

**ACC, HIMSS and RSNA
Integrating the Healthcare Enterprise**

**IHE Radiology Technical Framework
Supplement 2006-2007**

**Import Reconciliation Workflow
(IRWF)**

Draft for Trial Implementation

April 13, 2006

Contents

Foreword.....	2
1 Introduction.....	5
1.1 Background.....	5
1.2 Proposed Solution.....	5
1.3 Scope of Supplement.....	5
1.4 Open Issues and Questions.....	5
1.5 Closed Issues	1
1.6 Profile Abstract.....	2
2 GLOSSARY	2
Vol. 1	
1 Changes to Sections 1 – 1.10.....	3
1.7 History of Annual Changes.....	3
2 Integration Profiles.....	4
2.1.21 Import Reconciliation Workflow (IRWF)	5
2.2 Actor Descriptions.....	6
21 Import Reconciliation Workflow (IRWF).....	17
<u>21.1 Actors/Transactions</u>	18
21.2 Import Reconciliation Workflow Integration Profile Options	19
21.2.1 <u>Scheduled Import Option</u>	20
21.2.2 <u>Unscheduled Import Option</u>	20
21.3 Integration Workflow Process Flow.....	20
<u>21.3.1 Import Process Flow</u>	21
<u>21.3.2 Import Exception Management Workflow</u>	27
Vol. 2	
4.5 Query Modality Worklist.....	28
A: <Appendix A> Modality Worklist Integration-critical Attributes.....	34
<u>A.2 Imported Object Integration – Critical Attributes</u>	34
Vol. 3	
4.49 Instance Availability Notification	44
4.59 <u>Import Procedure Step In Progress</u>	46
4.59.1 <u>Scope</u>	46
4.59.2 <u>Use Case Roles</u>	46
4.59.3 <u>Referenced Standards</u>	47
4.59.4 <u>Interaction Diagram</u>	48
4.60 <u>Import Procedure Step Completed/Discontinued</u>	52
4.61. <u>Imported Objects Stored</u>	59
4.61.3 <u>Referenced Standards</u>	59
4.61.4 <u>Interaction Diagram</u>	60

Foreword

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 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. 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.

This initiative has numerous sponsors and supporting organizations in different medical specialty domains and geographical regions. In North America the primary sponsors are the American College of Cardiology (ACC), the Healthcare Information and Management Systems Society (HIMSS) and the Radiological Society of North America (RSNA). IHE Canada has also been formed. IHE Europe (IHE-EUR) is supported by a large coalition of organizations including the European Association of Radiology (EAR) and European Congress of Radiologists (ECR), the Coordination Committee of the Radiological and Electromedical Industries (COCIR), Deutsche Röntgengesellschaft (DRG), the EuroPACS Association, Groupement pour la Modernisation du Système d'Information Hospitalier (GMSIH), Société Française de Radiologie (SFR), Società Italiana di Radiologia Medica (SIRM), the European Institute for health Records (EuroRec), and the European Society of Cardiology (ESC). In Japan IHE-J is sponsored by the Ministry of Economy, Trade, and Industry (METI); the Ministry of Health, Labor, and Welfare; and MEDIS-DC; cooperating organizations include the Japan Industries Association of Radiological Systems (JIRA), the Japan Association of Healthcare Information Systems Industry (JAHIS), Japan Radiological Society (JRS), Japan Society of Radiological Technology (JSRT), and the Japan Association of Medical Informatics (JAMI). Other organizations representing healthcare professionals are invited to join in the expansion of the IHE process across disciplinary and geographic boundaries.

The IHE Technical Frameworks for the various domains (IT Infrastructure, Cardiology, Laboratory, Radiology, etc.) defines specific implementations of established standards to 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 www.rsna.org/IHE or <http://www.himss.org/IHE>.

The IHE Technical Framework identifies a subset of the functional components of the healthcare enterprise, called IHE Actors, and specifies their interactions in terms of a set of coordinated, standards-based transactions. It describes this body of transactions in progressively greater depth. The volume I provides a high-level view of IHE functionality, showing the transactions organized into functional units called Integration Profiles that highlight their capacity to address specific clinical needs. The subsequent volumes provide detailed technical descriptions of each IHE transaction.

This supplement to the IHE Radiology Technical Framework V1.0 is submitted for Trial Implementations.

Date: <April 13, 2006>

Authors: < Cynthia Levy , Peter Kuzmak, Andrew Casertano, Dr. Ruth Dayhoff >

These "boxed" instructions for the author to indicate to the Volume Editor how to integrate the relevant section(s) into the overall Technical Framework

1 Introduction

The Import Reconciliation Workflow Profile describes workflow details for the import of Evidence Objects (e.g. DICOM images) and Non-Digital Data (e.g. scanned films, documents) imported as DICOM Objects into the Enterprise. This includes the potential use of worklists, procedure step status messages and handling the coercion of critical attribute values such as patient demographics in the imported data. Preserving a copy of the original demographics (e.g. original patient ID) in the objects is also addressed.

1.1 Background

Organizations often need to share radiology information (e.g. Images, Reports) from an external enterprise. This need may be a result of an externally referred acquisition, an externally referred read, a need for patient priors or just additions to a patient history/record. This data may be in the form of scanned films, scanned documents or digital images. No defined mechanism for providing demographics, reconciliation and integrating into the department workflow currently exists.

1.2 Proposed Solution

This supplement defines mechanisms for obtaining accurate, local patient demographics to reconcile imported data, for providing notification and status of the import activity (which can be used to trigger further workflow), and optionally for scheduling an import worklist in the first place. The goal is to ensure that the process for local import of digital Evidence Objects is as robust as the process for image acquisition using Scheduled Workflow. The mechanisms are equally applicable to hardcopy import.

1.3 Scope of Supplement

The profile addresses import of DICOM Composite objects (including images, presentation states, key image notes, and structured reports (diagnostic reports and evidence documents)). The source of the data may be digital media (e.g. Portable Data for Imaging Media) or scanned hardcopy (i.e. film and paper). In all cases the Patient must be registered so that the critical attributes may be obtained and reconciled. The importation itself may be scheduled or unscheduled, and it may or may not be associated with an active imaging procedure at the importing institution. All of the imported data is stored as DICOM Objects. This Supplement is *not* intended for PACS migration.

1.4 Open Issues and Questions

1. New DICOM Codes need to be given to the new Exception Management Codes ID 9300 – Procedure Discontinuation Reasons and the new Contributing Equipment Codes. Code ID 7005 – Contributing Equipment. DICOM CPs are in-process.

2. A new Context ID Table – Import Device Media needs to be created along with the appropriate codes. DICOM CP is in-process.
3. ITI CP to include the Importer as a user of the Patient Demographics Query [ITI-21] transaction.

5 1.5 Closed Issues

1. This profile addresses only the import of DICOM Objects. This includes all types of Evidence Objects (.e.g SR Reports, Encapsulated PDFs, DICOM Composite Objects,).
2. This profile addresses the import of both Portable Media (digital DICOM data) and non-digital data converted to DICOM Objects (Evidence Objects)
- 10 3. No additional Security consideration beyond the PDI Media Profile will be considered as a part of this profile development.
4. The importation workflow for Cardiology is similar to Radiology. The Evidence Objects that will need to be imported include: DICOM Report/Image/ECG Objects. The data may be reviewed locally first, and only imported after the consultation.
- 15 5. Support for non-DICOM data on the Portable Media (e.g. PDI web option, Cardiology multi-frame MPEG) is out of scope.
6. Imported images will be treated as generic Stored Instances (analagous to Teaching File and Clinical Trial Export). DICOM Composite Objects (Images, SR Reports, Encapsulated PDFs, etc.) are not differentiated.
- 20 7. The John Doe Case will not be discussed since it is an unlikely case.
8. Coercion of the Patient Demographics is documented in Rad-TF Vol. 2, Appendix A and referenced in the Import Performed Procedure Step In-Progress and the Imported Objects Stored transactions.
- 25 9. In order to differentiate the fact that the system is importing Evidence Objects rather than creating them, the Contributing Equipment Sequence in the Evidence Object will record that the importer contributed an Import action.
- 30 10. Use Cases will be limited to the Portable Data for Imaging and Hardcopy Imports, but the language should be made more generic to allow for future expansion in the future. This will be accomplished by groupings. The Import will be for all types of imports, with expansion into and this Actor may be grouped with other Actors that know about the specifics of importing from specific transport mechanisms.
- 35 11. Tamperproofing (hardening) of the Portable Media process is out of scope for this Profile at this time. Standardized tamperproofing mechanisms for a single Portable Media have been created, but not for multiple media. Additionally, receipt confirmation mechanisms have not been developed. Inclusion of media tamperproofing in IHE will impact both the PDI and IRWF profiles.

12. For consistency Charge Posting will be included.
13. All Evidence Objects are imported into the system using the Image Manager/Image Archive. Once the Evidence Objects are imported, the appropriate Actors will be able to access them using the appropriate profile.
- 5 14. Scheduled Import and Unscheduled Import will both be Options on the profile. Implementations may include one or both of these options.
15. DICOM CP 526, the Original Attribute Sequence has been approved by DICOM.

1.6 Profile Abstract

- 10 The *Import Reconciliation Workflow Integration Profile (IRWF)* specifies how data Importers obtain local demographics, coerce patient and procedure attribute values in the imported data and report progress/status of the importation process. The Profile complements the Scheduled Workflow Profile by using the existing workflow mechanisms for notification and storage of imported Evidence Objects.

15 2 GLOSSARY

Hardcopy Import – The process of importing non-digital data into the Enterprise as DICOM Objects. The original data may be Films or Documents that are scanned and stored as DICOM Objects.

Volume I – Integration Profiles

1 Changes to Sections 1 – 1.10

None

1.7 History of Annual Changes

5 *Add the following bullet to the end of the bullet list in section 1.7*

- **Added the Importer Actor to the Charge Posting Profile.**
- **Added the Import Reconciliation Workflow Profile:**
 - **Added Importer as a possible client of Query Modality Worklist transactions.**
 - 10 • **Added the ability for the Importer to obtain Patient Demographics using the ITI Patient Demographics Query.**
 - **Added the Import Performed Procedure Step In Progress transaction to support the Modality Performed Procedure Step SOP Class (N-CREATE Service) and handle nuances specific to importation.**
 - 15 • **Added the Import Performed Procedure Step Completed/Discontinued transaction to support the Modality Performed Procedure Step SOP Class (N-SET Service) and handle nuances specific to importation. This includes details to bill specifically for the importation.**
 - **Added the Imported Objects Stored transaction to store a variety of objects and address how various attributes should be coerced.**
 - 20 • **Added new tables to Appendix A detailing the coercions and consistency required between the original data, the worklist (if used), the MPPS and the resulting imported data.**
 - **Added new Audit events for the Import Reconciliation Workflow transactions.**

2 Integration Profiles

Update Figure 2.1 to add Reconciliation Workflow Integration Profile when added to the Technical Framework.

