISO-19005-1 - Document management - Electronic document file format for long-term preservation - Part 1: Use of PDF 1.4 (PDF/A-1). This format supports a wide variety of content like text, images, graphics, fonts, color information and much more used in creation of clinical reports. This revised profile therefore requires the use of the new PDF/A format for the transactions in this profile.

2.2. Open Issues and Questions

240

2.3. Closed Issues

1. The scope of the profile includes a Report Repository that is responsible for long-term storage of the report *within the department*. Architectures that use only an Enterprise Report Repository and not any departmental long term storage are not covered by this profile.
- 245 2. There are two options for the departmental long term Report Repository: the Report Manager can manage the storage itself (by grouping with the Report Repository actor) using a proprietary mechanism (including possibly the use of an institutional NAS/SAN/HSM capability), or it can use the capabilities of a DICOM Repository (i.e. PACS).
- 250 3. The Report Repository in this profile must support RID Profile HTTP access to reports. It may also support DICOM Q/R access.

4. The same transaction (CARD-7) is used between the Report Creator and the Report Manager, and between the Report Manager and the Enterprise Report Repository. A Report Creator that supports this profile could thus be hooked directly to such an Enterprise Report Repository (outside the scope of this profile).
- 255 5. The Enterprise Report Repository does not need to be broken up into two actors (Enterprise Report Registry and Enterprise Report Repository) for the two types of messages that will be sent to this actor.
6. There does not need to be an optional DICOM based encapsulated PDF transaction from the Report Creator to the Report Manager. This may be included in a revision to the SINR
260 profile, which has been discussed with the Radiology Technical Committee.
7. The Study Instance UID in an HL7 encapsulation uses an OBX segment (as done in the SINR profile), not the ZDS segment (as done in the SWF profile).
8. The departmental Report Repository is required to be grouped with the Information Source actor of the RID Profile.
- 265 9. HL7 Application-level acknowledgements are not necessary from the Report Manager or the Enterprise Report Repository.
10. It is appropriate to require the ITI-12 (RID) format for URLs; arbitrary application-defined URLs are not allowed in this Profile. Note that the ITI-12 transaction specifies some desirable behavior on the part of the actors.
- 270 11. If the Report Creator and the Report Manager are grouped in a product implementation, that grouping must support the CARD-7 transaction from other Report Creators.
12. It is optional to support query by document title as a matching key for SCP implementation
13. Valid DICOM identifier are required as the document unique identifier by the report creator for TXA-12
- 275 14. Specification of HL7 messages have been updated in the Trial Implementation version to use the current HL7 message profiling style.

Changes to Volume I – Integration Profiles

280 Add the following bullet in section 1.7

1.7 IHE Cardiology Current Year Scope

...

- The Displayable Reports Profile describes mechanisms for the transmission of PDF-formatted clinical reports between report creators, managers, repositories, and displays. This profile describes the departmental production of reports, which can be further distributed using the Retrieve Information for Display and Cross-Enterprise Document Sharing Profiles (defined in the IHE IT Infrastructure Domain).

285

Add the following dependencies in section 2.1

290

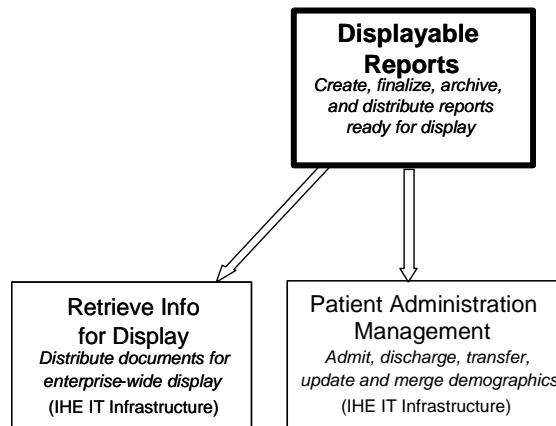


Figure 2-1. IHE Cardiology Integration Profiles and Dependencies

Table 2-1. Cardiology Integration Profiles Dependencies

Integration Profile	Depends on	Dependency Type	Comments
...			
Displayable Reports	ITI-TF Retrieve Info for Display	The Report Repository actor is required to be grouped with Information Source actor	

Integration Profile	Depends on	Dependency Type	Comments
	ITI-TF Patient Administration Management	The Report Repository actor is required to be grouped with Patient Demographics Consumer actor	

295

Add the following summary section 2.2.4

2.2.4 Displayable Reports (DRPT)

300 The Displayable Reports Profile specifies transactions supporting the creation, revision, intra/inter-department transmission, and reading of display-ready clinical reports. In the imaging procedure context, it provides linkage between the report, the imaging and other evidence of the procedure. The report is provided to actors outside the department for broad distribution (e.g., using other profiles).

305 The DRPT Profile requires the use of the Portable Document Format (PDF), which has emerged as a ubiquitous means of encoding documents ready for presentation, including graphical content. For reporting on imaging procedures, especially on cardiac procedures, PDF is able to present the full range of documentation generated by a wide variety of reporting packages. Furthermore, PDF allows the reporting physician to control the “look” of the report, which is important for both clinical and business reasons.

310 *Add the following Actors to the list in section 2.3*

Report Creator – A system that generates and transmits clinical reports.

Report Manager – A system that manages the status of reporting, and distributes reports to report repositories.

315 **Report Reader** – A system that can query/retrieve and view reports encoded as DICOM objects.

Report Repository – A departmental system that receives reports and stores them for long-term access.

Enterprise Report Repository – A system that receives reports and/or references to reports, and stores them for long-term access throughout the healthcare enterprise

320

Add the following Actors to the table in section 2.3

Table 2.3-1. Integration Profile Actors

Actor \ Integration Profile	CATH	ECHO	ECG	<u>DRPT</u>	<u>ED</u>
<u>Department System Scheduler/Order Filler</u>	<u>X</u>	X		<u>X</u>	
...					
Report Creator				<u>X</u>	X
<u>Report Manager</u>				<u>X</u>	
<u>Report Reader</u>				<u>X</u>	
<u>Report Repository</u>				<u>X</u>	
<u>Enterprise Report Repository</u>				<u>X</u>	

325 Add the following Transactions to the list in section 2.4

Encapsulated Report Submission – A Report Creator sends a preliminary, final, or corrected final clinical report to the Report Manager. [CARD-7]

330 **Report Reference Submission** – A Report Manager sends a reference to a report to the Enterprise Report Repository for storage. [CARD-8]

Encapsulated Report Storage – A Report Manager sends a preliminary, final, or corrected final clinical report to the Report Repository. [CARD-9]

Encapsulated Report Query – A Report Reader requests a list of clinical reports known by the Report Repository matching a set of selection criteria. [CARD-10]

335 **Encapsulated Report Retrieve** – A Report Reader requests and retrieves a clinical report from the Report Repository. [CARD-11]

Add the following Transactions to the table in section 2.4

340 **Table 2.4-1. Integration Profile Transactions**

Transaction \ Integration Profile	CATH	ECHO	ECG	<u>DRPT</u>	<u>ED</u>
...					
Storage Commitment [CARD-3]	X	X		<u>X</u>	<u>X</u>
...					
Maintain Time [ITI-1]	(note 1)				
Retrieve Specific Info for Display [ITI-11]			X	(note 2)	
Retrieve ECG List [CARD-5]			X		
Retrieve ECG Document for Display [CARD-6]			X		
<u>Encapsulated Report Submission [CARD-7]</u>				<u>X</u>	

Transaction \ Integration Profile	CATH	ECHO	ECG	<u>DRPT</u>	<u>ED</u>
<u>Report Reference Submission [CARD-8]</u>				<u>X</u>	
<u>Encapsulated Report Storage [CARD-9]</u>				<u>X</u>	
<u>Encapsulated Report Query [CARD-10]</u>				<u>X</u>	
<u>Encapsulated Report Retrieve [CARD-11]</u>				<u>X</u>	
<u>Retrieve Document for Display [ITI-12]</u>				<u>(note 2)</u>	
<u>Patient Identity Feed [ITI-30]</u>				<u>(note 3)</u>	

Notes:

1. The Maintain Time transaction is not formally part of the Cath Workflow Profile, but it is required for the Time Client actor grouped with certain actors in that Profile.
- 345 2. **The Retrieve Specific Info for Display and Retrieve Document for Display, transactions are not formally part of the Displayable Reports Profile, but are required for the Information Source actor grouped with certain actors in that Profile.**
- 350 3. **The Patient Identity Feed transaction is not formally part of the Displayable Reports Profile, but is required for the Patient Demographics Consumer actor grouped with certain actors in that Profile.**

Add the following grouping to the list in section 2.5

In general, a product implementation may incorporate any single actor or combination of actors. However, in the cases specified below, the implementation of one actor requires the implementation of one or more additional actors:

- 355 • **The Report Repository Actor participating in Displayable Reports Integration Profile shall be grouped with the Information Source Actor of the Retrieve Information for Display Profile, and with the Patient Demographics Consumer Actor of the Patient Administration Management Profile.**
- 360 • **The Report Manager Actor participating in Displayable Reports Integration Profile shall be grouped with the Report Repository Actor of that Profile, unless it supports the DICOM Storage Option.**
- 365 • **The Report Repository Actor participating in Displayable Reports Integration Profile shall be grouped with the Report Manager Actor of that Profile, unless it supports the DICOM Storage Option.**

When multiple actors are grouped in a single product implementation, all transactions originating or terminating with each of the supported actors shall be supported (i.e., the IHE transactions shall be offered on an external product interface). The exceptions to this rule are any transactions defined between actors in the required groupings defined above.

370

Add the following new profile

6. Displayable Reports (DRPT)

375 The Displayable Reports Profile specifies transactions supporting the creation, revision, intra/
inter-department transmission, and reading of display-ready clinical reports. In the imaging
procedure context, it provides linkage between the report, the imaging and other evidence of the
procedure. The report is provided to actors outside the department for broad distribution (e.g.,
using other profiles).

380 The DRPT Profile specifies use of the Portable Document Format (PDF), which has emerged as
a ubiquitous means of encoding documents ready for presentation, including graphical content.
For reporting on imaging procedures, especially on cardiac procedures, PDF is able to present
the full range of documentation generated by a wide variety of reporting packages. Furthermore,
PDF allows the reporting physician to control the “look” of the report, which is important for
both clinical and business reasons.

385 This profile does not address a standardized Reporting Worklist Management function. In the
context of reporting on cath lab and similar interventional procedures, there is often not a need
for such Worklist management as reports are created by the performing physician immediately
after the case. Those may be addressed in other profiles.

6.1 Actors/Transactions

390 Figure 6.1-1 diagrams the actors involved with this profile and the transactions between actors.
The Retrieve Information for Display Profile actors and transactions are shown in dashed lines,
since the Report Repository actor in DRPT profile must be grouped with the Information Source
actor in the RID Profile (see Section 2.5).

395 The Patient Administration Management actors and transactions are shown in dashed lines, since
the Report Repository actor in DRPT profile must be grouped with the Patient Demographic
Consumer Actor in the PAM Profile.