5

Modify the following table as shown

Table 2-1. Integration Profiles Dependencies

Integration Profile	Depends on	Dependency Type	Comments
Consistent Presentation of Images	<i>None</i>	<i>None</i>	-
Key Image Notes	<i>None</i>	<i>None</i>	-
NM Image	<i>None</i>	<i>None</i>	
Evidence Documents	<i>None</i>	<i>None</i>	-
Simple Image and Numeric Report	<i>None</i>	<i>None</i>	-
Access to Radiology Information	One or more of : { Scheduled Workflow Consistent Presentation of Images, Evidence Documents, Key Image Notes, Simple Image and Numeric Reports }	Required for Content output	Supporting the image related transactions of Scheduled Workflow counts as a Content profile
Scheduled Workflow	<i>None</i>	<i>None</i>	-
Presentation of Grouped Procedures	Scheduled Workflow	Required for workflow	-
	Consistent Presentation of Images	Required for Content output	-
Post-Processing Workflow	Scheduled Workflow	Required for workflow management	-
	One or more of : { Scheduled Workflow, Evidence Documents, NM Image }	Required for Content input	Supporting the image related transactions of Scheduled Workflow counts as a Content profile
	One or more of : { Scheduled Workflow Consistent Presentation of Images, Evidence Documents, Key Image Notes }	Required if any output is produced	Supporting the image related transactions of Scheduled Workflow counts as a Content profile
Reporting Workflow	Scheduled Workflow	Required for workflow management	-

Integration Profile	Depends on	Dependency Type	Comments
	One or more of : { Scheduled Workflow, Evidence Documents, NM Image }	Required for Content input	Supporting the image related transactions of Scheduled Workflow counts as a Content profile.
	Simple Image and Numeric Reports	Required for Content input/output	-
Charge Posting	One or More of : { Scheduled Workflow, Post-Processing Workflow, Reporting Workflow <u>Import Reconciliation Workflow</u> }	Required for charge trigger input	-
Patient Information Reconciliation	Scheduled Workflow	Required for workflow/content to manage	Patient Information Reconciliation is an extension to this profile requiring that the workitems and/or content be updated.
Portable Data for Imaging	<i>None</i>	<i>None</i>	-
<u>Import Reconciliation Workflow</u>	<u>Scheduled Workflow</u>	<u>Required for Workflow (including Scheduled Import Option)</u>	<u>Support the workflow related transactions of Scheduled Workflow.</u>
	<u>Patient Demographics Query [ITI]</u>	<u>Required for Unscheduled Import Option</u>	<u>Patient Demographic information is obtained using Patient Demographic Query.</u>

Addition of Integration Profile definition Section 2.1.21

2.1.21 Import Reconciliation Workflow (IRWF)

- 5 **The *Import Reconciliation Workflow Integration Profile (IRWF)* specifies how data Importers obtain local demographics, coerce patient and procedure attribute values in the imported data and report progress/status of the importation process. The Profile complements the Scheduled Workflow Profile by using the existing workflow mechanisms for notification and storage of imported Evidence Objects.**

2.2 Actor Descriptions

Addition of Importer and Patient Demographic Supplier Actor Definitions Section 2.2

- 5 **Importer – A system that imports evidence objects such as images, presentation states, Key Image Notes or Evidence Documents from hardcopy or digital media.**
- Patient Demographics Supplier – A repository of patient information that can be searched on demographic related fields. This actor is defined in the ITI Technical Framework.**

10 **Table 2.2-1. Integration Profile Actors**

Integration Profile Actor	SWF	PIR	PWF	RWF	CHG	CPI	PGP	KIN	ED	NM	SINR	PDI	ARI	<u>IRWF</u>
Acq. Modality	X	X			X	X	X	X	X	X				
ADT Patient Reg.	X	X			X									
Audit Record Rep														
Charge Processor					X									
Display (ITI)												X		
DSS/OF	X	X	X	X	X		X							<u>X</u>
Enterprise Rep. Repository											X			
Evidence Creator	X		X		X	X		X	X	X				
Ext. Rep. Access											X		X	
Image Archive	X	X	X	X		X	X	X	X	X			X	<u>X</u>
Image Display	X		X			X		X	X	X		X	X	
Image Manager	X	X	X	X		X	X	X	X	X			X	<u>X</u>
Order Placer	X	X												
Portable Media Creator												X		

Integration Profile	SWF	PIR	PWF	RWF	CHG	CPI	PGP	KIN	ED	NM	SINR	PDI	ARI	<u>IRWF</u>
Actor														
Portable Media Importer												X		
Post-Processing Manager			X		X									
PPS Manager	X	X		X	X		X							<u>X</u>
Print Composer						X						X		
Print Server						X								
Report Creator				X					X		X			
Report Manager		X		X	X						X			
Report Reader				X							X	X	X	
Report Repository		X									X		X	
Secure Node														
Time Server														
<u>Importer</u>					<u>X</u>									<u>X</u>
<u>Patient Demographics Supplier</u>														<u>X</u>

Replace Transaction Description Section 2.3

- 5 **5. Query Modality Worklist – In response to a query (with optional filtering) a list of Scheduled Procedure Steps with selected demographic and order information is returned.**

Added Transaction Descriptions for Import Procedure Step In Progress, Import Procedure Step Completed and Imported Objects Stored. Added reference to ITI Patient Demographics Query in Section 2.3

- 10 **59. Import Procedure Step In Progress – The Performed Procedure Step Manager receives progress notification of an importation Procedure Step and in turn notifies the Order Filler, Image Manager and the Report Manager.**

60. Import Procedure Step Completed – The Performed Procedure Step Manager receives completion notification of an importation Procedure Step and in turn notifies the Order Filler, Image Manager and the Report Manager.

5 **61. Imported Objects Stored – A system importing DICOM Objects or digitized hardcopy sends imported DICOM Composite Objects to the Image Archive.**

10 **[ITI-21] Patient Demographics Query: Look up and return patient demographic information in a single patient demographics source, based upon matches with full or partial demographic information entered by the user. This transaction is defined in the ITI Technical Framework.**

Modified Table 2.3-1 to include IRWF as an Integration Profile and connect it to the appropriate Transactions.

5

Table 2.3-1. Integration Profile Transactions

Integration Profile Transaction	SWF	PIR	PWF	RWF	CHG	CPI	PGP	KIN	ED	NM	SINR	PDI	ARI	<u>IRWF</u>
Patient Registration [RAD-1]	X				X									
Placer Order [RAD-2]	X													
Filler Order [RAD-3]	X													
Procedure Scheduled [RAD-4]	X			X										
Query Modality Worklist [RAD-5]	X	X												<u>X</u>
Modality Procedure Step In Progress [RAD-6]	X	X					X							
Modality Procedure Step Completed [RAD-7]	X	X		X	X		X							
Modality Images Stored [RAD-8]	X	X				X				X				
Modality Presentation State Stored [RAD-9]						X	X							
Storage Commitment [RAD-10]	X	X				X		X	X	X				<u>X</u>
Images Availability Query [RAD-11]	X	X	X	X										
Patient Update [RAD-12]	X	X		X										
Procedure Update [RAD-13]	X	X		X										
Query Images [RAD-14]	X		X			X		X	X	X			X	
Query Presentation States [RAD-15]						X							X	
Retrieve Images [RAD-16]	X	X	X	X		X		X		X			X	
Retrieve Presentation States [RAD-17]						X							X	
Creator Images Stored [RAD-18]	X		X			X				X				

IHE Technical Framework Supplement – IRWF Profile Draft for Trial Implementation

Integration Profile Transaction	SWF	PIR	PWF	RWF	CHG	CPI	PGP	KIN	ED	NM	SINR	PDI	ARI	<u>IRWF</u>
Creator Presentation State Stored [RAD-19]						X								
Creator Procedure Step In Progress [RAD-20]	X				X									
Creator Procedure Step Complete [RAD-21]	X				X									
Print Request with Presentation LUT [RAD-23]						X								
Report Submission [RAD-24]											X	X		
Report Issuing [RAD-25]											X	X		
Query Reports [RAD-26]		X									X	X	X	
Retrieve Reports [RAD-27]		X									X	X	X	
Structured Report Export [RAD-28]											X	X		
Key Image Note Stored [RAD-29]								X						
Query Key Image Notes [RAD-30]								X					X	
Retrieve Key Image Notes [RAD-31]								X					X	
Authenticate Node [RAD-32]														
Maintain Time [RAD-33]														
Record Audit Event [RAD-34]														
Charge Posted [RAD-35]					X									
Account Management [RAD-36]					X									
Query Post-Processing Worklist [RAD-37]			X											
Workitem Claimed [RAD-38]			X	X										
Workitem PPS In-Progress [RAD-39]			X	X										

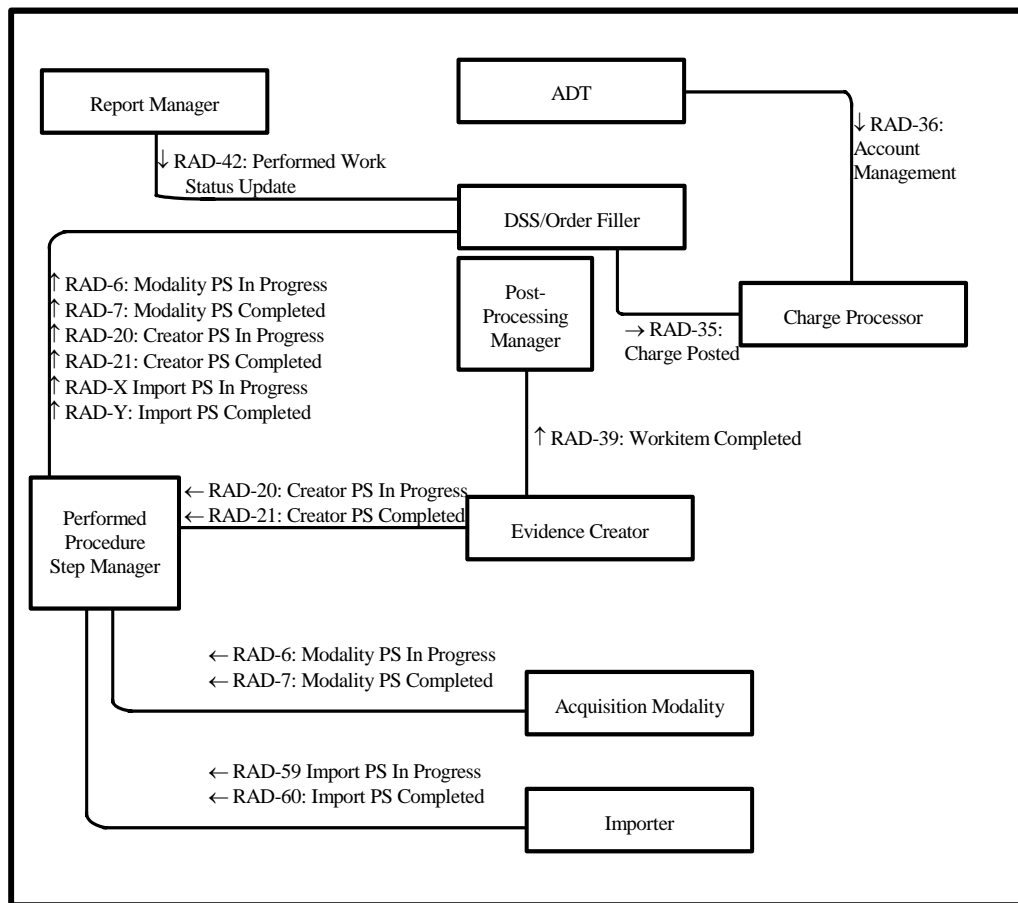
Integration Profile Transaction	SWF	PIR	PWF	RWF	CHG	CPI	PGP	KIN	ED	NM	SINR	PDI	ARI	<u>IRWF</u>
Workitem PPS Completed [RAD-40]			X	X										
Workitem Completed [RAD-41]			X	X										
Performed Work Status Update [RAD-42]	X		X	X	X									
Evidence Documents Stored [RAD-43]									X					
Query Evidence Documents [RAD-44]									X				X	
Retrieve Evidence Documents [RAD-45]									X				X	
Query Reporting Worklist [RAD-46]		X		X										
Distribute Imaging Information on Media [RAD-47]												X		
Appointment Notification [RAD-48]	X													
Instance Availability Notification [49]	X													
<u>Import Procedure Step In Progress [RAD-X]</u>					<u>X</u>									<u>X</u>
<u>Import Procedure Step Completed [RAD-60]</u>					<u>X</u>									<u>X</u>
<u>Import Objects Stored [RAD-61.]</u>														<u>X</u>
<u>Patient Demographics Query [ITI-21]</u>														<u>X</u>

Modification of Actors to group with the Portable Media Importer; Additional grouping listed in Section 2.4

- The Portable Media Importer shall be grouped with at least one of the following actors in order to complete import of the supported evidence objects and/or Diagnostic Reports:
- 5
- Evidence Creator (Evidence Documents)
 - Acquisition Modality (Images, Key Image Notes, Evidence Documents)
 - Image Manager/Image Archive (Images, Presentation States, Key Image Notes, Evidence Documents)
 - Report Creator (Diagnostic Reports)

- Report Manager (Diagnostic Reports)
 - Report Repository (Diagnostic Reports)
 - **Importer**
- 5 • **The Importer Actor is generic in terms of not defining a specific transport mechanism for the Evidence Objects it imports. It may be necessary for the Importer to be grouped with additional Actors to support specific transport mechanisms. For example, to support import from PDI Media, the Import Actor must be grouped with the Portable Media Importer Actor.**

10 ***Update Figure 11.1-1 Addition of Importer Actor into Charge Posting.***



15 ***Update Table 11.1-1 Addition of Importer Actor into Charge Posting Table plus associated note.***

Table 11.1-1. Charge Posting – Actors and Transactions

Actors	Transactions	Optionality	Vol II / III Section
ADT Patient Registration	Account Management [RAD-26]	R	4.36
Department System Scheduler/ Order Filler/Performed Procedure Step Manager	Charge Posted [RAD-26]	R	4.35
	Modality Procedure Step In Progress [RAD-6]	R	4.6
	Modality Procedure Step Completed [RAD-7] (note 2)	R	4.7
	Creator PS In Progress [RAD-20]	R	4.20
	Creator PS Completed [RAD-21]	R	4.21
	Performed Work Status Update [RAD-42]	R	4.42
Acquisition Modality	Modality Procedure Step In Progress [RAD-6] (note 1)	R	4.6
	Modality Procedure Step Completed [RAD-7] (note 2)	R	4.7
Report Manager	Performed Work Status Update [RAD-42]	R	4.42
Evidence Creator	Creator PS In Progress [RAD-20]	R	4.20
	Creator PS Completed [RAD-21]	R	4.21
Post-Processing Manager (note 3)	Workitem Completed [RAD-39]	R	4.39
Charge Processor	Charge Posted [RAD-35]	R	4.35
	Account Management [RAD-36]	R	4.36
<u>Importer</u>	<u>Import Procedure Step In Progress [RAD-59]</u>	<u>R</u>	<u>4.60</u>
	<u>Import Procedure Step Completed [RAD-60] (note 4)</u>	<u>R</u>	<u>4.61.</u>

Note 4: To claim the Charge Posting Profile, the Importer is required to support the Billing and Material Management Option (see RAD TF-3: 4.60.4.1.2.3).

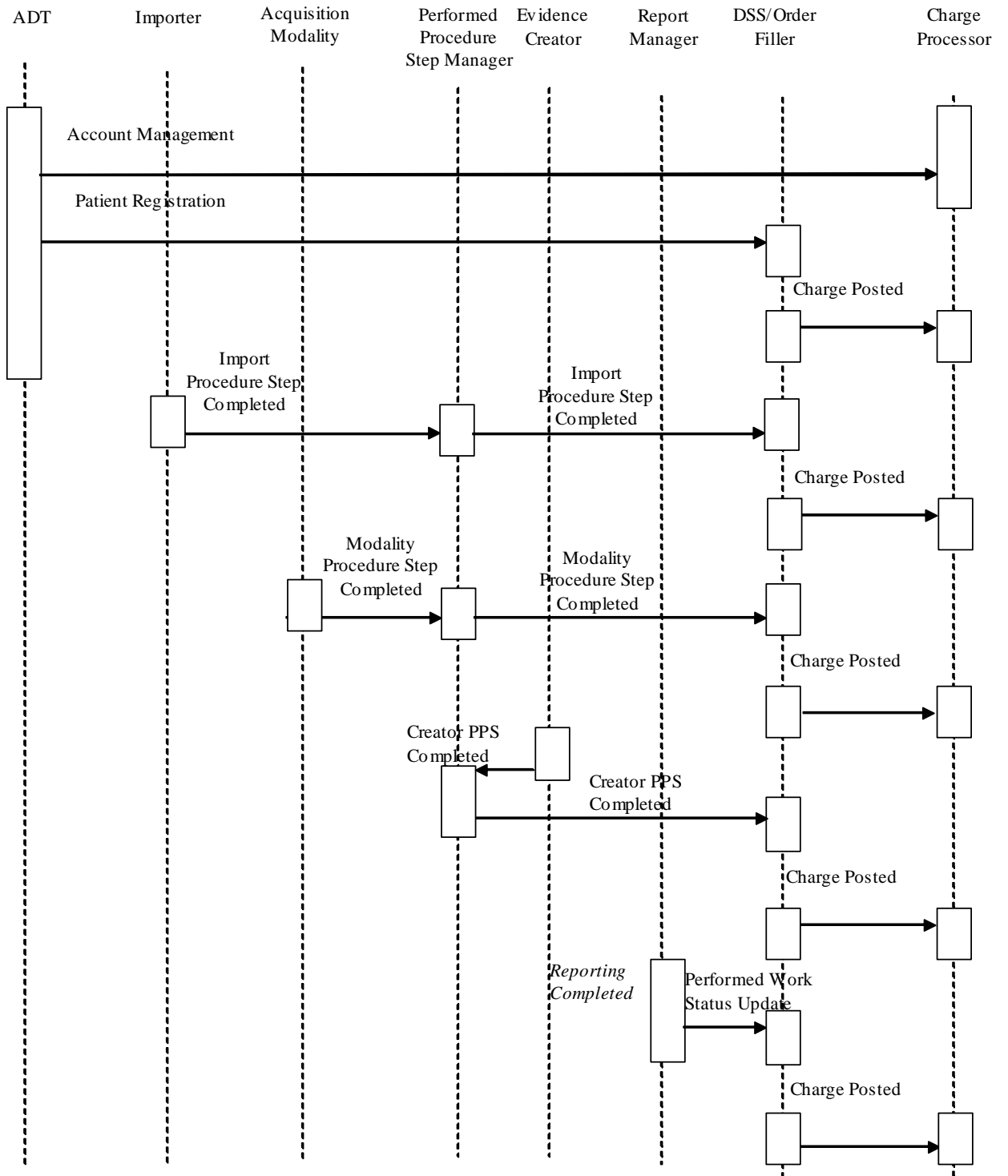
5 **Update Table 11.2-1 Addition of Importer into Charge Posting.**

Table 11.2-1 Charge Posting – Actors and Options

Actor	Options	Vol & Section
ADT Patient Registration	<i>No options defined</i>	-
Department System Scheduler/ Order Filler	<i>No options defined</i>	-

Actor	Options	Vol & Section
Acquisition Modality	PPS Exception Management	II 4.7
	Modality Group Case	II.4.6
Performed Procedure Step Manager	<i>No options defined</i>	-
Evidence Creator	<i>No options defined</i>	-
Report Manager	<i>No options defined</i>	-
Charge Processor	<i>No options defined</i>	-
<u>Importer</u>	<u>Billing and Material Management</u>	<u>RAD TF-3:4.60</u>

Update Figure 11.3-1 Addition of Importer into Charge Posting Workflow Figure.



Update Sec. 15.3.2 Addition of reference to the IRWF Profile.

C) Media Import (Use Case 2):

5 The “Media Import” activity is accomplished by a Portable Media Importer and deals exclusively with the DICOM portion of the media content. The Portable Media Importer actor is grouped with one or more content actors (Evidence Creator, Report Creator, etc.), depending on the type of media content to be imported. The grouped actor provides storage capability for the media data accessed by the Portable Media Importer.

10 The Portable Media Importer actor accesses all DICOM instances referenced by the DICOMDIR file and enables the user to select a media patient dataset to be imported.

The Portable Media Importer obtains local data that is known to be accurate within the importing institution/enterprise and reconciles “key attributes” of patient and study information (when required). **A method for performing these steps is documented in the Import Reconciliation Workflow Profile (see Section 3.21).** Refer to RAD TF-3: 4.47.4.1.3. for the list of “key attributes” and the related reconciliation actions to be performed.

15

Addition of Section 21 – New Scheduled Workflow for Portable Media Import

21 Import Reconciliation Workflow (IRWF)

5 **The *Import Reconciliation Workflow Integration Profile (IRWF)* specifies both the data and workflow requirements for importing existing Evidence Objects and importing Hardcopy from an external Enterprise. Worklists and Patient Demographics Query are provided as mechanisms to provide local patient and procedure information to be used in the process of reconciling the imported patient/procedure information. Procedure Step Completed messages enable subsequent workflow steps to occur based on the importation of the Evidence Objects.**

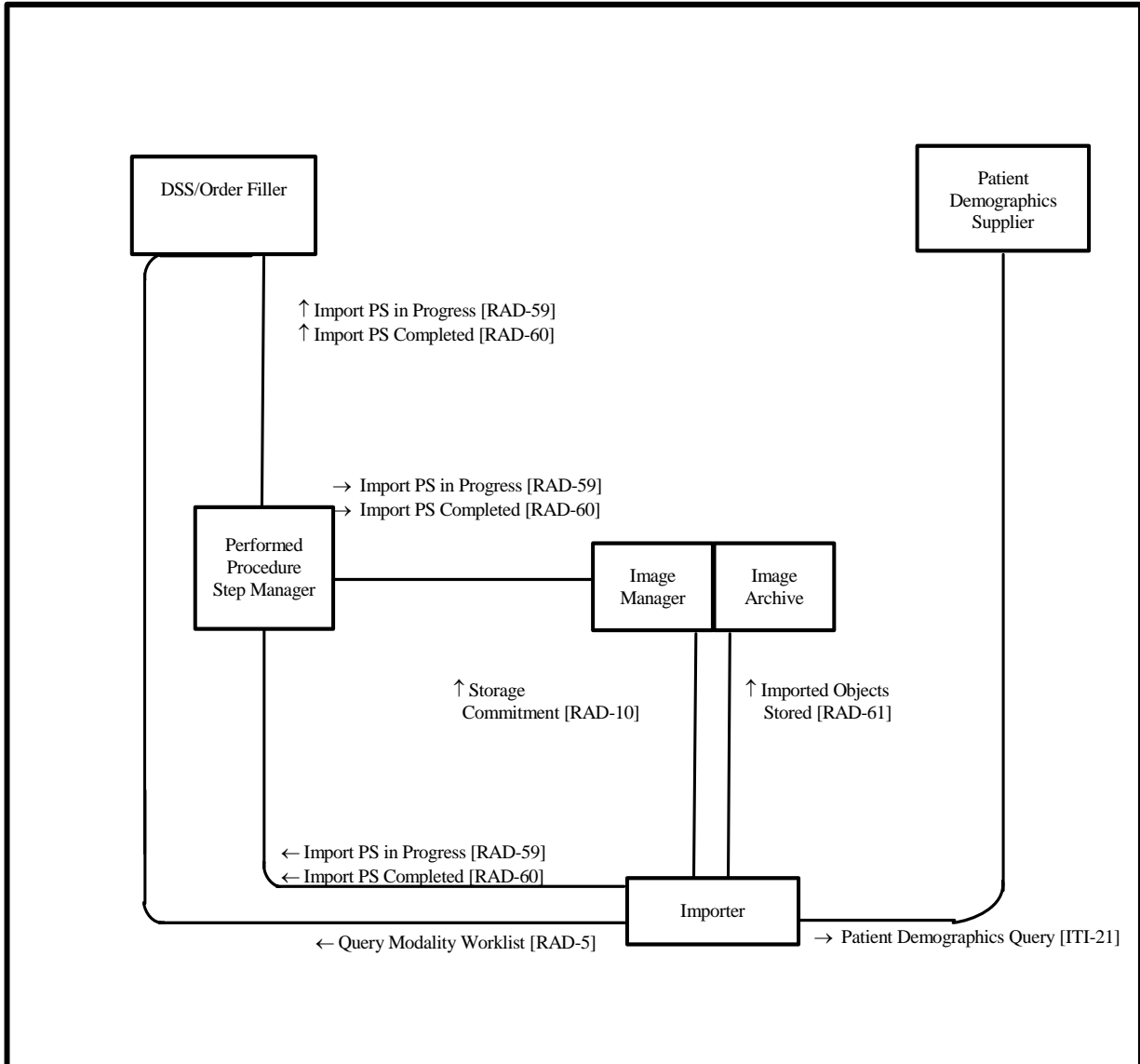
10 **Reconciling critical patient demographics (e.g. Patient Name, Patient ID) and order/procedure Information (e.g. Accession Number) is an important part of the importation process since the local Enterprise will typically have different identifiers (for patient, orders, etc.) from the Enterprise that created the Evidence Objects or Hardcopy being imported.**