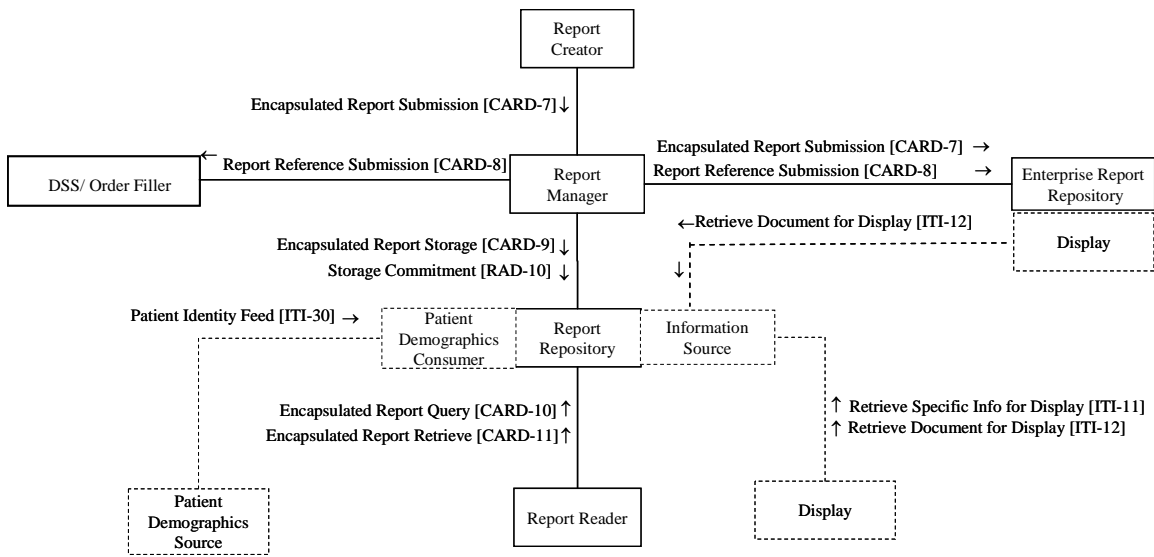


Figure 6.1-1 DRPT Profile Diagram, with RID and PAM Profiles for Reference

400 Table 6.1-1 lists the transactions for each actor directly involved in the DRPT Integration Profile. In order to claim support of this Integration Profile, an implementation must perform the required Transactions (labeled “R”). Transactions labeled “O” are optional. A complete list of options defined by this Integration Profile that implementations may choose to support is listed in Section 6.2.

Table 6.1-1. DRPT – Actors and Transactions

Actors	Transactions	Optionality	Section
Report Creator	Encapsulated Report Submission [CARD-7]	R	CARD-TF 2: 4.7
Report Manager	Encapsulated Report Submission [CARD-7]	R	CARD-TF 2: 4.7
	Report Reference Submission [CARD-8]	R	CARD-TF 2: 4.8
	Encapsulated Report Storage [CARD-9] (as SCU)	R (see note 1)	CARD-TF 2: 4.8
	Storage Commitment [RAD-10] (as SCU)	R (see note 1)	RAD-TF 2: 4.10
Report Repository	Encapsulated Report Storage [CARD-9] (as SCP)	R (see note 1)	CARD-TF 2: 4.9
	Storage Commitment [RAD-10] (as SCP)	R (see note 1)	RAD-TF 2: 4.10
	Encapsulated Report Query [CARD-10] (as SCP)	O (see note 2)	CARD-TF 2: 4.10
	Encapsulated Report Retrieve [CARD-11] (as SCP)	O (see note 2)	CARD-TF 2: 4.11
	Patient Identity Feed [ITI-30]	R (see note 4)	CARD-TF 2: E.1
	Retrieve Specific Info for Display [ITI-11]	R	ITI-TF 2:3.11
Enterprise Report Repository	Encapsulated Report Submission [CARD-7]	O (see note 3)	CARD-TF 2: 4.12
	Report Reference Submission [CARD-8]	O (see note 3)	CARD-TF 2: 4.8
Report Reader	Encapsulated Report Query [CARD-10]	R	CARD-TF 2: 4.10
	Encapsulated Report Retrieve [CARD-11]	R	CARD-TF 2: 4.11

Department System Scheduler/Order Filler	Report Reference Submission [CARD-8]	R	CARD-TF 2: 4.8
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405

Notes: 1. If the Report Manager is grouped with the Report Repository, the Encapsulated Report Storage [CARD-9] and Storage Commitment [RAD-10] transactions between them may be replaced by equivalent non-standard functionality (see Section 2.5).

410

2. If the Report Repository supports the DICOM Storage option, it must support both Encapsulated Report Query [CARD-10] and Encapsulated Report Retrieve [CARD-11].

3. The Enterprise Report Repository is required to support one or both of the transactions defined for it; see 6.2 for options.

4. This transaction is required by the Report Repository because of its grouping with the patient demographics consumer actor

415

6.2 DRPT Integration Profile Options

Some Actors have Options defined in order to accommodate variations in use across domains or implementations. Options that may be selected for this Integration Profile are listed in the table 6.2-1 along with the Actors to which they apply.

420

Table 6.2-1: DRPT – Actors and Options

Actor	Option Name	Optionality	Vol & Section
Report Creator	<i>No options defined</i>	-	-
Report Manager	DICOM Storage	O (see 6.2.1)	CARD-TF 2: 4.9
Report Repository	DICOM Storage	O (see 6.2.1)	CARD-TF 2: 4.9
Enterprise Report Repository	Encapsulated Reports	O (see 6.2.2)	CARD-TF 2: 4.7
	By-Reference Reports	O (see 6.2.2)	CARD-TF 2: 4.8
Report Reader	<i>No options defined</i>	-	-
Department System Scheduler/Order Filler	<i>No options defined</i>	-	-

6.2.1 DICOM Storage Option

This Profile allows two different architectures for the long term storage of reports. In one architecture, the Report Repository is integrated with the Report Manager (the actors are grouped in an implementation). In the second architecture, the Report Repository is a separate implementation using DICOM interfaces (e.g., grouped with an Image Manager actor in an implementation). The DICOM Storage Option is used by the Report Manager and Report Repository to support the second architecture. The Report Manager is required to either be grouped with the Report Repository, or to support the DICOM Storage option, or both. The

425

430 Report Repository is required to either be grouped with the Report Manager, or to support the
DICOM Storage option, or both.

6.2.2 Encapsulated Reports and By-Reference Reports Options

435 This Profile allows two different architectures for report submissions to the Enterprise Report
Repository actor. In one architecture, the Enterprise Report Repository receives the report
document in the submission transaction. In the second architecture, the Enterprise Report
Repository receives a reference to the report document in the submission transaction, and may
later retrieve the document through another transaction.

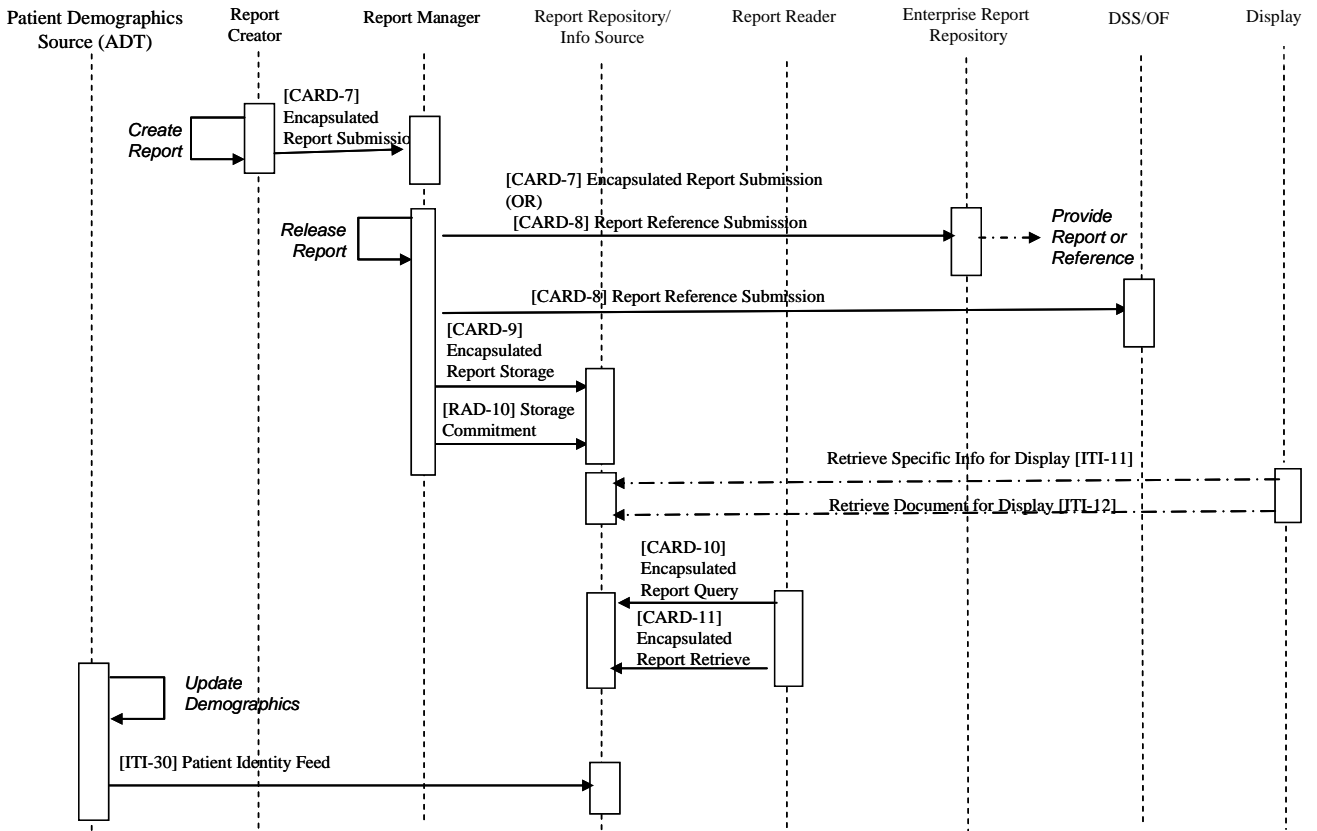
The Enterprise Report Repository is required to support one or both of the Encapsulated Reports
and By-Reference Reports options.

440 Notes: 1. The two architectures for the Report Repository (Section 6.2.1) are independent of the
architectures for the Enterprise Report Repository (Section 6.2.2).
2. The use of the By-Reference Reports Option may be necessary due to message size
constraints on HL7 messages passing through interface engines to the Enterprise Report
Repository.

445

6.3 Process Flow

450 The basic process flow for the DRPT Profile is shown in Figure 6.3-1. The reporting clinician
uses an application at the Report Creator to create a display-ready clinical report. This report
may incorporate text, graphics such as coronary tree diagrams or wall motion scoring charts,
embedded images, etc. The report may be unverified, preliminary, final, or a corrected final; if
preliminary, final, or corrected final, it needs to be signed (using a mechanism not specified in
this profile; see Appendix Z). The report is sent using the Encapsulated Report Submission
[CARD-7] transaction to the Report Manager, including an identifier for the Requested
Procedure (i.e., a Study Instance UID).



455

Figure 6.3-1 DRPT Process Flow

460 In this Profile the Report Manager may apply processing rules to reports, e.g., presentation of an unverified report to a user for verification or signature. The Report Manager is responsible for managing the status of reports and determining when a report is to be made available to the enterprise. The report manager may choose to change the status of a report from a report creator When it has determined that the report is to be released, it stores the report in the departmental Report Repository.

465 The Report Repository may be grouped with the Report Manager, in which case the transactions between the Report Manager and the Report Repository may use a proprietary mechanism. If the Report Manager supports the DICOM Storage option, it re-encapsulates the report a DICOM Encapsulated PDF object and sends it to the Report Repository.

470 When a report is released, which may be workflow dependent or automated, the Report Manager also forwards the report to the Enterprise Report Repository. The Enterprise Report Repository elects to receive the reports either encapsulated in the Report Submission [CARD-7] transaction, or by reference URL in the Report Reference Submission [CARD-8] transaction or both; the

Report Manager must support both transactions. The Enterprise Report Repository may be responsible for distribution of the report outside the department.

475 The department Report Repository is required to be grouped with the Information Source actor of the Retrieve Information for Display Profile, and as such provides access to stored reports for any Display actor using the Retrieve Specific Info for Display [ITI-11] and Retrieve Document for Display [ITI-12] transactions of the Retrieve Information for Display Profile. Additionally, if the Report Repository supports the DICOM Storage option, it also provides access using
480 DICOM Query/Retrieve functions through the Encapsulated Report Query [CARD-10] and Encapsulated Report Retrieve [CARD-11] transactions.

The department Report Repository is also required to be grouped with the Patient Demographics Consumer actor of the Patient Administration Management (PAM) profile. This provides patient demographic updates to the Report Repository using the Patient Identity Feed [ITI-30]
485 transaction.