15 **When the attribute values must be changed, this Profile provides a mechanism to preserve a copy of the original values inside the imported DICOM Composite Objects.**

This profile also makes it possible to determine whether images, reports and other evidence objects associated with a particular import have been stored (archived) and are available to subsequent workflow steps, such as post-processing and reporting.

21.1 Actors/Transactions

Figure 21.1-1 diagrams the actors involved with this profile and the transactions between them.



5

Figure 21.1-1. Import Reconciliation Workflow Diagram

Table 21.1-1 lists the transactions for each actor directly involved in the Import Reconciliation Workflow Integration Profile. In order to claim support of this Integration Profile, Import Reconciliation Actors present in the Scheduled Workflow Profile must also

support Scheduled Workflow and 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 21.2.

Actors	Transactions	Optionality	Vol Section
<u>Department System Scheduler/ Order Filler</u>	<u>Import Procedure Step In Progress [RAD-59]</u>	<u>R</u>	<u>4.59</u>
	<u>Import Procedure Step Completed [RAD-60]</u>	<u>R</u>	<u>4.60</u>
<u>Patient Demographics Supplier</u>	<u>Patient Demographics Query [ITI-21]</u>	<u>R</u>	<u>ITI TF-2:4.21</u>
<u>Importer</u>	<u>Query Modality Worklist [RAD-5] (Note 1)</u>	<u>O</u>	<u>4.5</u>
	<u>Patient Demographics Query [ITI-21] (Note 1)</u>	<u>O</u>	<u>ITI TF-2:4.21</u>
	<u>Import Procedure Step In Progress [RAD-59]</u>	<u>R</u>	<u>4.59</u>
	<u>Import Procedure Step Completed [RAD-60]</u>	<u>R</u>	<u>4.60</u>
	<u>Imported Objects Stored [RAD-61.]</u>	<u>R</u>	<u>4.61.</u>
	<u>Storage Commitment [RAD-10]</u>	<u>R</u>	<u>4.10</u>
<u>Image Manager/ Image Archive</u>	<u>Import Procedure Step In Progress [RAD-59]</u>	<u>R</u>	<u>4.59</u>
	<u>Import Procedure Step Completed [RAD-60]</u>	<u>R</u>	<u>4.60</u>
	<u>Imported Objects Stored [RAD-61.]</u>	<u>R</u>	<u>4.61.</u>
	<u>Storage Commitment [RAD-10]</u>	<u>R</u>	<u>4.10</u>
<u>Performed Procedure Step Manager</u>	<u>Import Procedure Step In Progress [RAD-59]</u>	<u>R</u>	<u>4.59</u>
	<u>Import Procedure Step Completed [RAD-60]</u>	<u>R</u>	<u>4.60</u>

5 **Note 1: The Importer shall support at least one of the Query Modality Worklist or Patient Demographics Query transactions.**

Refer to Table 2-1 for other profiles that may be pre-requisites for this profile

21.2 Import Reconciliation Workflow Integration Profile Options

10 **Options that may be selected for this Integration Profile are listed in the table 21.2-1 along with the Actors to which they apply. Dependencies between options, when applicable, are specified in notes.**

Table 21.2-1: Import Reconciliation Workflow - Actors and Options

<u>Actor</u>	<u>Option</u>	<u>Vol I/II/III</u>
<u>Department System Scheduler/ Order Filler</u>	<u>No Option Defined</u>	=
<u>Importer</u>	<u>Scheduled Import (note 1)</u>	<u>RAD TF-1:21.2.1</u>
	<u>Unscheduled Import (note 1)</u>	<u>RAD TF-1:21.2.2</u>
	<u>Billing and Material Management</u>	<u>RAD TF III 4.60</u>
<u>Image Manager/ Image Archive</u>	<u>No Option Defined</u>	=
<u>Performed Procedure Step Manager</u>	<u>No Option defined</u>	=

Note 1: The Importer shall support at least one of the Scheduled Import or Unscheduled Import options.

5 The Importer and Image Manager/ Image Archive will likely support a variety of DICOM SOP Classes. It is expected that this level of optionality will be documented in the DICOM Conformance Statement.

21.2.1 Scheduled Import Option

10 Importers claiming the Scheduled Import Option are required to support the Query Modality Worklist transaction (See RAD TF-2:4.5) to obtain import worklists and use the patient and procedure information provided to reconcile the imported data.

For further details of this option, refer to RAD TF-3:4.59.4.1.2.3.1.

21.2.2 Unscheduled Import Option

15 Importers claiming the Unscheduled Import Option are required to support the Patient Demographics Query transaction (See ITI-TF-2:4.21) to obtain patient demographics for reconciling the imported data.

For further details of this option, refer to RAD TF-3 4.59.4.1.2.3.2.

20 Note that the identifiers provided by the ITI Patient Demographic Supplier Actor are expected to be consistent with those that would be obtained using SWF transactions. This is necessary to ensure the synchronization of the Patient Demographics from both sources.

21.3 Integration Workflow Process Flow

This section describes the workflow related to importing DICOM data or importing hardcopy created external to the Enterprise. Import Reconciliation Workflow uses many transactions from Scheduled Workflow (See Section Rad TF-1: 3.3). In most cases there

are no changes in these transactions. See Appendix C for an overview of the information exchange between the Department System Scheduler/Order Filler and Image Manager.

5 Once the desired information has been imported into the local Enterprise it is up to the local institution to determine the retention policies for physical media associated with the import (e.g. films, CDs, DVDs) and the imported data itself.

21.3.1 Import Process Flow

10 This section describes the typical process flow for managed importation. This profile only applies to data from patients that have been registered and assumes that the patient demographics information is known and available to the local system and user. If the Patient is not registered, the data is imported and needs to be reconciled by other mechanisms such as PIR.

21.3.1.1 Use Cases

The primary use cases for importing radiology information are:

- 15 1. External Acquisition or Read: An institution has referred the patient to an external facility for acquisition, or for reading. The institution receives the acquired study on media from the external facility and imports it to the local archive.
- 20 2. External Priors: The institution receives media containing prior images and/or reports for a current patient. The data is imported to the local archive and associated with the patient's record so they can be referred to as priors during the reading of the current study.
- 25 3. Patient Referral: The institution receives media containing a patient's radiological history associated with a referral or patient transfer. The data is imported to the local archive and associated with the patient's record.

The importation may be managed in two different ways:

- 30 1. Scheduled Import: The institution schedules the import task on an importation worklist which provides the local demographics and local procedure information.
2. Unscheduled Import: The institution does not electronically schedule the import task and instead relies on the Importer to obtain local demographics from a Demographics Supplier.

35 In either case it is a prerequisite that the patient has been registered so that locally correct demographic information for the patients is available. Importation of "locally unknown" patients followed by Patient Information Reconciliation is not covered by this Integration Profile.

Importation could be performed piecewise on a physician’s workstation, or batched at a central location.

5 **The data may arrive at the institution by a variety of transport mechanisms including hardcopy (films, prints), media (CDs, DVDs) or simple network transfer. This profile does not dictate a particular transport mechanism.**

For any import, there may exist information in addition to the media, which will be taken into account by the importing enterprise but its usage is not specified by IHE. This information may be available electronically, written or orally. Main examples for such information are:

- 10
- **Administrative information like checklists, importation rules, workflow codes or billing items.**
 - **Clinical information like lab reports, discharge summaries, ECGs, potentially as PDI web data.**

15 **Note that the person importing the Evidence Objects or Hardcopy can be assumed to have the most comprehensive and complete information available for the importing task. In case of exceptions, the import may need to be aborted (see RAD TF:3-4.60.4.1.2.2 for Exception Management).**

20 **After the importation is done and the imported evidence objects are available through the Image Manager/ Image Archive (which may be indicated by an Instance Availability Notification), the enterprise may schedule subsequent steps like reading or reporting.**

21.3.1.2 Scheduled Import Process Flow

An enterprise internally schedules an import, e.g. associated with an external acquisition or read. There may be other scheduling items, which are not within the scope of the Technical Framework, but will be taken into account by the Enterprise:

- 25
- **For external referrals, patient and order information needs to be conveyed to the external Enterprise.**
 - **Clinical information may be received in addition to the DICOM information, e.g. electronic referrals, Lab Reports, Clinical Summaries, or PDI web information.**
 - **The importation of data is typically a scheduled event separate from how the data is used (images to be reported, historical data to be used in-conjunction with a current procedure, etc).**
 - **The importation scheduling information may include instructions, e.g. which studies, series or images are to be imported.**
- 30

35 **The following steps can be identified in the scheduled process flow:**

- **Using Scheduled Workflow, the relevant study data to be imported is available**

in the scheduled procedure step. Note that the Patient Registration and Procedure Ordering all uses the Scheduled Workflow Profile (See 3.3.1, 3.3.2, 3.3.3).