- Notes:
1. The Report Creator may create an unverified, preliminary, final, or corrected final report. The Report Manager manages the release process for submitted reports, and may change an unverified or preliminary report to final. The Report Manager application-specific processing rules may dictate that some or all unverified or preliminary reports are made
490 available to the enterprise, or that only final reports are made available.
 2. The Report Manager creates a URL link to the PDF report for the Report Reference Submission transaction. If the Report Manager is not grouped with the Report Repository, it needs to be configurable for the web service access point of the Report Repository as the target of the Retrieve Document for Display [ITI-12] transaction. It uses the Encapsulated PDF Instance UID as the documentUID for the [ITI-12] transaction.
495
 3. Distribution of the report outside the department by the system that incorporates the Enterprise Report Repository actor may use the RID Profile or the XDS Profile – see Appendix Y.
 4. The DRPT profile does not specify the demographic updates for the Enterprise Report Repository. DRPT specifies a PAM-based demographic update for the departmental Report Repository.
500
 5. The Report Manager may notify the Department System Scheduler/Order Filler of a signed report. This is a notification only, without the document itself, but with a report retrieval reference (to the Report Repository) in accordance with the RID Profile. The Department System Scheduler/Order Filler may use this information to determine when to send the ORM to the Order Placer with status “CM”. The Report Manager will not assert that the order nor the Requested Procedure is complete ; that is a responsibility of the Department System Scheduler/Order Filler. In the case of an order that has multiple Requested Procedures, or that requires multiple reports for order completion (e.g., a stress
505 test with ECG and imaging components separately read), the Department System Scheduler/Order Filler may be able to implement an automated process, but may require manual review of the reports to verify completion of all order requirements.. The Department System Scheduler/Order Filler is expected to participate in the order fulfillment aspect of a workflow function such as the Radiology Scheduled Workflow, CATH, ECHO
510 or STRESS Profiles
515

6.4 Use Cases

Case R1: Report manager provides local storage and distribution of reports

520 **Clinical Context:** A departmental report management system may have the capability to provide long-term storage of the report. The report management system will be used for distribution of the report to workstations both within and outside the department.

IHE Context: The Report Manager is grouped with the Report Repository to provide long-term storage of reports. These reports may be stored in proprietary formats.

525 The Report Manager/ Report Repository/ Information Source supports requests from workstations that implement the RID Display actor to access the reports using HTTP.

Case R2: Image manager/archive provides storage and distribution of reports

530 **Clinical Context:** A departmental report management system uses an existing PACS capability to provide long-term storage of the report. The PACS will be used for distribution of the report to workstations within and outside the department.

IHE Context: The Report Manager implements the DICOM Storage option, to provide long-term storage of reports. These reports are stored in the PACS, acting as the Report Repository actor, as DICOM objects.

535 The PACS Report Repository also supports the DICOM Storage option, and will both support DICOM report queries, and be a RID Information Source for report requests using HTTP. Workstations may implement either the Report Reader actor using standard DICOM Q/R, or the RID Display actor to access the reports using HTTP.

Case R3: Multiple Reports on one Requested Procedure

540 **Clinical Context:** A common occurrence in cardiology is the use of procedures requiring multiple reports, potentially from different participating physicians.

One example is the exercise stress study with an imaging component. The stress component is interpreted by a physician, and the results reported. Similarly, the imaging component may be interpreted separately by a different physician. The reports must be distributed electronically to the referring physician.

545

Another example is a cardiac cath procedure where both diagnostic and interventional phases are completed, and reported on by different performing physicians.

550 **IHE Context:** One or more Report Creators may provide reports on the various individual components of the Requested Procedure. The Report Manager is required to support separate management of reports with different titles within a single Requested Procedure. The fact that IHE accommodates multiple reports within a single Requested Procedures mitigates the need to have multiple requested procedures (with the additional administrative overhead inherent in same) for a complex cardiology study.

555 The multiple reports in each of these cases are distinguished by their report titles, e.g., “Exercise Stress Test Report” and “Nuclear Stress Test Report” in the first example, or “Diagnostic Cardiac Catheterization Report” and “Interventional Cardiac Catheterization Report” in the second example.

Case R4: Unverified, Preliminary, Final and Corrected Final Reports

560 **Clinical Context:** Reporting workflow often requires multiple stages and contributors before a report is completed. In many cases there are valid clinical reasons to distribute the information in the report throughout the various stages, even though it is not “complete”, e.g., preliminary measurements without final interpretation. Furthermore even after “completion”, there may be valid reasons to update or otherwise correct the report and hence a need to re-issue it.

565 **IHE Context:** The Report Creator may create an unverified, preliminary, final, or corrected final report. In all cases the Report Manager manages the release process for submitted reports. The Report Manager typically will have application-specific processing rules dictating that some or all unverified or preliminary reports are made available to the enterprise, or that only finalized reports are made available. There is a dedicated report-status flag in the HL7 MDM Encapsulated Report Submission and Report Reference Submission messages to facilitate
570 management and query/retrieval of reports based on status.

Each intermediate report product will have its own unique object identifier, so that it can be individually accessed.

Case R5: Demographic Update to Stored Reports

575 **Clinical Context:** After a report has been created, verified, signed and released, the patient registration application/patient identity source may send a demographic data update or may send data that would change patient identifiers for the patient whose report has been finalized. This necessitates a mechanism to support demographic information and patient identifier updates for patients for whom reports have been created and stored.

580 **IHE Context:** The department Report Repository is required to support the Patient Identity Feed transaction. This transaction contains two options: “Merge” and “Link/Unlink”. A Patient Demographics Consumer in the PAM Profile (grouped with a Report Repository in the DRPT profile) shall support at least one of the two options, or both. If the Patient Identity source sends a patient merge message, the department Report Repository matches the patient based on the identifiers in the message and merges demographics data and also the reports that are linked to

585 the identifier. If the Patient Identity source sends a link message, the repository links both the patient information and the reports.

The updates are for the metadata associated with the reports in the report repository to enable searching of the reports based on demographics

590

Add the following text to Appendix H

H.5 Patient Administration Management

595 The full specification of the Patient Administration Management Profile is found in **ITI-TF 1:14**.

The Patient Administration Management Profile provides a mechanism to apply patient demographic updates to stored reports in a patient-centric clinical information/report repository.

Figure H.5-1 shows the actors involved in this Profile and the transactions between actors.

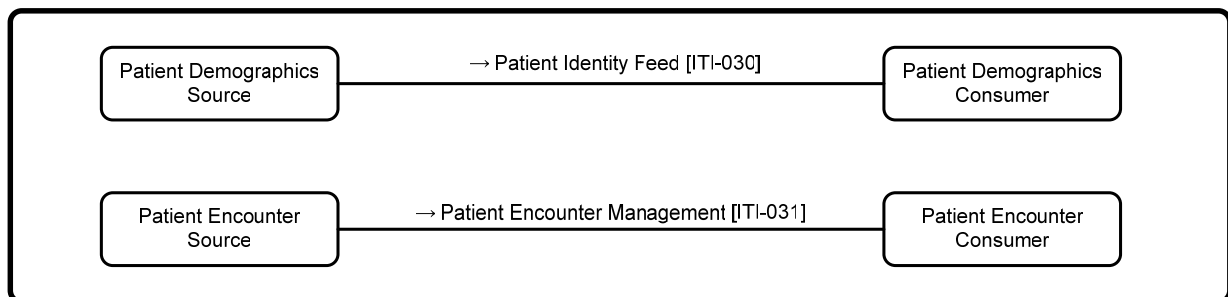


Figure H.5-1. Patient Administration Management Diagram

H.5.1 PAM Process Flow

605 The Patient Identity Feed incorporates the following process flows.

- *Create Patient.*
- *Update Patient Demographics.*
- *Create Temporary Patient.*
- *Update Patient Demographics and Change Patient Identifiers*
- 610 • *Merge Patient Identifiers.*
- *Link Patient Identifiers.*

The Patient Encounter Management incorporates the following process flows:

- *Patient Registration*
- *Change Outpatient to Inpatient*
- 615 • *Pre-admit Patient for Hospitalization*
- *Patient Admitted Notification*
- *Patient Insurance Information Update*

- *Patient Location Transfer:*
- *Patient Location Transfer Error Reconciliation*
- 620 • *Patient Pending Discharge*
- *Change Inpatient to Outpatient*
- *Register Patient as Outpatient*
- *Patient Discharged from Outpatient System:*
- 625 • *Patient discharged from Hospital ADT System*

H.5.2 Cardiology Use Cases

After a report has been created, verified, signed and released, the patient registration application/patient identity source may send a demographic data update or may send data that would change patient identifiers for the patient whose report has been finalized. This necessitates a mechanism to support demographic information and patient identifier updates for patients for whom reports have been created and stored

Add the following new appendix

635 **Appendix Y: Displayable Report Distribution Using the DRPT, RID and XDS Profiles**

Different mechanisms may be used to access displayable report data from systems in the department in which it was generated, from other departments within the enterprise, and from outside the institution, even though the accessed content is the same to all these users.

640 IHE specifies three Profiles generally corresponding to the three environments: DRPT for departmental access, RID for intra-enterprise access, and XDS for cross-enterprise access. See Table Y-1.

Table Y-1 Comparison of Displayable Report Distribution Profiles

Profile		DRPT	RID	XDS
Scope		Departmental	Enterprise	Cross-enterprise
Actors	Report Source	Report Manager	<not specified>	Document Source
	Server	Report Repository	Information Source	Document Repository
	Directory	Report Repository	Information Source	Document Registry
	Client	Report Reader	Display	Document Consumer

Transactions / protocols	Document submission	Encapsulated Report Storage [CARD-9] / DICOM Store	<not specified>	Provide and Register Document Set [ITI-15] / ebXML
	Query	Query Reports [CARD-10] / DICOM Query	Retrieve Specific Information for Display [ITI-11] / HTTP	Query Registry [ITI-16] / ebXML+SQL
	Retrieve	Retrieve Reports [CARD-11] / DICOM Retrieve	Retrieve Document for Display [ITI-12] / HTTP	Retrieve Document [ITI-17] / HTTP

645

While the three access mechanisms are associated with different actors, a product implementation may in fact group actors so that, for instance, a single repository may serve as the server for more than one mechanism. In fact, such grouping between the Report Repository actor of the DRPT Profile and the Information Source actor of the RID Profile is mandatory. This Appendix describes several typical grouping combinations; this is by no means an exhaustive list.

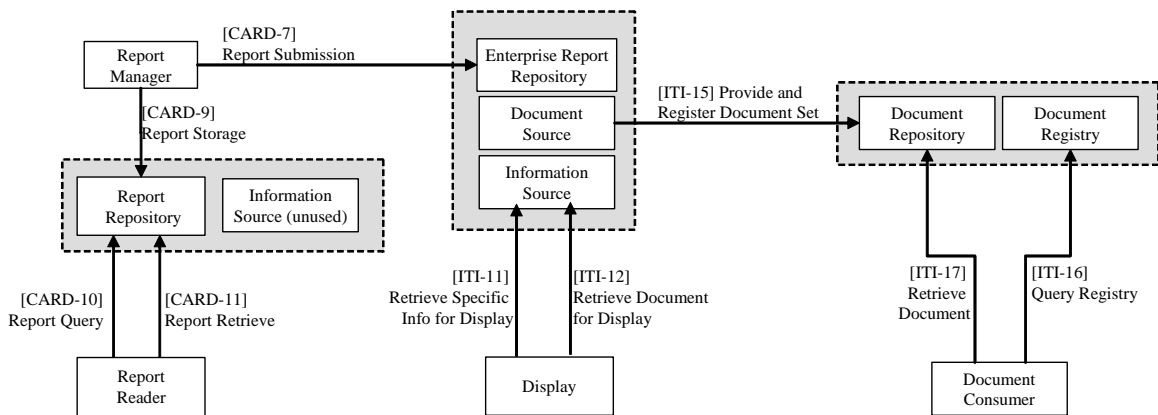
650

In these examples, grouping is facilitated by the use of PDF as the report content format in all three Profiles.

Y.1 Three Repositories

655

In this example, separate repositories at the department, enterprise, and cross-enterprise levels each keep a copy of the report. See Figure Y-1, where each repository is marked in gray; each repository may include several actors from different Profiles.



660

Figure Y-1 Three Repositories

The report is finalized in PDF format in the Report Manager. It is encapsulated in a DICOM object and sent to the Report Repository for departmental storage. It is encapsulated in an HL7 message and sent to the Enterprise Report Repository. The Enterprise Report Repository is

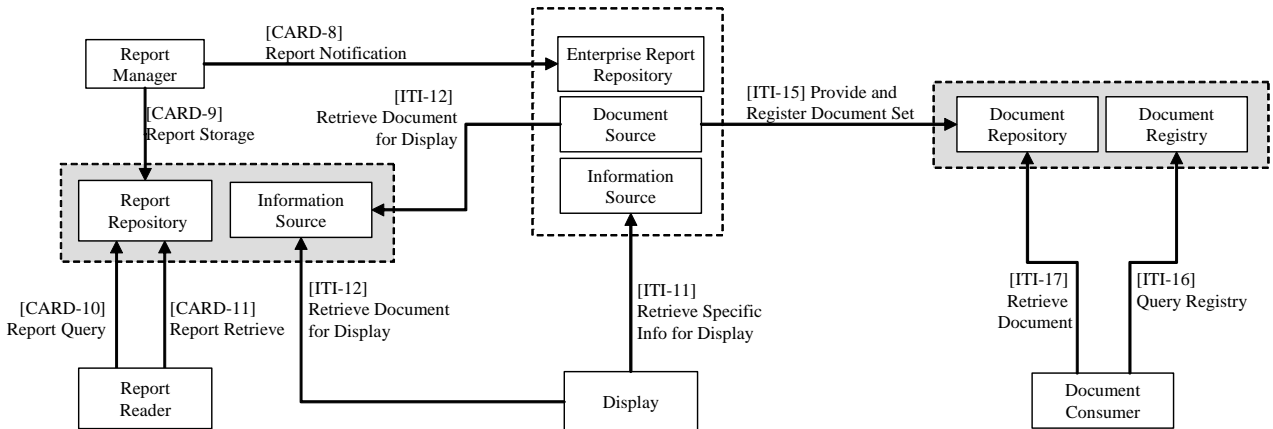
665 grouped with the XDS Document Source, and when it is desired to share the report externally, it
 is re-wrapped in ebXML and forwarded to the XDS Document Repository.

Thus a departmental DICOM-based Report Reader workstation can query the Report Repository
 for the report and retrieve it using the DICOM protocol. Any enterprise Display workstation can
 670 query the Enterprise Report Repository for the report, as that repository is here also grouped with
 a RID Information Source actor, and retrieve the (unwrapped) PDF using the HTTP protocol.
 Similarly, any Document Consumer workstation in the cross-enterprise sharing domain can
 query the XDS Document Registry, and retrieve the report from the XDS Document Repository.

In this example, even though the Report Repository is grouped with a RID Information Source
 actor, the environment does not require that capability to be used.

675 **Y.2 Two Repositories – Distributed Enterprise Storage**

In this example, the departmental Report Repository stores the report for both department and
 enterprise access; a separate repository is used for cross-enterprise access. See Figure Y-2,
 where each repository is marked in gray. This architecture is typical of an enterprise storage
 architecture where the central repository only maintains reference links to the data actually held
 680 in distributed departmental level storage systems.



685 **Figure Y-2 Two Repositories – Distributed Enterprise Storage**

The report is finalized in PDF format in the Report Manager. It is encapsulated in a DICOM
 object and sent to the Report Repository for departmental/enterprise storage. The Report
 Repository is grouped with a RID Information Source actor, which will support HTTP GET of
 the PDF document using the Retrieve Document for Display transaction.

690 The Report Manager sends the Enterprise Report Repository an HL7 message with a reference
 pointer to the report, using the RID URI to the report in the Report Repository.

As in the previous example, the Enterprise Report Repository is grouped with the XDS Document Source. To externally share the report, it must retrieve it from the Report Repository using the RID transaction, and then re-wrap the report in ebXML to be forwarded to the XDS Document Repository.

Query and retrieve of the report is the same as in the previous example, except for enterprise Display workstations. They may query the Enterprise Report Repository for the report, but receive a link to the departmental Report Repository for retrieving the (unwrapped) PDF, rather than retrieving it from the Enterprise Report Repository.

Note: The Enterprise Report Repository could also provide a document retrieval link to itself, but then use an HTTP Redirect to throw the retrieval to the departmental Report Repository.

Y.3 Two Repositories – Distributed Enterprise Storage, No DICOM Access

In this example, the Report Manager grouped with a Report Repository stores the report for both department and enterprise access; as in the previous example, a separate repository is used for cross-enterprise access. However, no DICOM access to the report is provided, and in this case intra-departmental report access uses the RID Profile. See Figure Y-3.

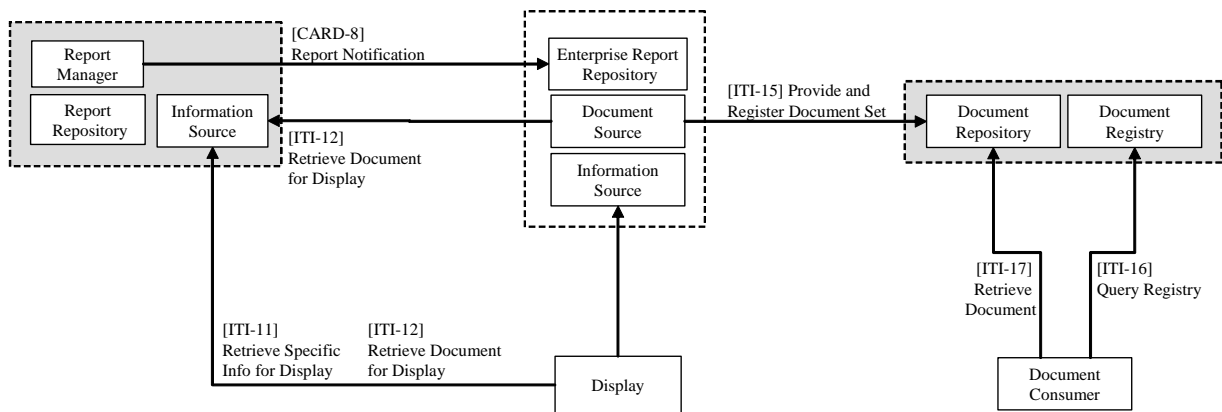


Figure Y-3 Two Repositories – Distributed Enterprise Storage

The report is finalized in PDF format in the Report Manager, which also stores the report in its grouped Report Repository. The Report Repository is also grouped with a RID Information Source actor, which will support HTTP GET of the PDF document using the Retrieve Document for Display transaction. This system does not support the DICOM Storage Option, so all workstations that wish to access the reports must use the RID Profile.

Operation of the Enterprise Report Repository, Display, and XDS actors is identical to the previous example.

Note: The Display actor could also directly query the Information Source grouped with the Report Manager to access a list of departmental reports.

Y.4 Two Repositories – Distributed Cross-Enterprise Storage

In this example, a single repository stores the report for both intra-enterprise and cross-enterprise access; a separate repository is used for department access. See Figure Y-4. This architecture is typical of a cross-enterprise storage architecture where the domain supports only a central registry, and data is managed by each of the participating institutions.

725

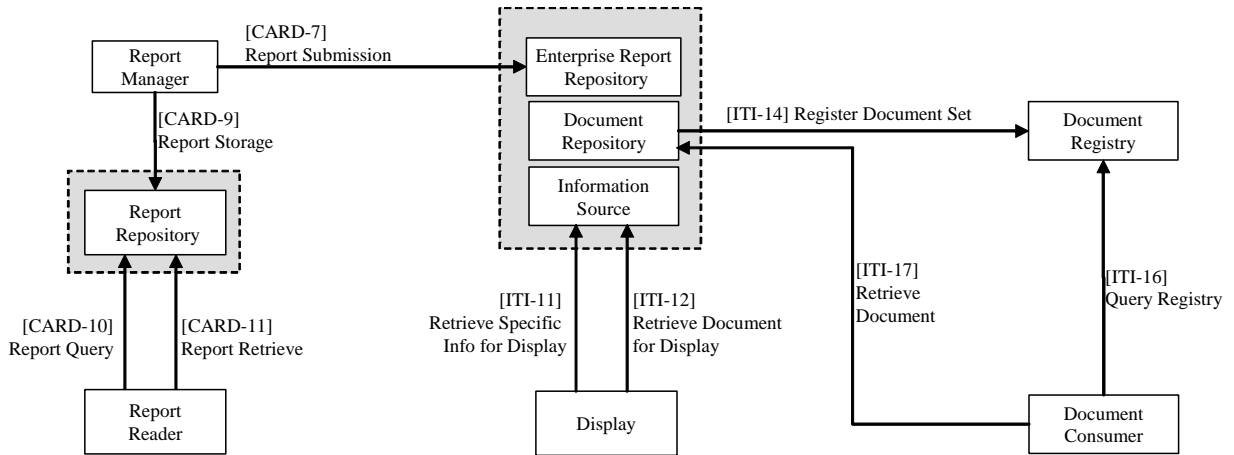


Figure Y-4 Two Repositories – Distributed Cross-Enterprise Storage

730 This example is similar to the three repositories example. The difference is that the Enterprise Report Repository is grouped with the XDS Document Repository, and only submits document registration to the XDS Document Registry.

735

Appendix Z: Displayable Report Signing

740 A displayable (PDF) report that has been finalized by the reporting clinician may be signed in a number of ways. More than one of these methods may be used for a single document, but those multiple signatures must be consistent. The DRPT Profile does not specify a required signature mechanism, and there may be others beyond those described here.

The first method is to simply include a graphic or image of the clinician’s signature in the displayable page content. While this is useful for display, it is not electronically secure.

745 A second mechanism is to maintain a “signature on file”; i.e., the document asserts that it has been signed, but verification of the signature requires an audit process of the report creation and finalization application. The audit must be able to show that the asserted signature corresponds to a signing act by the identified clinician, and that the distributed document is identical to the original data presented during the signing process.

750 A third method is to attach a signature to the encapsulation of the PDF document. For the DICOM encapsulation, a cryptographic digital signature mechanism is specified in the DICOM Standard (see PS3.3, Section C.12.1.1.3). However, such a signature is lost when the PDF content is extracted from the encapsulating message or object and distributed “naked”.

755 Notes: 1. HL7 v2.x does not define a digital signature mechanism. HL7 v3 allows encapsulation of PDF in a Clinical Document Architecture (CDA) wrapper, which may include digital signatures; the CDA may in turn be encapsulated in an HL7 v2.x MDM message for transmission. However, the DRPT Profile does not support the encapsulation of CDA in the Encapsulated Report Submission transaction.

2. Since a report may be persistently stored as a DICOM object in the Report Repository, a digital signature in that object can be treated as part of a “signature on file” mechanism.

760 Finally, PDF includes its own internal cryptographic digital signature mechanism. Its use provides additional assurance that the content of the document has not been altered after application of the digital signature. While verification of the signature requires an audit process, that process can use the digital certificate registration authority, rather than the original report creating system.

765 An implementation may reasonably use several of these mechanisms, e.g., a displayable graphic for user convenience in hard-copy or soft-copy display, plus a PDF digital signature.

Changes to Volume 2 – Transactions

770 *Add the following new transactions*

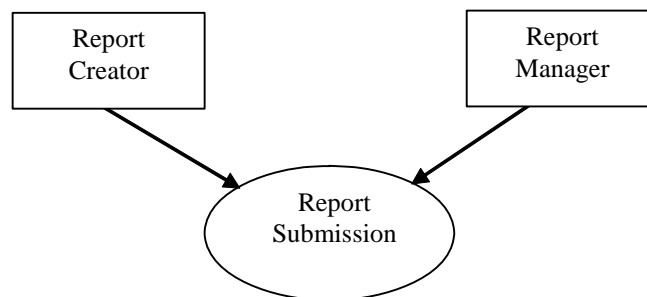
4.7 Encapsulated Report Submission [CARD-7]

This section corresponds to Transaction CARD-7 of the IHE Cardiology Technical Framework. Transaction CARD-7 is used by the Report Creator and Report Manager actors.

4.7.1 Scope

775 In the Encapsulated Report Submission transaction, the Report Creator transmits PDF formatted reports as unsolicited HL7 Original Document Notification and Content message.

4.7.2 Use Case Roles



Actor: Report Creator

780 **Role:** Creates PDF report as a preliminary, final, or corrected final, and sends it to a Report Manager.