- 5 • **Depending on the type of media to be imported, the procedure step can be scheduled to the appropriate Importing device (e.g. Film Scanner, PDI Workstation).**
- 10 • **The SCHEDULED IMPORT Option is used to import the evidence objects and reconcile the patient and procedure data (e.g., to change the recorded Patient ID to the local Patient ID) using the Modality Worklist Query. The resultant DICOM objects are stored in the PACS.**
- **Errors and exceptions during import are handled by using Exception Management described in RAD TF3:4.60.4.1.2.2.**
- 15 • **Subsequent steps may be**
 - **performed, such as implicit post-processing (see section 3.3.5);**
 - **scheduled for a Post-Processing or Reporting Workflow, probably involving the availability notification option.**

20 **This process flow requires that the Patient be registered and that procedure step(s) be scheduled for the importation.. Associated Patient Registration Scheduling, and subsequent Availability or Notification transactions are part of the Scheduled Workflow (See Section 3.3). The following sequence of steps describes the typical process flow for the scheduled import of patient data.**

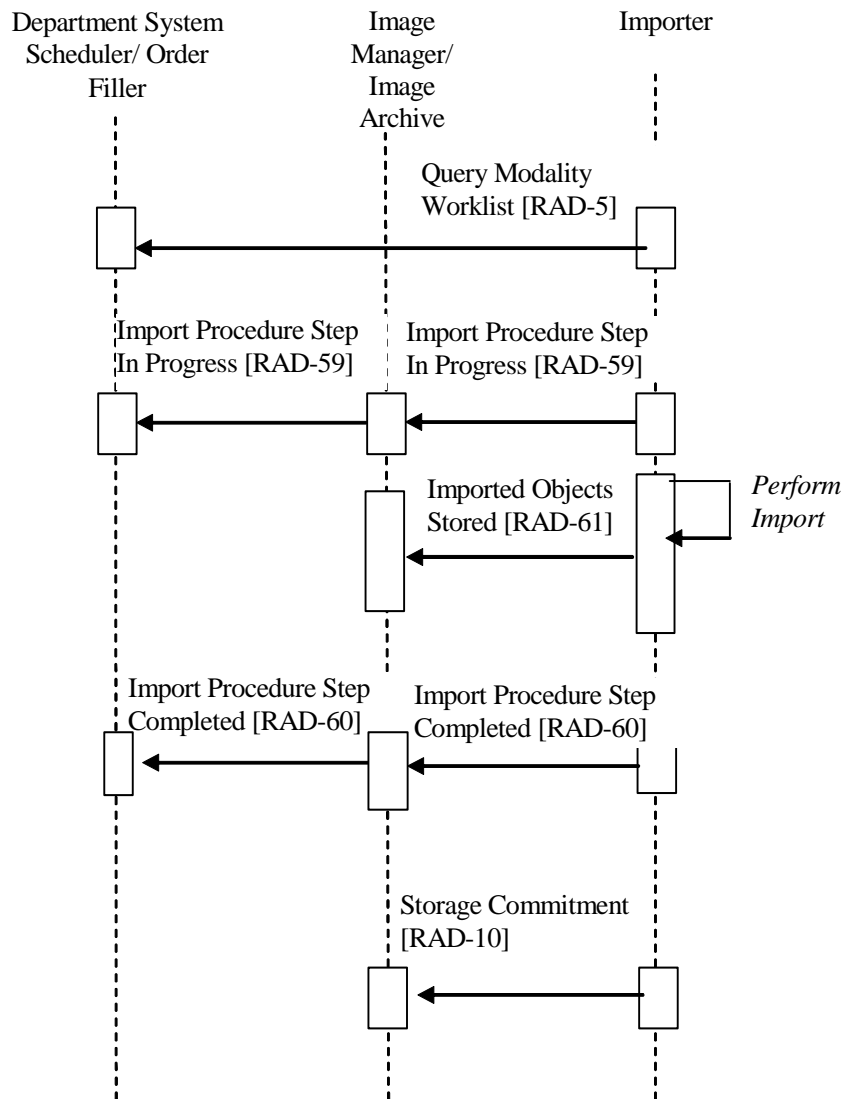


Figure 21.3.1-1. Scheduled Import Reconciliation Workflow Process Flow

21.3.1.2.1 Scheduled Import Data Reconciliation

5 **Importation requires that some of the Patient/Procedure information be treated differently than prescribed in Scheduled Workflow.**

The Study UID provided by the Modality Worklist shall be ignored and the reconciliation rules shall be followed. As part of the import process, the Importer reconciles the patient data as needed (e.g., to change the recorded Patient ID to the local Patient ID). See RAD TF-2: Appendix A.2 for a full list of the reconciliation requirements. The original DICOM

10

object identifiers must be maintained in the imported DICOM Composite Objects. The policies of the importing enterprise will determine

- **if demographics from the Import Data can be used (e.g Birth Date, Patient Sex).**
- 5 • **whether or how enterprise-specific codes in the imported data are coerced or ignored.**

21.3.1.3 Unscheduled Import Process Flow

10 **An enterprise has received evidence objects for import that are not part of an order or scheduled procedure in one of its information systems, e.g. relevant priors prior to a consultation. There is no scheduled procedure to trigger the importation. The actual task of importation may be a batched process that does not schedule individual importations.**

- 15 • **Aside from the physical media (e.g. films, CDs), there may be clinical information in addition to the DICOM data in electronic, written or oral format, such as referral letters. The incorporation of this information into the Enterprise is out of scope for the Import Reconciliation Workflow.**

The following steps can be identified in this process flow:

- 20 • **The User does the import at an appropriate device (e.g. a film scanner is used to digitize films, a workstation with PDI capabilities is used to import PDI media).**
- **The UNSCHEDULED IMPORT Option is used to retrieve the Patient Demographics information, import the Evidence Objects and to reconcile the patient data (e.g., to change the recorded Patient ID to the local Patient ID) using the Patient Demographics Query. The resultant DICOM objects are stored in the PACS.**
- 25 • **Errors and exceptions during import are handled by using Exception Management described in RAD TF-3:4.60.1.2.2.**
- **The Evidence Objects are available from the PACS and may be used in subsequent scheduled or unscheduled steps, or at a later time.**

30 **This process flow requires that the Patient be registered. Associated Patient Registration, and subsequent Availability or Notification transactions are part of the Scheduled Workflow (See Section 3.3). The following sequence of steps describes the typical process flow for the unscheduled import of patient data.**

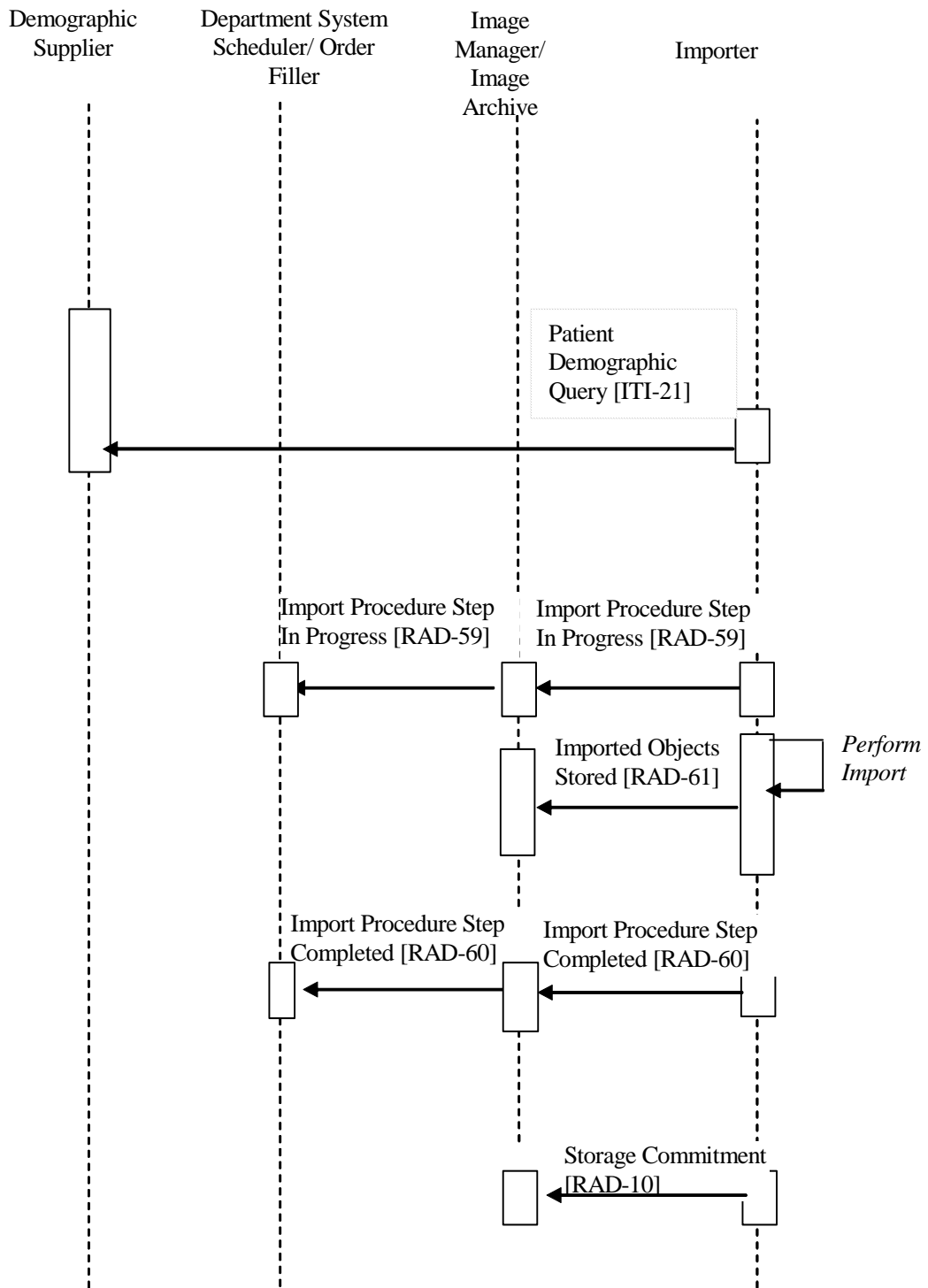


Figure 21.3.1-2. Unscheduled Import Reconciliation Workflow Process Flow

21.3.1.2.1 **Unscheduled Import Data Reconciliation**

5 As part of the import process, the Importer reconciles the patient data as needed (e.g., to change the recorded Patient ID to the local Patient ID). The original DICOM object identifiers must be maintained in the imported DICOM Composite Objects in order to maintain the relationship of the Images within the Study (See RAD-TF:2-A.2).

The policies of the importing enterprise will determine

- if demographics from the Import Data can be used (e.g Birth Dates, Patient Sex).
- 10 • whether or how enterprise-specific codes in the imported data are coerced or ignored.

21.3.2 Import Exception Management Workflow

Exception management Workflow is required for Import Reconciliation Workflow. This case addresses the need to manage errors generated through the Import Reconciliation Workflow such as:

- 15 • Selection of the incorrect Scheduled Procedure Step from the Modality Worklist.
- Selection of the incorrect Patient Demographics from the Patient Demographics List.
- The inability to support the DICOM Composite Objects to be imported.
- Equipment Failure
- 20 • Bad media

Some of these exception cases are addressed using required functionality for IHE actors in the Import Reconciliation Workflow and Scheduled Workflow Profiles, while others make use of the IMPORT PPS EXCEPTION MANAGEMENT (See RAD TF-3:4.60.4.1.2.2). The following numbered items list exception cases that shall be supported by the actors listed in each item.