Actor: Report Manager

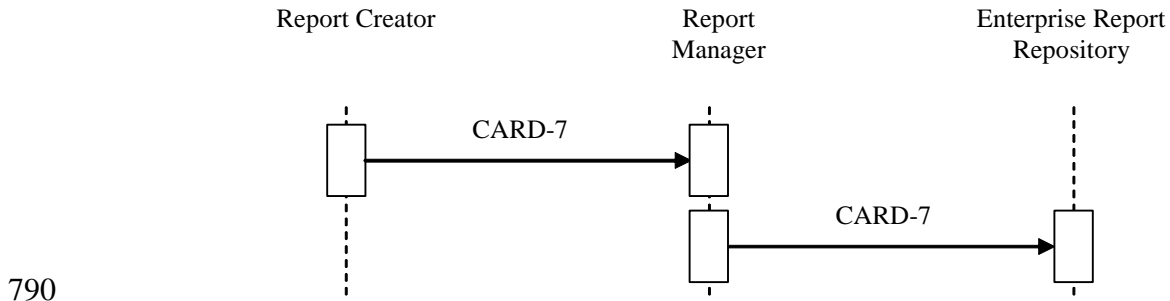
Role: Accepts report from Report Creator, releases report for distribution, and sends it to multiple repositories.

785 4.7.3 Referenced Standards

HL7 Messaging Standard v.2.5, Chapter 9

ISO 19005-1. Document management – Electronic document file format for long-term preservation – Part 1: Use of PDF (PDF/A)

4.7.4 Interaction Diagram



4.7.4.1 Encapsulated Report Submission

This section relates to the CARD-7 transaction between the Report Creator and the Report Manager in the above interaction diagram in section 4.7.4.

795 **4.7.4.1.1 Trigger Events**

When a Report Creator has a new clinical report to be submitted, the Report Creator initiates the CARD-7 transaction with the Report Manager using the Original Document Notification and Content message.

4.7.4.1.2 Message Semantics

800 The CARD-7 transaction shall be an HL7 V2 MDM^T02 message from the Report Creator to the Report Manager with a corresponding ACK message back to the Report Creator. Refer to the HL7 2.5 Standard, Chapter 9 for general message semantics.

Table 4.7-1 IHE Profile – Encapsulated Report Submission MDM Message

MDM^T02	Document Notification and Content	Chapter in HL7 2.5	Comment
MSH	Message Header	2	
EVN	Event Type	3	
PID	Patient Identification	3	
PV1	Patient Visit	3	
ORC	Order Common	4	
OBR	Order detail	4	
TXA	Document Notification	9	
{OBX}	Observation/Result	7, 9	

805 The PV1 Segment is required if use of PV1-19 Visit Number is required per the applicable regional or national appendices to the IHE Technical Framework (See RAD TF-4).

The following subsections provide field-by-field definitions of the required segments of the MDM message of the CARD-7 transaction. The tables shall be interpreted according to the HL7 Standard v2.5, unless otherwise specified in notes beneath the tables.

810

4.7.4.1.2.1 MSH Segment

Table 4.7-2 IHE Profile – MSH segment

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM #	ELEMENT NAME
1	1	ST	R			00001	Field Separator
2	4	ST	R			00002	Encoding Characters
3	180	HD	R			00003	Sending Application
4	180	HD	R			00004	Sending Facility
5	180	HD	R			00005	Receiving Application
6	180	HD	R			00006	Receiving Facility
9	7	CM	R			00009	Message Type
10	20	ST	R			00010	Message Control ID
11	3	PT	R			00011	Processing ID
12	60	VID	R		0104	00012	Version ID
18	6	ID	C		0211	00692	Character Set

Adapted from the HL7 Standard, version 2.5

The IHE Technical Framework requires that applications support HL7-recommended values for the fields MSH-1 Field Separator and MSH-2 Encoding Characters.

815

Field MSH-9 Message Type shall have at least two components. The first component shall have a value of “MDM”; the second component shall have the value of “T02”.

Implementations supporting sequence number protocol shall be configurable to allow them to perform this transaction without such protocol.

4.7.4.1.2.2 EVN Segment

820

Table 4.7-3 identifies required fields in the EVN segment.

Table 4.7-3. IHE Profile - EVN segment

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	ELEMENT NAME
2	26	TS	R			00100	Recorded Date/Time

Adapted from the HL7 Standard, version 2.5

825

4.7.4.1.2.3 PID and PV1 Segments

Table 4.7-4 IHE Profile PID segment

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	ELEMENT NAME
3	20	CX	R			00106	Patient Identifier List
5	48	XPN	R			00108	Patient Name
7	26	TS	RE			00110	Date/Time of Birth
8	1	IS	RE		0001	00111	Sex
10	80	CE	RE		0005	00113	Race
11	106	XAD	RE			00114	Patient Address
18	20	CX	RE			00121	Patient Account Number

Adapted from the HL7 standard, version 2.5

Table 4.7-5 IHE Profile – PV1 segment

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	ELEMENT NAME
2	1	IS	R		0004	00132	Patient Class
19	20	CX	RE			00149	Visit Number
51	1	IS	C		0326	01226	Visit Indicator

830

Adapted from the HL7 standard, version 2.5

Note: The fields *PID-18 Patient Account Number* and *PV1-19 Visit Number* have requirements for the values in the use of the PID segment in ADT and Order Messages (see, e.g., transactions RAD-3 and RAD-4). In the context of this MDM message, these values may not be known, but if known, shall be included in the message.

835 Field *PV1-51 Visit Indicator* shall be valued with value “V” if the field *PV1-19 Visit Number* is present. It may be omitted otherwise.

4.7.4.1.2.4 ORC Segment

Table 4.7-6 IHE Profile ORC Segment

SEQ	LEN	DT	Usage	CARD.	TBL#	ITEM#	ELEMENT NAME
1	2	ID	R		0119	00215	Order Control
2	22	EI	R			00216	Placer Order Number
3	22	EI	R			00217	Filler Order Number

Adapted from the HL7 Standard, version 2.5

840 The ORC-2 Placer Order Number and ORC-3 Filler Order Number fields are required to be filled by the Report Creator.

Note: The method by which the Report Creator obtains the Placer Order Number (ORC-2, OBR-2, TXA-14), Filler Order Number (ORC-3, OBR-3, TXA-15) and Study Instance UID (OBX-5) is beyond the scope of this transaction. The Report Creator may receive this information

845

from a Procedure Scheduled [RAD-4] transaction. It may also obtain this information from images or other study evidence that are referenced during the reporting process.

If the Report Creator does not have these identifiers from the actual Placer and Filler systems, it shall fill the fields with an identifier that it creates, and identify the assigning authority as itself.

4.7.4.1.2.5 OBR Segment

850

Table 4.7-7 IHE Profile OBR Segment

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM #	ELEMENT NAME
1	4	SI	R			00237	Set ID OBR
2	22	EI	RE			00216	Placer Order Number
3	22	EI	RE			00217	Filler Order Number
4	200	CE	R			00238	Universal Service ID
7	26	TS	R			00241	Observation Date/Time
25	1	ID	R		See table 4.7-8	00258	Result Status

Adapted from the HL7 Standard, version 2.5

Field OBR-7 is the clinically relevant date/time of the observation; i.e. it is the date/time of the procedure, not the date/time of the report.

The Result Status values of Table 4.7-8 shall be supported in field OBR-25.

855

Table 4.7-8 Supported Result Status Values

Value	Description
R	Results stored; not yet verified
P	Preliminary: A verified early result is available, final results not yet obtained
F	Final results; results stored and verified. Can only be changed with a corrected result.
C	Correction to results

Adapted from the HL7 Standard, version 2.5, Table 0123

860

Note: Unverified reports, commonly referred to as “preliminary”, and are reported with status value “R” rather than “P”. Only results that have had clinician overreading and signature may be reported with status value “P”. “P” is used more in the case of laboratory results, where a final result may be awaiting development of a culture, but the preliminary results are usable for clinical treatment planning.

4.7.4.1.2.6 TXA Segment

865

Table 4.7-9 IHE Profile – TXA Segment for Encapsulated Report

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	ELEMENT NAME
1	4	SI	R			00914	Set ID- TXA
2	30	IS	R		0270	00915	Document Type
3	2	ID	C		0191	00916	Document Content Presentation
5	250	XCN	C	Y		00918	Primary Activity Provider Code/Name
7	26	TS	C			00920	Transcription Date/Time
11	250	XCN	C	Y		00924	Transcriptionist Code/Name
12	30	EI	R			00925	Unique Document Number
13	30	EI	C			00926	Parent Document Number
14	22	EI	RE	Y		00216	Placer Order Number
15	22	EI	RE			00217	Filler Order Number
17	2	ID	R		See table 4.7-10	00928	Document Completion Status
21	30	ST	C			00933	Document Change Reason
22	250	PPN	RE	Y		00934	Authentication Person, Time Stamp

Adapted from the HL7 Standard, version 2.5

TXA-12 shall contain a unique document identifier. If multiple reports are created for the order, each report shall contain a unique identifier in TXA-12. Each intermediate report version shall have its own unique object identifier, so that it can be individually accessed. The unique identifier shall be an OID in accordance with ITI TF 2: Appendix B. Note: This requires the OID to be limited to 64 characters

870

TXA-17 Document Completion Status. This field contains the reference to the current completion state of the document.

TXA-22: At least one of TXA-22.2 or TXA-22.3 (Family name and Given Name) shall be valued and TXA-22.15 (Date /Time Action Performed) shall valued.

875

Table 4.7-10 IHE Profile – Document completion status

Value	Description	Comment	Mapping to OBR-25 Result Statuses
PA	Pre-authenticated		R
AU	Authenticated		P, F, C
LA	Legally authenticated		F, C

Adapted from the HL7 Standard, version 2.5 Table 0271

880

4.7.4.1.2.7 OBX for Study Instance UID

An OBX Segment is defined to convey the DICOM Study Instance UID for which the report is submitted, if applicable (see Table 4.7-11). This Segment shall be included in the MDM if the report is created for a Requested Procedure managed by the Department System Scheduler/Order Filler.

885

Table 4.7-11 IHE Profile – OBX Segment with DICOM Study Instance UID

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	ELEMENT NAME
1	4	SI	R			00569	Set ID – OBX
2	3	ID	R		0125	00570	Value Type = HD
3	80	CE	R			00571	Observation Identifier
5	70	HD	R			00573	Observation Value
11	1	ID	R		0085	00579	Observation Result Status = O

Adapted from the HL7 Standard, version 2.5

The OBX-3 Observation Identifier field shall have the value “113014^DICOM Study^DCM”. The OBX-5 Observation Value shall include the Study Instance UID as an ISO OID. The OBX-11 Observation Result Status shall have the value O (Order detail description).

890

Note: The method by which the Report Creator obtains the Study Instance UID (OBX-5) is beyond the scope of this transaction. The Report Creator may receive this information from a Procedure Scheduled [RAD-4] transaction. It may also obtain this information from images that are referenced during the reporting process.

895

4.7.4.1.2.8 OBX for Encapsulated Report

An OBX Segment is defined to convey the encapsulated report (see Table 4.7-12).

Table 4.7-12 IHE Profile – OBX Segment with Encapsulated Report

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	ELEMENT NAME
1	4	SI	R			00569	Set ID – OBX
2	3	ID	R		0125	00570	Value Type = ED
3	80	CE	R			00571	Observation Identifier
5	*	ED	R			00573	Observation Value
11	1	ID	R		See table 4.7-13	00579	Observation Result Status

900

Adapted from the HL7 Standard, version 2.5

Field OBX-3 Observation Identifier shall be used for the report title. In accordance with HL7 CE Data Type requirements, a local (private) title may be encoded only with OBX-3.2 valued (e.g., “^Interventional Radiology Report”).

905 Notes: 1. This field may use document names from the HIPAA Attachments class of the LOINC coding scheme. See Appendix D for examples of report titles. If LOINC does not have appropriate titles, the Report Creator can assign titles from some other resource (including private titles).

Field OBX-5 Observation Value contains the report document in PDF/A format.

910 The Type of Data (OBX-5.2) component shall have the value “Application”, and the Data Subtype (OBX-5.3) component shall have the value “PDF”. The Encoding (OBX-5.4) component shall have the value “Base64”. The Data (OBX-5.5) component shall contain base64 encoded PDF data in accordance with ISO 19005-1.