25

Volume 2 - Transactions

4.5 Query Modality Worklist

Modification of Section 4.5 – Add Importer

5 This section corresponds to Transaction RAD-5 of the IHE Technical Framework. Transaction RAD-5 is used by the Department System Scheduler/Order Filler, and **worklist clients such as Acquisition Modalities and Importers.**

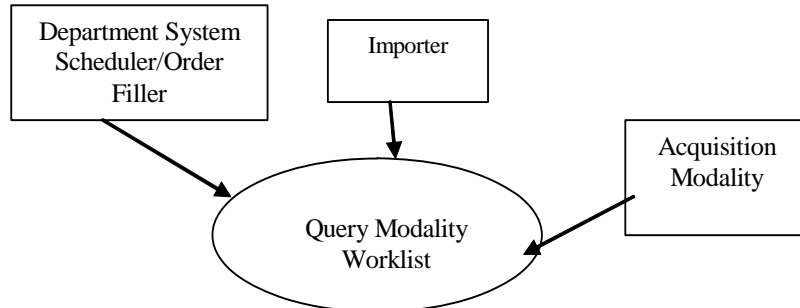
Modification of Section 4.5.1 – Add Importer

10 This transaction takes place **under two circumstances. The first is for the scheduling of an acquisition, the second is for the scheduling of an importation of existing Evidence Objects or Hardcopy.**

15 **At the point of acquisition by a technologist at an Acquisition Modality. When a patient arrives for the scheduled procedure, the technologist performing the procedure must examine key information elements as they relate to the procedure, the correctness of the procedure that has been ordered, and comments that may have been entered by the referring physician and/or radiologist, among others. The technologist at the Acquisition Modality uses the DICOM Modality Worklist to query the Department System Scheduler/Order Filler for Scheduled Procedure Steps. The list is downloaded to the Acquisition Modality and the technologist verifies the information on the Acquisition Modality console. In the Modality Images Stored transaction this information will be included in the header of the generated images (See sec. 4.8 and**
20 **Appendix A).**

25 **At the point of scheduled DICOM data importation by a User. An importation may occur with existing DICOM Objects or the creation of DICOM Objects as part of the importation (e.g. the digitization of films into DICOM Objects). The actual scheduling of the importation may vary. For example, the importation may be scheduled as part of an externally referred acquisition, or upon the receipt of a physical PDI media containing patient images required for an upcoming consultation. The User at the Importer uses the DICOM Modality Worklist to query the Department System Scheduler/Order Filler for Scheduled Procedure Steps. The User must be able to verify that Evidence Objects or the Hardcopy data to be imported as DICOM Composite Objects, are for the correct Patient and Scheduled Procedure Step. In the Imported Objects Stored transaction this information will be included in the header of the imported Evidence Documents (See Rad TF-3: 4.61. and Appendix A.2).**
30

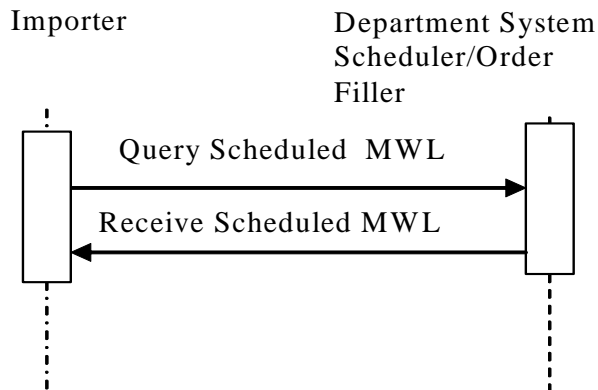
Modification of Section 4.5.2 – Add Importer



5 **Actor: Importer**

Role: Responsible for requesting and receiving data from the Department System Scheduler/Order Filler.

Modification of Section 4.5.4 – New Interaction Diagrams for Importer



10

Modification of Section 4.5.1.1 – Add trigger for Scheduled Import

15 The patient arrives at the Acquisition Modality for a procedure (**scan/acquisition**).

The trigger event for an importation is a User that wants to perform a scheduled importation. The actual trigger for scheduling the importation is site specific, but may be triggered by such events as:

- **Arrival of films as a result of a request for a scheduled consult.**
- 5 • **Patient with a scheduled procedure brings prior Evidence Objects on a PDI Media.**
- **Other communications not specified further by the IHE Technical Framework which result in the scheduling of a import.**

10 *Modification of Section 4.5.1.2 – Additional Message Semantics for Import*

The Acquisition Modality or **Importer** uses the C-FIND Request of the DICOM Modality Worklist SOP Class to query for the worklist from the DSS/Order Filler. The Acquisition **or Importer** performs the SCU role, and the DSS/Order Filler the SCP role.

15

Acquisition Modalities **and Importers** shall support individually each one of the required query keys listed in Table 4.5-3 - Matching and Return Keys For Modality Worklist. **For Importers, Patient Based Query shall be supported. For Acquisition Modalities,** at least one of the following two combinations of keys shall be supported.

20

Modification of Section 4.5.4.1.2.1 – Addition of Use of Matching Key Attributes example

2.1.1.1.1 Examples for the Use of Matching Key Attributes

- **Using the Patient Name, Patient Birth Date and Patient Sex query for all the procedures that are scheduled for a patient.**
- 25 • **Using the Patient Name and AE Title query for all procedures to be imported for a Patient.**

Modification of Section 4.5.4.1.2.2 – Additional of second paragraph for Import Return Keys to Display

30

The Importer is required to query for specified attributes (return keys) that will be used to modify the imported objects. The attribute modification requirements are defined in RAD TF-3: 4.61. and Appendix A.2.

Modification of Section 4.5.4.1.3 – Add Importer within Expected Actions for the Query

5 The Departmental System Scheduler/Order Filler performs the query and sends the DICOM Modality Worklist to the Acquisition Modality, **or Importer**.

The Importer shall make available to the Operator the information in the Scheduled Procedure Step Description (See Table 4.5-3). This information may include:

- **A description of specific Evidence Objects to import (e.g. Only a particular study, series or image should be imported).**

10

Modification of Section 4.5.4.2.2 – Additional of Importer for Message Semantics Receipt of MWL

15 C-FIND Response from the DICOM Modality Worklist SOP Class will be used for this message. Some of the attributes queried through the MWL SOP class originate with the Order Placer and ADT, while other attributes are managed internally by the Department System Scheduler/Order Filler. The DSS/Order Filler will determine the Requested Procedures needed to fulfill the Order, and decompose the Requested Procedures in Scheduled Procedure Steps, assigning proper Protocol Codes. The DSS/Order Filler shall support the definition of multiple Protocol Codes in
20 a Scheduled Protocol Code Sequence contained in the Scheduled Procedure Steps for any Requested Procedure. Coded Values shall be used to specify exactly what actions are to be performed at the Acquisition Modality. In addition to these Coded Values additional instructions for the technologist may be specified. It is recommended to use the Scheduled Procedure Step Description and the Requested Procedure Description attributes for these additional specific
25 instructions.

Appendix B defines the origin and mappings of the attributes returned in a MWL query.

30 The details of the C-FIND Response from the DICOM MWL SOP Class are depicted in table 4.5-3 and Appendix A. At the time images are being created/generated, these attributes will be stored into the DICOM image instance headers. The Acquisition Modality **or Importer** may need additional information; however this is beyond the scope of this document. Refer to RAD TF-1, Appendix A for a discussion of Accession Number and Procedure ID.

35 An Order may be cancelled after the corresponding Requested Procedure(s) and Scheduled Procedure Steps have been scheduled, and possibly even after a Performed Procedure Step has been started. In this case the Department System Scheduler/Order Filler shall remove the Scheduled Procedure Steps of the Order from its worklist, and the absence of these Scheduled Procedure Steps in the next C-FIND response to the Acquisition Modality **or Importer** will

indicate that the procedure has been cancelled. In this way the technologist recognizes that the previously scheduled steps no longer need to be performed.

5 It is the responsibility of the Department System Scheduler/Order Filler to ensure that the patient and procedure information is current in the Modality Worklist response. The Department System Scheduler/Order Filler receives patient and procedure updates through Transactions RAD-2, RAD-3 and RAD-12.

Add new Section 4.5.4.2.2.1 for support of Scheduled Protocol Sequence for Import

4.5.4.2.2.1 Scheduled Protocol Sequence for Import

10 **The Department System Scheduler/Order Filler has the ability to provide instructions to the Importer on what should be done with the imported Evidence Objects after they are imported through the use of the Scheduled Protocol Sequence (0040,0008). Zero or more items may be present. Table 4.5-4 provides a list of the valid codes that may be used.**

15 **If present the codes are intended to be made available for copying into the Performed Protocol Sequence (0040.0260) in order to convey the subsequent use of the instances.**

Table 4.5-4: Import Instruction Codes

<u>Coding Scheme Designator (0008,0102)</u>	<u>Code Value (0008,0100)</u>	<u>Code Meaning (0008,0104)</u>
<u>IHERADTF</u>	<u>IRWF001</u>	<u>Import</u>
<u>IHERADTF</u>	<u>IRWF002</u>	<u>To be interpreted</u>
<u>IHERADTF</u>	<u>IRWF003</u>	<u>To be archived</u>
<u>IHERADTF</u>	<u>IRWF004</u>	<u>To be over read</u>
<u>IHERADTF</u>	<u>IRWF005</u>	<u>To be post-processed</u>
<u>IHERADTF</u>	<u>IRWF006</u>	<u>To be printed</u>
<u>IHERADTF</u>	<u>IRWF007</u>	<u>To be provided as a prior</u>
<u>IHERADTF</u>	<u>IRWF008</u>	<u>Destroy original media</u>
<u>IHERADTF</u>	<u>IRWF009</u>	<u>Return original media to patient</u>
<u>IHERADTF</u>	<u>IRWF010</u>	<u>Return original media to sender</u>
<u>IHERADTF</u>	<u>IRWF011</u>	<u>Archive original media</u>

20 *Modification of Section 4.5.4.2.3 – Additional of Importer for Expected Actions for Receipt of MWL*

5 **For imports, the User checks for the existence of the Scheduled Procedure Steps, validates the selected Patient Demographics with the Patient demographics of the existing Evidence Objects or the hardcopy, and checks for special instructions given in the Scheduled Procedure Step Description on what Evidence Objects are to be imported (e.g. how many PDI Media or films are associated with the Scheduled Procedure Step). In addition, the Importer shall provide the means to use the protocol codes specified in the Scheduled Procedure Step selected from the Modality Worklist (See RAD TF-3: 4.59.4.1.2.3.3) Import Instruction Codes).**

10

A: <Appendix A> Modality Worklist Integration-critical Attributes

Add as section A.2 in Volume 2, and renumber the existing A.2, A.3 and A.4 sections and subordinate tables, etc. Including searching for, and replacing existing references to these sections and tables.

A.2 Imported Object Integration – Critical Attributes

The Importer shall modify each DICOM object to ensure that critical attributes from the local Enterprise are incorporated.

The tables below describe requirements, recommendations or explanations on integration-critical attributes for cases covering import of digital media and creation of digitized objects into the local environment.

Until such time that Code Sets are consistent among Enterprises, the Protocol Code Sets used within one Enterprise will most likely not be valid in another Enterprise. Coercion rules or mechanisms for Code Sets is out of scope for the Radiology Technical Framework.

General table structure:

- **The 1st column denotes the DICOM attributes whose values shall be mapped between the DICOM objects (equal values in the same table row). The DICOM attribute tag is indicated for clarity.**
- **The 2nd to 5th columns define where attribute values come from: all defined attribute values of one table row are equal. These columns read left to right.**
- **The column labeled ‘Objects for Import’ refers to attributes and values included in, or “extracted” from the objects to be imported. In the case of hardcopy import (i.e., digitization), this extraction can be done via OCR or manual entry, extracted from the paperwork accompanying the media, or via some other mechanism. It is likely that values will not be available for some of the attributes in that column.**
- **The column labeled ‘Resultant IOD’ signifies the attributes and values included in the objects resulting from the Import action (regardless of the source of the import).**
- **The MWL column is replaced by a column entitled ‘Demographic Query Information’ for unscheduled cases where the Importer receives information via an HL7 query message rather than via a DICOM MWL response.**

Cell content conventions:

- **“Source” in a table cell means that the DICOM object defined in the table column (e.g. MWL) and created by one actor shall be the source of this value for the**

DICOM attribute for another actor to fill in this value for their own objects (e.g. Image or MPPS).