915 Notes: 1. An actor participating in this transaction must support encapsulated data with a length beyond the nominal 65536 byte limit of the OBX-5.
2. Considering that a PDF document may become disassociated from its HL7 or DICOM encapsulation, it is recommended that a PDF document contain in its displayable content the patient identification, and the dates of the procedure and of the report.

920 3. The base64 encoded stream must not include CR/LF characters, which are forbidden within HL7 field text streams. Breaking a base64 encoded stream into lines of 76 characters or less is used for email in accordance with RFC 822, but is not applicable to encapsulated data in HL7.

The Observation Result Status values of Table 4.7-13 shall be supported in field OBX-11. The value shall be consistent with the value in field OBR-25.

925

Table 4.7-13 Supported Observation Result Status Values

Value	Description	Corresponding OBR-25 Value
R	Results entered – not verified	R
P	Preliminary results	P
F	Final results; Can only be changed with a corrected final result.	F
C	Record coming over is a correction and thus replaces a final result	C

Adapted from the HL7 Standard, version 2.5, Table 0085

930 Note: Additional OBX segments, beyond the ones conveying the Study Instance UID and the encapsulated report, may be present in the MDM. These may be used to convey significant measurements present in the displayable report in a manner conducive to automated processing. Such use is outside the scope of this transaction.

4.7.4.1.3 Expected Actions

935 Upon receipt of this message, the Report Manager may apply application-specific report processing rules (e.g., presentation to a user for verification or signature). The Report Manager shall determine when the report is to be released, or made available, to the enterprise.

The Report Manager shall have the capability to edit the PDF content, at a minimum by adding a “cover page” with the report status, and identity of signing clinician. This may also involve further modification of the PDF content (e.g., to add a digital signature).

940 The report manager shall also have the capability to modify the status of the report. If a prior transaction to the Enterprise Report Repository had already occurred, the transaction following the status change shall be an HL7 V2 MDM T^10 Document Replacement notification from the Report Manager to the Enterprise Report Repository. The Report Manager shall support multiple reports with different titles (Encapsulated PDF segment OBX-3 Observation Identifier) submitted for the same Requested Procedure or Order. Each document title shall be treated independently for the purpose of the report processing rules.

945 Notes: 1. The Report Manager must support multiple reports with same or different titles submitted for the same Order, and if the Order is mapped to multiple Requested Procedures, and then it must support multiple reports with different titles submitted for each Requested Procedure identified in the OBX with the Study Instance UID. To uniquely identify each document, each document shall contain a unique document identifier (OID) in TXA -12 of the message.

950 2. For example, a Requested Procedure for a Cardiac Catheterization may result in the Report Creator submitting one report titled “Cardiac Cath Diagnostic Report” and a second report titled “Cardiac Cath Intervention Report”. Verification, signature, and distribution of these two reports are handled separately, and may indeed be associated with two different

955 physicians.

When the Report Manager has determined that the report is to be made available to the enterprise, it shall guarantee long term storage of the report in the department by forwarding the report to the Report Repository (see Transaction CARD-9).

960 Note: The Report Manager application-specific processing rules may dictate that some or all unverified or preliminary reports are made available to the enterprise, or that only finalized and corrected final reports are made available.

4.7.4.2 Encapsulated Report Update

965 This transaction relates to the CARD-7 transaction between the Report Creator and the Report Manager in the above interaction diagram.

4.7.4.2.1 Trigger Events

When a Report Creator has a revision of a prior report to be submitted, the Report Creator initiates the CARD-7 transaction with the Report Manager using the Document Replacement Notification and Content message.

970

4.7.4.2.2 Message Semantics

The CARD-7 transaction shall be an HL7 V2 MDM^T10 message from the Report Creator to the Report Manager with a corresponding ACK message back to the Report Creator. Refer to the HL7 2.5 Standard, Chapter 9 for general message semantics.

975

Table 4.7-14 IHE Profile – Encapsulated Report Submission MDM Message

MDM^T10	Document Replacement Notification and Content	Chapter in HL7 2.5	Comment
MSH	Message Header	2	
EVN	Event Type	3	
PID	Patient Identification	3	
PV1	Patient Visit	3	
ORC	Order Common	4	
OBR	Order detail	4	
TXA	Document Notification	9	
{OBX}	Observation/Result	7, 9	

Except as provided below, the content of this message is identical to that of the MDM^T02 message specified in 4.7.4.1.1.

4.7.4.2.2.1 TXA Segment

Table 4.7-15 IHE Profile – TXA Segment with Reference to a Report

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	ELEMENT NAME
1	4	SI	R			00914	Set ID- TXA
2	30	IS	R		0270	00915	Document Type
3	2	ID	C		0191	00916	Document Content Presentation
5	250	XCN	C	Y		00918	Primary Activity Provider Code/Name
7	26	TS	C			00920	Transcription Date/Time
11	250	XCN	C	Y		00924	Transcriptionist Code/Name
12	30	EI	R			00925	Unique Document Number
13	30	EI	RE			00926	Parent Document Number
14	22	EI	RE	Y		00216	Placer Order Number
15	22	EI	RE			00217	Filler Order Number
17	2	ID	RE		See table 4.7-10	00928	Document Completion Status
21	30	ST	C			00933	Document Change Reason
22	250	PPN	RE	Y		00934	Authentication Person, Time Stamp

980

Adapted from the HL7 Standard, version 2.5

TXA-13 Parent Document shall contain the Unique Document Number of the document being replaced. This shall be the value of TXA-12 Unique Document Number in the MDM message for the parent document.

4.7.4.2.3 Expected Actions

985

Upon receipt of this message, the Report Manager may apply application-specific report processing rules, as described in 4.7.4.1.3.

The Report Manager shall replace the existing document, identified in TXA-13 of the MDM^T10, with the new document, in accordance with its rules for accepting replacement notifications from external sources.

990

4.7.4.3 Encapsulated Report Submission to Enterprise

This transaction relates to the CARD-7 transaction between the Report Manager and the Enterprise Report Repository.

4.7.4.3.1 Trigger Events

995

When the Report Manager deems a clinical report ready for communication to the enterprise, e.g., by completion of a signature process, and the Enterprise Report Repository supports the Encapsulated Reports option, the Report Manager initiates the CARD-7 transaction with the Enterprise Report Repository using the Original Document Notification and Content message.

Note: The Report Manager will be configured to initiate either a CARD-7 or a CARD-8 transaction with the Enterprise Report Repository whenever a clinical report is deemed ready for communication to the enterprise. The appropriate transaction is determined by the option supported by the Enterprise Report Repository.

1000

4.7.4.3.2 Message Semantics

The CARD-7 transaction shall be an unsolicited HL7 V2 MDM^T02 message from the Report Manager to the Enterprise Report Repository with a corresponding ACK message back to the Report Manager. Except as provided below, the content of this message is identical to that of the MDM^T02 message described in 4.7.4.1.2.

1005

4.7.4.3.2.1 ORC, OBR, and TXA Segments

If the ORC-2/OBR-2/TXA-14 Placer Order Number and ORC-3/OBR-3/TXA-15 Filler Order Number fields were filled by the Report Creator with identifiers assigned by the Report Creator, the Report Manager shall replace them with the identifiers assigned by the Order Placer and Order Filler systems, respectively.

1010

Note: The method by which the Report Manager obtains the Placer Order Number and Filler Order Number is beyond the scope of this transaction.

4.7.4.3.2.2 OBX for Study Instance UID

1015 The OBX that conveys the Study Instance UID (see 4.7.4.1.2.6) is optional for the MDM^T02 message from the Report Manager to the Enterprise Report Repository.

4.7.4.3.3 Expected Actions

The Enterprise Report Repository shall make the report available to other systems in the Enterprise, in a manner outside the scope of this transaction.

1020 **4.7.4.4 Encapsulated Report Update Submission to Enterprise**

4.7.4.4.1 Trigger Events

1025 When the Report Manager has a revision of a prior report ready for communication to the enterprise, and the Enterprise Report Repository supports the Encapsulated Reports option, the Report Manager initiates the CARD-7 transaction with the Enterprise Report Repository using the Document Replacement Notification and Content message.

4.7.4.4.2 Message Semantics

1030 The CARD-7 transaction shall be an HL7 V2 MDM^T10 message from the Report Manager to the Enterprise Report Repository with a corresponding ACK message back to the Report Manager. The content of this message is identical to that of the MDM^T10 message described in 4.7.4.1.2. The requirement for Placer Order Number and Filler Order Number described in 4.7.4.3.2.1 applies here as well. The OBX that conveys the Study Instance UID (see 4.7.4.1.2.6) is optional for the MDM^T10 message from the Report Manager to the Enterprise Report Repository

4.7.4.4.3 Expected Actions

1035 The Enterprise Report Repository shall replace the existing document, identified in TXA-13 of the MDM^T10, with the new document, and make the report available to other systems in the Enterprise, in a manner outside the scope of this transaction.

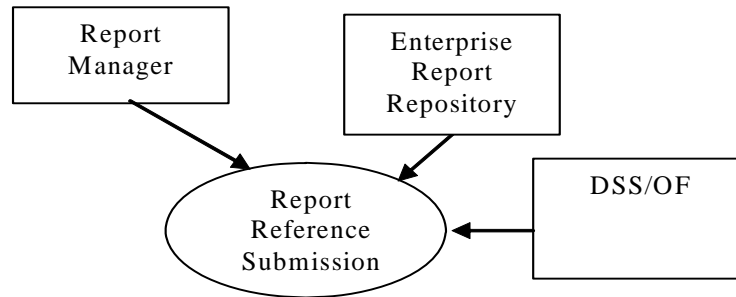
4.8 Report Reference Submission [CARD-8]

1040 This section corresponds to Transaction CARD-8 of the IHE Cardiology Technical Framework. Transaction CARD-8 is used by the Report Manager, Enterprise Report Repository and the Department System Scheduler/Order Filler actors.

4.8.1 Scope

In the Report Reference Submission transaction, the Report Manager transmits URL references to reports as Document Notifications.

1045 4.8.2 Use Case Roles



Actor: Report Manager

Role: Sends URL reference to report to an Enterprise Report Repository and the Department System Scheduler/Order Filler.

1050 **Actors:** Enterprise Report Repository and Department System Scheduler/Order Filler

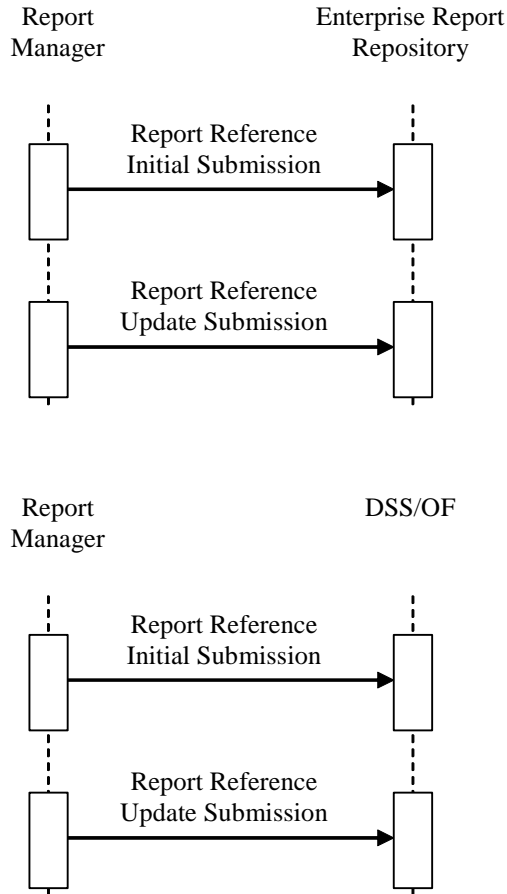
Role: Accepts and stores the URL reference to report transmitted by the Report Manager.

4.8.3 Referenced Standards

HL7 Messaging Standard v.2.5,

4.8.4 Interaction Diagram

1055



1060 **4.8.4.1 Report Reference Initial Submission**

This section relates to the Report Reference Initial Submission transaction between the Report Manager, Department System Scheduler/Order Filler and the Enterprise Report Repository in the above interaction diagram.