- **“Copy” in a table cell means that the value shall be copied from a corresponding source attribute of another DICOM object, as defined by the table column.**
- 5 • **”Copy from: <DICOM attribute>” means that, instead of using the DICOM attribute of the same row as the source, the source as specified in the referenced DICOM attribute shall be used.**
- 10 • **“Equal” in a table cell means that an actor already knows the value, e.g. from some previously performed action. Thus, the circumstances of value generation do not matter.**
- 15 • **“Equal (internally generated)” in a table cell means that an actor has internally generated a value that may be used in more than one DICOM object, without having obtained this value from another actor (i.e. no copy).**
- 15 • **”Source-1”, “Copy-1” or “Equal-1” etc. are corresponding mapping attribute values, if several sources appear in one table row.**
- 20 • **“Copy-2 [Copy-1]” in a table cell means Copy the value from Source-2 (Copy-2) if present, otherwise Copy from Source-1 (Copy-1).**
- 20 • **“Merge Copy-1, Copy-2” in a table cell means that the values copied from multiple sources are all to be included in the resulting attribute. Note: this is done only for some multi-valued or sequence attributes.**
- 25 • **“See (IHE-X)” in a table cell denotes additional requirements, recommendations or explanations for the attribute value, as described in the table’s note “(IHE-X)”. Otherwise, brief text that fits into a table cell is presented in the cell.**
- 25 • **“n.a.” in a table cell means that such an attribute or value shall not exist. Either the attribute is not defined by the DICOM standard for this object, or the particular sequence attribute is a DICOM type 3 attribute, and DICOM requires at least one sequence item to be present.**

Actor behavior:

- 30 • **The general goal for the ‘importing’ actor (Importer) is to minimally change the original Objects. Only attributes that are critical to ensure identification consistency in the receiving environment are coerced.**
- 35 • **The ‘importing’ actor (Importer) shall use the values in the second and third columns (‘Objects for Import’ and ‘MWL return values’ or ‘Demographic Query Information’) as the source for copying into the Image/ Standalone or MPPS IODs according to the rules defined within the tables.**

- **Any attribute value in the original Objects for Import that is replaced by the importing actor shall be recorded in the ‘Original Attributes Sequence’ contained in the Objects resulting from the import activity.**
- 5 • **Attributes from the column “Modality Worklist” shall be requested by a MWL SCU (Importer) as a return key in its C-FIND Requests. The Department System Scheduler shall return attribute values in the Modality Worklist C-FIND response (for a complete description, see Table 4.5-3).**
- 10 • **The PPS Manager, Image Manager and Department System Scheduler actors shall be capable of handling the attributes shown in the column titled “MPPS IOD” as defined by the SCP Type and the additional notes. The general goal is to use the PPS information presenting for the imported instances for use in the resulting PPS.**

Table A.2-1: Scheduled Import - required mapping of corresponding attributes

<u>DICOM attribute</u>	<u>Objects for Import</u>	<u>Modality Worklist</u> <u>(return attribute values)</u>	<u>Filling values for:</u>		
			<u>Resultant IOD</u>	<u>MPPS IOD</u>	
<u>Patient Name (0010,0010)</u>	<u>Source-1</u>	<u>Source-2</u>	<u>Copv-2 [Copv-1]</u>	<u>Copv-2 [Copv-1]</u>	
<u>Patient ID (0010,0020)</u>	<u>Source-1</u>	<u>Source-2</u>	<u>Copv-2 [Copv-1]</u>	<u>Copv-2 [Copv-1]</u>	
<u>Other Patient Ids (0010,1000)</u>	<u>Source-1</u>	<u>Source-2</u>	<u>Merge Copv-1,Copv-2</u>	<u>n.a</u>	
<u>Patient's Birth Date (0010,0030)</u>	<u>Source-1</u>	<u>Source-2</u>	<u>Copv-2 [Copv-1]</u>	<u>Copv-2 [Copv-1]</u>	
<u>Patient's Sex (0010,0040)</u>	<u>Source-1</u>	<u>Source-2</u>	<u>Copv-2 [Copv-1]</u>	<u>Copv-2 [Copv-1]</u>	
<u>Study Instance UID (0020,000D)</u>	<u>Source-1</u> <u>(See IHE-A.2.1.2)</u>	<u>Source-2</u>	<u>Copv-1 [Copv-2]</u> <u>(See IHE-A.2.1.2)</u>	<u>Scheduled Step Attributes Sequence (0040,0270)</u> <u>Copv-1 [Copv-2]</u> <u>(See IHE-A.2.1.2)</u> <u>Merge Copv-1,Copv-2</u> <u>Copv-2</u> <u>See (IHE-A.2.1.3)</u> <u>Copv-2 [Copv-1]</u> <u>Copv-2 [Copv-1]</u> <u>See (IHE-A.2.1.7)</u> <u>Copv-2 [Copv-1]</u> <u>Copv-2</u> <u>Copv-2</u>	
<u>Referenced Study Sequence (0008,1110)</u>	<u>Source-1</u> <u>See (IHE-A.2.1.8)</u>	<u>Source-2</u> <u>See (IHE-A.2.1.6)</u>	<u>Merge Copv-1,Copv-2</u>		
<u>Accession number (0008,0050)</u>	<u>Source-1</u>	<u>Source-2</u>	<u>Copv-2</u> <u>See (IHE-A.2.1.3)</u>		
<u>Requested Procedure ID (0040,1001)</u>	<u>Source-1</u>	<u>Source-2</u>	<u>Request Attributes Sequence (0040,0275)</u> <u>Copv-2 [Copv-1]</u> <u>Copv-2 [Copv-1]</u> <u>See (IHE-A.2.1.7)</u> <u>Copv-2 [Copv-1]</u> <u>Copv-1</u> <u>Copv-1</u> <u>See (IHE-A.2.1.7)</u>		
<u>Requested Procedure Description (0032,1060)</u>	<u>Source-1</u>	<u>Source-2</u>			
<u>Scheduled Procedure Step ID (0040,0009)</u>	<u>Source-1</u>	<u>Source-2</u>			
<u>Scheduled Procedure Step Description (0040,0007)</u>	<u>Source-1</u>	<u>Source-2</u>			
<u>Scheduled Protocol Code Sequence (0040,0008)</u>	<u>Source-1</u>	<u>Source-2</u>			
<u>Performed Protocol Code Sequence (0040,0260)</u>	<u>Source-1</u>	<u>n.a.</u>	<u>Copv-1</u> <u>See (IHE-A.2.1.9)</u>		<u>See (IHE-A.2.1.10)</u>

<u>DICOM attribute</u>	<u>Objects for Import</u>	<u>Modality Worklist (return attribute values)</u>	<u>Filling values for:</u>	
			<u>Resultant IOD</u>	<u>MPPS IOD</u>
<u>Study ID (0020,0010)</u>	<u>Source</u>	<u>n.a.</u>	<u>Copy [Equal (Internally Generated Recommendation: Use Requested Procedure ID from MWL)]</u>	<u>Copy [Equal (Internally Generated Recommendation: Use Requested Procedure ID from MWL)]</u>
<u>Performed Procedure Step ID (0040,0253)</u>	<u>Source</u> <u>See (IHE-A.2.1.1)</u>	<u>n.a.</u>	<u>Copy</u> <u>See (IHE-A.2.1.1)</u>	<u>Copy [Equal (Internally Generated)]</u> <u>See (IHE-A.2.1.1)</u>
<u>Performed Procedure Step Description (0040,0254)</u>	<u>Source</u>	<u>n.a.</u>	<u>Copy</u> <u>See (IHE-A.2.1.7)</u>	<u>Copy</u> <u>See (IHE-A.2.1.7)</u>
<u>Performed Procedure Step Start Date (0040,0244)</u>	<u>Source</u>	<u>n.a.</u>	<u>Copy</u>	<u>Equal (internally generated).</u>
<u>Performed Procedure Step Start Time (0040,0245)</u>	<u>Source</u>	<u>n.a.</u>	<u>Copy</u>	<u>Equal (internally generated).</u>
<u>Requested Procedure Code Sequence (0032,1064)</u>	<u>n.a.</u>	<u>Value shall be used for Procedure Code Sequence as specified below.</u>	<u>n.a.</u>	<u>n.a.</u>
<u>Procedure Code Sequence (0008,1032)</u>	<u>n.a.</u>	<u>n.a.</u>	<u>Copy from: Requested Procedure Code Sequence (0032,1064).</u> <u>See (IHE-A.2.1.7)</u>	<u>Copy from: Requested Procedure Code Sequence (0032,1064)</u> <u>See (IHE-A.2.1.7)</u>
<u>Referenced SOP Class UID (0008,1150)</u>	<u>n.a.</u>	<u>n.a.</u>	<u>Referenced PPS Sequence (IHE-A.1.3)</u>	<u>1.2.840.10008.3.1.2.3.3</u> <u>See (IHE-A.2.1.4)</u>
<u>Referenced SOP Instance UID (0008,1155)</u>	<u>n.a.</u>	<u>n.a.</u>		<u>Equal to SOP Instance UID of the associated MPPS</u> <u>See (IHE-A.2.1.5)</u>

- 5 **(IHE-A.2.1.1) Performed Procedure Step ID may be generated by the Importer arbitrarily and is not necessarily unique: Two different Performed Procedure Steps may share the same ID (e.g. may have been generated by different importers). The Performed Procedure Step ID (0040,0253) will not be available when data is imported from non-digital media (e.g., digitized hardcopy objects)**
- 10 **(IHE-A.2.1.2) Valid DICOM UIDs are universally unique, so there should be no risk of collision with local UIDs. When a valid set of DICOM UIDs is present the importer shall use this set and not change them. If the importer detects incorrect UIDs or an inconsistent set of UIDs, then it may correct or re-generate UIDs. The UIDs are used as references between objects, and if they are altered, the Importer shall maintain referential integrity.**
- 15 **(IHE-A.2.1.3) A Zero Length Accession Number shall be created when no reliable value for this attribute is available. Reliable values are those that can be conveyed by means other than manual data entry such as a value received from the Order Filler via a Modality Worklist including an Accession Number or received through a bar code reader.**
- 20 **(IHE-A.2.1.4) In MPPS, SOP Class UID is sent in the Affected SOP Class UID (0000,0002) for the PPS N-Create message and in Requested SOP Class UID (0000,0003) for the PPS N-Set message. SOP Class UID (0008,0016) shall not be used.**
- 25 **(IHE-A.2.1.5) In MPPS, SOP Instance UID is sent in the Affected SOP Instance UID (0000,1000) of the PPS N-Create message and in Requested SOP Instance UID (0000,1001) for the PPS N-Set message. SOP Instance UID (0008,0018) shall not be used.**
- 30 **(IHE-A.2.1.6) According to the Query Modality Worklist transaction (RAD TF-2: 4.5.4.1.2.2), the DSS/ Order Filler is required to replicate the Study Instance UID value in both the Study Instance UID attribute (0020,000D) and within the Referenced Study Sequence (0008,1110).**
- 35 **(IHE-A.2.1.7) Descriptions and Codes used in the Enterprise may not match those used in the Evidence Objects. The method used to coerce the Descriptions or Codes is out of scope of the Technical Framework. Note that the Descriptions and Codes from the Evidence Objects may be useful.**
- (IHE-A.2.1.8) The Referenced Study Sequence (0008,1110) will not be available when data is imported from non-digital media (e.g., digitized hardcopy objects)**
- (IHE-A.2.1.9) Performed Protocol Codes used in the Enterprise may not match those used in the Evidence Objects. Determination of whether to copy, coerce or remove the Codes is out of scope of the Technical Framework. Note that the Codes from the Evidence Objects may be useful.**

5

(IHE-A.2.1.10) See Section RAD TF-4.59.4.1.2.3. If no information about the Scheduled Import exists, this shall be internally generated and included as one of the items in the Performed Protocol Sequence. The Performed Protocol Codes present in the Objects for Import may not match those used in the Evidence Objects. Determination of whether to merge, coerce and merge or discard the Codes is out of scope of the Technical Framework. Note that the Codes from the Evidence Objects may be useful.