4.8.4.1.1 Trigger Event

1065 The Report Manager has determined that a new report is to be made available to the enterprise, and it has guaranteed long term storage of the report in the department by forwarding the report to the Report Repository. For a transaction to the Enterprise Report Repository, the Enterprise Report Repository must support the By-Reference Reports option.

1070 Note: The Report Manager will be configured to initiate either a CARD-7 or a CARD-8 transaction with the Enterprise Report Repository whenever a clinical report is deemed ready for communication to the enterprise. The appropriate transaction is determined by the option supported by the Enterprise Report Repository.

4.8.4.1.2 Message Semantics

1075 The transaction shall be an HL7 V2 MDM^T01 message. Refer to the HL7 2.5 Standard for general message semantics.

Table 4.8-1 IHE Profile – Encapsulated Report Submission MDM Message

MDM^T01	Original Document Notification	Chapter in HL7 2.5	Comment
MSH	Message Header	2	
EVN	Event Type	3	
PID	Patient Identification	3	
PV1	Patient Visit	3	
ORC	Order Common	4	
OBR	Order detail	4	
TXA	Document Notification	9	

Except as provided below, the content of this message is identical to that of the MDM^T02 message described in 4.7.4.1.

4.8.4.1.2.1 TXA Segment

1080

Table 4.8-2 IHE Profile - TXA Segment with Reference to a Report

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	ELEMENT NAME
1	4	SI	R			00914	Set ID- TXA
2	30	IS	R		0270	00915	Document Type
3	2	ID	C		0191	00916	Document Content Presentation
5	250	XCN	C	Y		00918	Primary Activity Provider Code/Name
7	26	TS	C			00920	Transcription Date/Time
11	250	XCN	C	Y		00924	Transcriptionist Code/Name
12	30	EI	R			00925	Unique Document Number
13	30	EI	C			00926	Parent Document Number
14	22	EI	RE	Y		00216	Placer Order Number
15	22	EI	RE			00217	Filler Order Number
16	30	ST	RE			00927	Unique Document File Name
17	2	ID	RE		See table 4.7-10	00928	Document Completion Status
21	30	ST	C			00933	Document Change Reason
22	250	PPN	RE	Y		00934	Authentication Person, Time Stamp

Adapted from the HL7 Standard, version 2.5

Field TXA-16 Unique Document File Name contains the reference to the report document. The field shall include the URL to access the stored report document in the format as specified in the Retrieve Document for Display (ITI-12) transaction (see ITI-TF 2: 3.12.4.1.2).

- 1085 Note: The target address of the service of the URL is the RID Profile Information Source actor grouped with the Report Repository. The Report Manager needs to be configurable with the network address of the Information Source actor, in particular if the Information Source is in a separate system.

1090 **4.8.4.1.2.2 OBX Segment**

There are no OBX segments in an MDM^T01 message.

4.8.4.1.3 Expected Actions

- 1095 The Enterprise Report Repository receives the MDM with the URL reference to the report, and shall make the report available to other systems in the enterprise, in a manner outside the scope of this transaction.

 Note: The Enterprise Report Repository may retrieve the report based on the URI, or use the reference as an index for a distributed “virtual” repository.

- 1100 The Enterprise Report Repository shall be prepared to receive, and make available to other systems in the enterprise, multiple reports with different OIDs (TXA12-5 Document Unique Identifier Value) for the same order number (see 4.7.4.1.3).

- 1105 The method by which the reports are made available to other systems by the Enterprise Report Repository is outside the scope of this profile. The Enterprise Report Repository may make the stored reports available by supporting the Retrieve Specific Info for Display [ITI-11] and Retrieve Document for Display [ITI-12] transactions of the Retrieve Information for Display Profile (See Volume1 Appendix Y for sample implementations of this architecture)

The Department System Scheduler/Order Filler actor shall receive a HL7 v2.5 MDM^T01 (Original Document Notification) in the CARD-8 transaction. The Department System Scheduler/Order Filler can use the information in the CARD-8 message to determine when to send an Order Complete message (ORM with status CM) to the Order Placer.

- 1110 Note: The Report Manager will not assert that the order is complete, and will not state that a Requested Procedure is complete; that is a responsibility of the Department System Scheduler/Order Filler. In the case of an order that has multiple Requested Procedures, or which requires multiple reports for order completion (e.g., a stress test with ECG and imaging components separately read), the Department System Scheduler/Order Filler *may* be able to implement an automated process, but may require manual review of the reports to verify completion of all order requirements.
- 1115

The order complete message is described in RAD TF-2: 3.3, Filler Order Management

The Department System Scheduler/Order Filler must participate in a scheduled workflow or equivalent such as STRESS, CATH or ECHO profiles

1120 The Department System Scheduler/Order Filler shall be prepared to receive multiple reports with different OIDs (TXA-12 Document Unique Identifier) for the same order number (see 4.7.4.1.3).

4.8.4.2 Report Reference Update Submission

1125 This transaction relates to the Report Reference Update Submission transaction between the Report Manager, Department System Scheduler/Order Filler and the Enterprise Report Repository in the above interaction diagram.

4.8.4.2.1 Trigger Event

1130 The Report Manager has determined that a changed report is to be made available to the enterprise, and it has guaranteed long term storage of the report in the department by forwarding the report to the Report Repository. For a transaction to the Enterprise Report Repository, the Enterprise Report Repository must support the BY-REFERNCE REPORTS option.

4.8.4.2.2 Message Semantics

The transaction shall be an HL7 V2 MDM^T09 message. Refer to the HL7 2.5 Standard for general message semantics.

1135

Table 4.7-10 IHE Profile – Report Reference Update Submission MDM Message

MDM^T09	Document Replacement Notification	Chapter in HL7 2.5	Comment
MSH	Message Header	2	
EVN	Event Type	3	
PID	Patient Identification	3	
PV1	Patient Visit	3	
ORC	Order Common	4	
OBR	Order detail	4	
TXA	Document Notification	9	

1140 Except as provided below, the content of this message is identical to that of the MDM^T01 message specified in 4.8.4.1.1.

4.8.4.2.2.1 TXA Segment

Table 4.7-11 IHE Profile - TXA Segment with Reference to a Report

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	ELEMENT NAME
1	4	SI	R			00914	Set ID- TXA
2	30	IS	R		0270	00915	Document Type

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	ELEMENT NAME
3	2	ID	C		0191	00916	Document Content Presentation
5	250	XCN	C	Y		00918	Primary Activity Provider Code/Name
7	26	TS	C			00920	Transcription Date/Time
11	250	XCN	C	Y		00924	Transcriptionist Code/Name
12	30	EI	R			00925	Unique Document Number
13	30	EI	RE			00926	Parent Document Number
14	22	EI	RE	Y		00216	Placer Order Number
15	22	EI	RE			00217	Filler Order Number
16	30	ST	RE			00927	Unique Document File Name
17	2	ID	RE		See table 4.7-10	00928	Document Completion Status
21	30	ST	C			00933	Document Change Reason
22	250	PPN	RE	Y		00934	Authentication Person, Time Stamp

Adapted from the HL7 Standard, version 2.5

TXA-13 Parent Document shall contain the OID of the document being replaced.

1145 **4.7.4.2.3 Expected Actions**

The Enterprise Report Repository shall replace the existing document, identified in TXA-13 of the MDM^T09, with the new document, and make the report available to other systems in the Enterprise, in a manner outside the scope of this transaction.

1150 The Department System Scheduler/Order Filler can use the information in the CARD-8 message to determine when to send an Order Complete message (ORM with status CM) to the Order Placer.

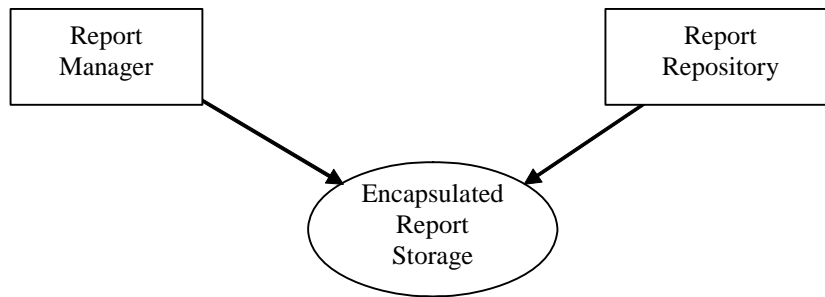
4.9 Encapsulated Report Storage [CARD-9]

1155 This section corresponds to Transaction CARD-9 of the IHE Technical Framework. Transaction CARD-9 is used by the Report Manager and Report Repository actors.

4.9.1 Scope

In the Encapsulated Report Storage transaction, the Report Manager transmits a DICOM Encapsulated PDF to the Report Repository for persistent storage.

4.9.2 Use Case Roles



1160

Actor: Report Manager

Role: Transmit reports to Report Repository.

Actor: Report Repository

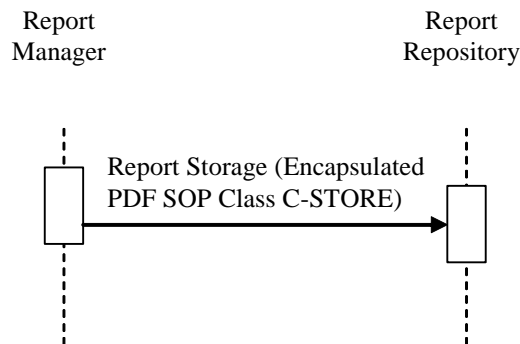
Role: Accept and store DICOM Encapsulated PDF Reports from Report Managers.

1165

4.9.3 Referenced Standards

DICOM 2007 PS 3.4: Storage SOP Class

4.9.4 Interaction Diagram



1170

4.9.4.1 Report Storage

This transaction relates to the “Report Storage (Encapsulated PDF SOP Class C-STORE)” event between the Report Manager and Report Repository in the above interaction diagram.

4.9.4.1.1 Trigger Events

1175

When the Report Manager has determined that a report is to be made available to the enterprise, and it supports the DICOM Storage option, it shall encapsulate the PDF report in a DICOM Instance and forward the report to the Report Repository.

4.9.4.1.2 Message Semantics

1180

The Report Manager uses the DICOM C-STORE message to transfer DICOM Encapsulated PDF objects. The SOP Instance UID of the DICOM Instance shall be the report OID encoded in the TXA-12 Unique Document Number field in the MDM message of Transaction CARD-7 conveying the Encapsulated report.

1185

The Report Manager shall assign values to all Type 1 attributes of the Encapsulated PDF Instance, in accordance with the DICOM Standard, based on fields in the MDM message of Transaction CARD-7 where applicable. The report manager shall also assign values to Type 2 attributes that are defined as required fields in the CARD-7 transaction

The Encapsulated PDF Instance shall include the attributes shown in Table 4.9-1 with the semantics as defined.

Table 4.9-1. Encapsulated PDF IOD Attributes

Attribute Name	Tag	Description
Verification Flag	(0040,A493)	Indicates whether the Encapsulated Document is Verified. Enumerated Values: UNVERIFIED = Not attested by a legally accountable person; corresponds to an HL7 TXA-17 Document Completion Status value other than “LA”. VERIFIED = Attested by a Verifying Observer or Legal Authenticator who is accountable for its content; corresponds to an HL7 TXA -17 Document Completion Status value “LA”
Burned In Annotation	(0028,0301)	Indicates whether or not the encapsulated document contains sufficient burned in annotation to identify the patient and date the data was acquired (This is always the case for the PDF content). Enumerated Value: YES
Acquisition Datetime	(0008,002A)	Populate Acquisition Datetime from OBR-7
Document Title	(0042,0010)	Populate Document Title from OBX-3
Patient Name	(0010,0010)	Populate Patient Name from PID-5

Patient ID	(0010,0020)	Populate Patient ID from PID-3
Name Code Seq	(0040,0A43)	Populate Doc Title from OBX-3
Study Instance UID	(0020,000D)	Populate Study Instance UID from OBX-5
Modality	(0008,0060)	If the report manager does not know the value, the value shall default to OT
Series Instance UID	(0020,000E)	The report manager shall generate this value
Series Number	(0020,0011)	The report manager shall generate this value
Instance Number	(0020,0013)	The report manager shall generate this value
MIME Type of Encapsulated Document	(0042,0012)	Application/PDF
Encapsulated Document	(0042,0011)	Report Manager to translate OBX 5-5 by unencoding from base64 to PDF binary

1190

4.9.4.1.3 Expected Actions

The Report Repository shall support Level 2 (Full) storage, which means all DICOM Type 1, 2 and 3 attributes (public and private) are stored.

1195 The Report Repository shall store the received DICOM Encapsulated PDF objects. It shall make them available for query and retrieve.

1200 Note: The Report Repository in the DRPT Profile is grouped with the RID Profile Information Source actor. The list of available reports is made available using transaction ITI-11 Retrieve Specific Info for Display, and the PDF content is made available for retrieve using transaction ITI-12 Retrieve Document for Display. The Retrieve Document for Display transaction provides the PDF content only, not the encapsulation of the PDF in the DICOM Instance.

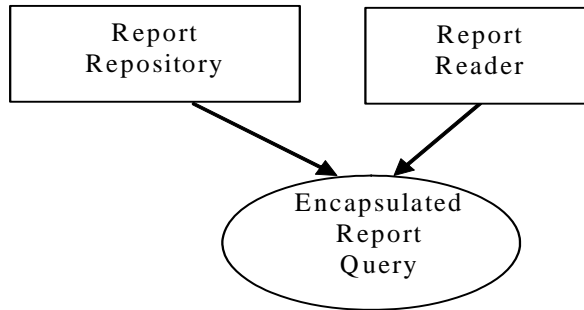
4.10 Encapsulated Report Query [CARD-10]

1205 This section corresponds to Transaction CARD-10 of the IHE Technical Framework.
Transaction CARD-10 is used by the Report Reader and Report Repository actors.

4.10.1 Scope

In the Encapsulated Report Query Transaction, the Report Reader queries the Report Repository for DICOM Encapsulated PDF Reports.

4.10.2 Use Case Roles



1210

Actor: Report Repository

Role: Responds to queries for DICOM Encapsulated PDF Reports.

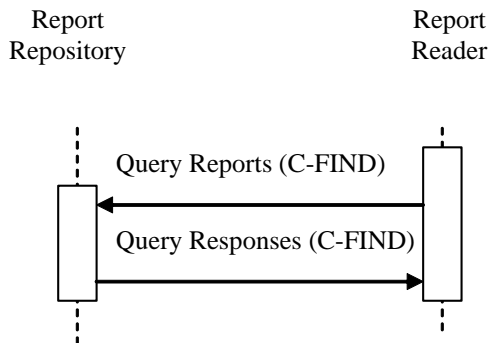
Actor: Report Reader

1215 **Role:** Queries Report Repository for DICOM Encapsulated PDF Reports and makes them available for selection.

4.10.3 Referenced Standards

DICOM 2007 PS 3.4: Query/Retrieve Service Class

4.10.4 Interaction Diagram



1220

4.10.4.1 Query Reports

1225 This transaction relates to the query section of the above interaction diagram. The Query (Study Root – FIND and optionally Patient Root – FIND) SOP Classes will be supported. Refer to DICOM 2003 PS 3.4: Query/Retrieve Service Class for detailed descriptive semantics.

Note: This Transaction is used in the DRPT Profile only by a Report Repository that supports the DICOM Storage Option.

4.10.4.1.1 Trigger Events

The user at the Report Reader wishes to view selected reports.

1230 4.10.4.1.2 Message Semantics

The message semantics are defined by the DICOM Query/Retrieve SOP Classes.

A C-FIND Request from the DICOM Study Root Query/Retrieve Information Model – FIND SOP Class or the DICOM Patient Root Query/Retrieve Information Model – FIND SOP Class shall be sent from the Report Reader to the Report Repository.

1235 The Report Reader uses one or more matching keys as search criteria to obtain the list of matching entries in the Report Repository at the selected level (Patient & Study/Series/Instance).

1240 In addition to the required and unique keys defined by the DICOM Standard, the IHE Technical Framework has defined matching and return keys to be supported by query SCUs and SCPs. The keys are defined in RAD-TF 2: 4.14.4.1.2, Table 4.14-1. The conventions for key usage are defined in section 2.2. For the Report Reader (SCU) and the Report Repository (SCP) the additional Encapsulated PDF Instance specific keys are defined in table 4.10-1.

Table 4.10-1. Encapsulated PDF Instance Specific Query Matching and Return Keys

Attribute Name	Tag	Query Keys Matching		Query Keys Return	
		SCU	SCP	SCU	SCP
Encapsulated PDF Instance Specific Level					
Verification Flag	(0040,A493)	R+	R+	R+	R+
Content Date	(0008,0023)	O	O	O	R+
Content Time	(0008,0033)	O	O	O	R+
Concept Name Code Sequence	(0040,A043)	R+	R+	R+	R+
>Code Value	(0008,0100)	R+	R+	R+	R+
>Coding Scheme Designator	(0008,0102)	R+	R+	R+	R+
>Coding Scheme Version	(0008,0103)	O	O	O	R+
>Code Meaning	(0008,0104)	O	O	R+	R+
Document Title	(0042,0010)	O	O	R+	R+

4.10.4.1.3 Expected Actions

1245 The Report Repository receives the C-FIND request, performs the matching on the provided keys and sends the list of matching records back to the Report Reader via C-FIND responses.

Note: See discussion of expected actions for Query in RAD-TF 2: 4.14.4.1.3.

4.11 Encapsulated Report Retrieve [CARD-11]

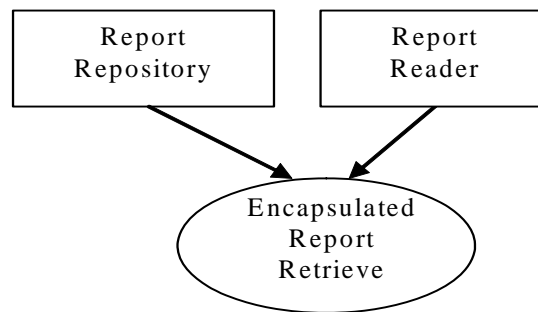
1250 This section corresponds to Transaction CARD-11 of the IHE Technical Framework.
Transaction CARD-11 is used by the Report Reader and Report Repository actors.

4.11.1 Scope

In the Retrieve Reports Transaction, the requested DICOM Encapsulated PDF Reports are transferred from the Report Repository to the Report Reader for viewing.

4.11.2 Use Case Roles

1255



Actor: Report Repository

Role: Sends requested DICOM Encapsulated PDF Reports to Report Reader.

Actor: Report Reader

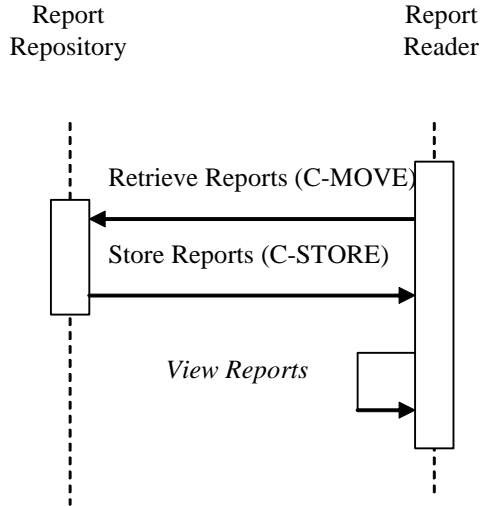
1260 **Role:** Retrieves DICOM Encapsulated PDF Reports from Report Repository and makes them available for viewing.

4.11.3 Referenced Standards

DICOM 2007 PS 3.4: Query/Retrieve Service Class

1265 DICOM 2007 PS 3.4: Storage SOP Class

4.11.4 Interaction Diagram



1270 **4.11.4.1 Retrieve Reports**

This transaction relates to the retrieve section of the above interaction diagram. The Retrieve (Study Root – MOVE and optionally Patient Root – MOVE) SOP Classes shall be supported. The Report Reader as an SCP and the Report Repository as an SCU shall support the DICOM Encapsulated PDF Storage SOP Class. Refer to DICOM PS 3.4, Annex C, for detailed descriptive semantics.

Note: This Transaction is used in the DRPT Profile only by a Report Repository that supports the DICOM Storage Option.

4.11.4.1.1 Trigger Events

The user at the Report Reader selects specific reports to view.

1280 **4.11.4.1.2 Message Semantics**

The DICOM Query/Retrieve SOP Classes and the DICOM Encapsulated PDF Storage SOP Classes define the message semantics.

1285 A C-MOVE Request from the DICOM Study Root Query/Retrieve Information Model – MOVE SOP Class or the DICOM Patient Root Query/Retrieve Information Model – MOVE SOP Class shall be sent from the Report Reader to the Report Repository.

4.11.4.1.3 Expected Actions

The Report Repository receives the C-MOVE request, establishes a DICOM association with the Report Reader and uses the DICOM Encapsulated PDF Storage SOP Class to transfer the requested reports.

1290

4.11.4.2 View Reports

This transaction relates to the “View Reports” event of the above interaction diagram.

4.11.4.2.1 Trigger Events

The Report Reader receives reports from the Report Repository.

1295

4.11.4.2.2 Invocation Semantics

This is a local invocation of functions at the Report Reader to initiate display of the encapsulated PDF report data.

4.11.4.2.3 Expected Actions

The Report Reader presents to the user the encapsulated PDF report data in accordance with the requirements of the PDF Specification.

1300

Add the following new appendices

Appendix D: Coded Report Titles

1305 Table D-1 shows examples of LOINC coded report titles that are appropriate for cardiology and radiology studies. This is not an exhaustive list, and LOINC may continue to add new report titles.

Note: This Table is similar to DICOM Context Group 7000.

Table D-1. Example LOINC Report Titles

Coding Scheme Designator	Code Value	Code Meaning
LN	18745-0	Cardiac Catheterization Report
LN	18750-0	Cardiac Electrophysiology Report
LN	18747-6	CT Report
LN	11540-2	CT Abdomen Report
LN	11538-6	CT Chest Report
LN	11539-4	CT Head Report
LN	18748-4	Diagnostic Imaging Report
LN	11522-0	Echocardiography Report
LN	11524-0	ECG Report
LN	18752-6	Exercise Stress Test Report
LN	18754-2	Holter Study Report
LN	18755-9	MRI Report
LN	11541-0	MRI Head Report
LN	18756-7	MRI Spine Report
LN	18757-5	Nuclear Medicine Report
LN	18758-3	PET Scan Report
LN	11528-7	Radiology Report
LN	18760-9	Ultrasound Report
LN	11525-3	Ultrasound Obstetric and Gyn Report

1310

Appendix E: Specializations of Transactions from other Domains

E.1 [ITI-30] Patient Identity Feed

This is a clarification of the ITI-30 transaction as used in conjunction with the DRPT profile

E.1.1 Expected Actions

1315 PAM requires the updating of the local database based on the Patient Identity Feed transaction. In the context of the Report Repository of the DRPT profile, which is grouped with the Patient Identity Consumer actor of the PAM profile, the receiving system will update the patient demographic information used to support Queries for Stored Reports.

1320 The Report Repository grouped with the PAM Demographics Source consumer will support either the Merge or the Link/Unlink options in the Patient Identity Feed Transaction.

Merge

1325 When the same patient has multiple registrations on the Patient Demographic Source, the registrations will be merged on the Patient Demographic Source to have a single patient record with a unique identifier and a Merge message will be sent to the Report Repository. The Report Repository database shall merge the demographics data based on the patient identifiers in the merge message and shall support demographics based queries of reports from the Report Reader and Display Actors in that profile. It is not required for the Report Repository to update the content of the stored PDF.

Link

1330 In a similar situation such as the Merge, the Patient Demographics Source may send a link message the patient records belonging to the same patient and send a Link message to the Report Repository to link the patient records instead of merging the two patient records. The Report Repository shall link the identifiers of the patient records in its database and both records shall persist. The Report Repository shall respond to queries for either patient identifier by providing the reports to both patient records

Unlink

1340 When the Report Repository receives an Unlink message for the Patient Demographics Source, the Report Repository shall unlink the identifiers of the two patient records that have been previously linked. While responding to queries on from other actors in that profile, the Report Repository shall provide only reports pertaining to records matching the patient identifier in the query.