Table A.2-2: Unscheduled Import - required mapping of corresponding attributes

<u>DICOM attribute</u>	<u>Objects for Import</u>	<u>Demographic Query Information</u> (return attribute values)	<u>Filling values for:</u>		
			<u>Resultant IOD</u>	<u>MPPS IOD</u>	
<u>Patient Name</u> (0010,0010)	<u>Source-1</u>	<u>Source-2</u> <u>PID:5</u>	<u>Copv-2 [Copv-1]</u>	<u>Copv-2 [Copv-1]</u>	
<u>Patient ID (0010,0020)</u>	<u>Source-1</u>	<u>Source-2</u> <u>PID:3</u>	<u>Copv-2 [Copv-1]</u>	<u>Copv-2 [Copv-1]</u>	
<u>Other Patient Ids</u> (0010,1000)	<u>Source-1</u>	<u>Source-2</u> <u>PID:4</u>	<u>Merge Copv-1,Copv-2</u>	<u>n.a</u>	
<u>Patient's Birth Date</u> (0010,0030)	<u>Source-1</u>	<u>Source-2</u> <u>PID:7</u>	<u>Copv-2 [Copv-1]</u>	<u>Copv-2 [Copv-1]</u>	
<u>Patient's Sex</u> (0010,0040)	<u>Source-1</u>	<u>Source-2</u> <u>PID:8</u>	<u>Copv-2 [Copv-1]</u>	<u>Copv-2 [Copv-1]</u>	
<u>Study Instance UID</u> (0020,000D)	<u>Source</u> (See IHE-A.2.2.6)	<u>n.a</u>	<u>Copv or Equal</u> (internally generated) (See IHE-A.2.2.6)	<u>Scheduled Step Attributes Sequence</u> (0040,0270)	
<u>Accession number</u> (0008,0050)	<u>Source</u>	<u>n.a</u>	<u>Shall be empty (zero length).</u>		<u>Shall be empty.</u>
<u>Requested Procedure ID</u> (0040,1001)	<u>Source</u>	<u>n.a</u>	<u>Request Attributes Sequence</u> (0040,0275)		<u>Equal</u> (internally generated)
<u>Scheduled Procedure Step ID</u> (0040,0009)	<u>Source</u>	<u>n.a</u>			<u>Copv</u>
<u>Scheduled Protocol Code Sequence</u> (0040,0008)	<u>Source</u>	<u>n.a</u>	<u>Copv</u>	<u>Copv</u>	
<u>Performed Protocol Code Sequence</u> (0040,0260)	<u>Source</u>	<u>n.a</u>	<u>Copv</u> <u>See (IHE-A.2.2.7)</u>	<u>Merge Copv</u> (internally generated). <u>Shall contain a code indicating that an import was performed</u> <u>See (IHE A.2.2.8)</u>	
<u>Study ID (0020,0010)</u>	<u>Source</u>	<u>n.a.</u>	<u>Copv [Equal</u> (Internally Generated)]	<u>Copv [Equal</u> (Internally Generated)]	

<u>DICOM attribute</u>	<u>Objects for Import</u>	<u>Demographic Query Information</u> (return attribute values)	<u>Filling values for:</u>	
			<u>Resultant IOD</u>	<u>MPPS IOD</u>
<u>Performed Procedure Step ID (0040,0253)</u>	<u>Source</u>	<u>n.a.</u>	<u>Copy</u> <u>See (IHE-A.2.2.1)</u>	<u>Copy [Equal (Internally Generated)] See (IHE-A.2.2.1)</u>
<u>Performed Procedure Step Description (0040,0254)</u>	<u>Source</u>	<u>n.a.</u>	<u>Copy</u> <u>See (IHE-A.2.2.5)</u>	<u>Copy</u> <u>See (IHE-A.2.2.5)</u>
<u>Performed Procedure Step Start Date (0040,0244)</u>	<u>Source</u>	<u>n.a.</u>	<u>Copy</u>	<u>Equal (internally generated).</u>
<u>Performed Procedure Step Start Time (0040,0245)</u>	<u>Source</u>	<u>n.a.</u>	<u>Copy</u>	<u>Equal (internally generated).</u>
<u>Requested Procedure Code Sequence (0032,1064)</u>	<u>n.a.</u>	<u>Value shall be used for Procedure Code Sequence as specified below.</u>	<u>n.a.</u>	<u>n.a.</u>
<u>Procedure Code Sequence (0008,1032)</u>	<u>n.a.</u>	<u>n.a.</u>	<u>Copy from: Requested Procedure Code Sequence (0032,1064). See (IHE-A.2.2.5)</u>	<u>Copy from: Requested Procedure Code Sequence (0032,1064) See (IHE-A.2.2.5)</u>
<u>Referenced SOP Class UID (0008,1150)</u>	<u>n.a.</u>	<u>n.a.</u>	<u>Referenced PPS Sequence (IHE-A.2.2.2)</u>	<u>1.2.840.1008.3.1.2.3.3</u> <u>See (IHE-A.2.2.3)</u>
<u>Referenced SOP Instance UID (0008,1155)</u>	<u>n.a.</u>	<u>n.a.</u>		<u>Equal to SOP Instance UID of the associated MPPS</u> <u>See (IHE-A.2.2.4)</u>

(IHE-A.2.2.1) Performed Procedure Step ID is generated by the importer arbitrarily and is not necessarily unique: Two different Performed Procedure Steps may share the same ID (e.g. may have been generated by different importers).

5 **(IHE-A.2.2.2) The Referenced Performed Procedure Step Sequence (0008,1111) that contains the PPS SOP Instance UID shall be included (per DICOM PS3.3 section C.7.3 strong recommendation, General Series Module Table, Note 1).**

(IHE-A.2.2.3) In MPPS, SOP Class UID is sent in the Affected SOP Class UID (0000,0002) for the PPS N-Create message and in Requested SOP Class UID (0000,0003) for the PPS N-Set message. SOP Class UID (0008,0016) shall not be used.

5 **(IHE-A.2.2.4) In MPPS, SOP Instance UID is sent in the Affected SOP Instance UID (0000,1000) of the PPS N-Create message and in Requested SOP Instance UID (0000,1001) for the PPS N-Set message. SOP Instance UID (0008,0018) shall not be used.**

10 **(IHE-A.2.2.5) Descriptions and Codes used in the Enterprise may not match those used in the Evidence Objects for Import. The method used to coerce the Descriptions or Codes is out of scope of the Technical Framework. Note that the Descriptions and Codes from the Evidence Objects may be useful.**

15 **(IHE-A.2.2.6) Ideally, UIDs are universally unique, so there should be no risk of collision with local UIDs, and hence there should be no reason to change them. However, since the integrity of externally generated data cannot be ensured, it may be necessary to correct or re-generate UIDs. The UIDs are used as references between objects, and if they are altered, the Importer shall maintain referential integrity.**

20 **(IHE-A.2.2.7) Performed Protocol Codes used in the Enterprise may not match those used in the Evidence Objects. Determination of whether to copy, coerce or remove the Codes is out of scope of the Technical Framework. Note that the Codes from the Evidence Objects may be useful.**

25 **(IHE-A.2.2.8) See Section RAD TF-4.59.4.1.2.3. The Performed Protocol Codes present in the Objects for Import may not match those used in the Evidence Objects. Determination of whether to merge, coerce and merge or discard the Codes is out of scope of the Technical Framework. Note that the Codes from the Evidence Objects may be useful.**

30

Volume 3 - Transactions

Modification of of Section 4.47.4.1.3.4 – Modified the first paragraph regarding the ability to group with IRFW to provide Import Reconciliation Workflow.

5

The Portable Media Importer reads DICOM data from the media. Together with the actor with which it is grouped (see vol. 1), it shall be able to perform key attribute reconciliation. Reconciliation may not be required in all cases (e.g., within the same importing institution/enterprise). Refer to Table 4.47.4-1 for key attributes to be reconciled. **Import Reconciliation Workflow provides a workflow to reconcile key attributes (See Section RAD-TF 1:3.59).** Note that the Referenced Study Sequence and Requested Attributes Sequence are removed for consistency with behavior of the unscheduled cases in SWF and PIR.

10

4.49 Instance Availability Notification

15

Modification of of Section 4.49.4.1.1 – Addition of Triggers for the IAN due to Import of Evidence Objects.

4.49.4.1.1 Trigger Events

20

During image acquisition, an MPPS-capable Acquisition Modality creates a set of instances and stores them to an Image Manager/Image Archive. Alternatively as a part of **importing Evidence Objects**, an MPPS capable Importer imports instances and stores them to an Image Manager/Image Archive. The Image Manager/Image Archive, after having received the last instance of the instance set referenced in the MPPS, shall send an Instance Availability Notification to the DSS/Order Filler that has also received the related MPPS. It may also decide to send the Instance Availability Notification to other instance managing actors in the workflow to inform them that all instances referenced in the related MPPS are available.

25

30

One Instance Availability Notification shall be sent for each MPPS that contains references to instances. MPPS without references to instances shall not trigger the sending of an Instance Availability Notification. This applies to all the MPPS cases described in transaction RAD-6 (Rad TF-2, 4.6: Simple Case, Unscheduled Case, Group Case, Append Case (Normal and Group Case), Abandoned Case) and in transaction RAD-7 (Rad TF-2, 4.7: MPPS DISCONTINUED, except the case of incorrect worklist entry selected, Rad TF 2, 4.7.4.1.3.1). **It also applies to the Import PPS cases described in transaction RAD TF-3: 4.59.4.1.2. 3- (Unscheduled Import and Unscheduled Import Cases) and the Import PPS Discontinued, RAD TF:3-4.60.4.1.2.2).**

Modification of Section 4.49.4.1.2 – Addition of Semantics for the IAN due to Import of Evidence Objects.

4. 49.4.1.2 Message Semantics

- 5 The end of the image acquisition is indicated to the Department System Scheduler/Order Filler and Image Manager/ Image Archive by an MPPS message from the Acquisition Modality referencing the DICOM instances that were created and are to be stored in the Image Manager/Image Archive. **The end of the DICOM object import is indicated to the Department System Scheduler/Order Filler and Image Manager/ Image Archive by an Import MPPS message from the Importer referencing the DICOM instances that were created and are to be stored in the Image Manager/Image Archive**
- 10

- Note that the MPPS and Instance Availability Notification inform about different events. Thus, depending on the total volume of the images stored and characteristics of the local system environment, the MPPS may arrive considerably earlier at the DSS/OF than the Instance Availability Notification. The dependency of the IAN transaction on the MPPS Completed transaction may result in delayed notification to the DSS/OF of available instances, if the MPPS is not sent from the Acquisition Modality or **Importer** to the Image Manager/Image Archive in a timely fashion.
- 15

- 20 *Modification of Section 4.49.4.1.3 – Addition of Expected Actions for the IAN due to Import of Evidence Objects.*

4. 49.4.1.3 Expected Actions

- 25 The Department System Scheduler/Order Filler, Post-Processing Manager and Report Manager shall act as an Instance Notification SOP Class SCP. As a result of receiving the notification, the Department System Scheduler/Order Filler (or other actors) shall take appropriate action knowing that the referenced instances are available for further use in the workflow. Examples of such actions can be:

- 30 The Department System Scheduler/Order Filler updates the procedure status internally, indicating that images for the procedure have been stored.
- The Post-Processing Manager adds items to a corresponding worklist.
- The Report Manager adds items to a corresponding worklist.
- The Report Manager adds items to a list of relevant priors for use within Reporting.**

Addition of Section 4.59 – New transaction to support Import Procedure Step In-Progress.

4.59 Import Procedure Step In Progress

5 **This section corresponds to Transaction RAD-59 of the IHE Technical Framework. Transaction RAD-59 is used by the Department System Scheduler/Order Filler, Image Manager, Performed Procedure Step Manager, Report Manager, and Importer actors.**

4.59.1 Scope

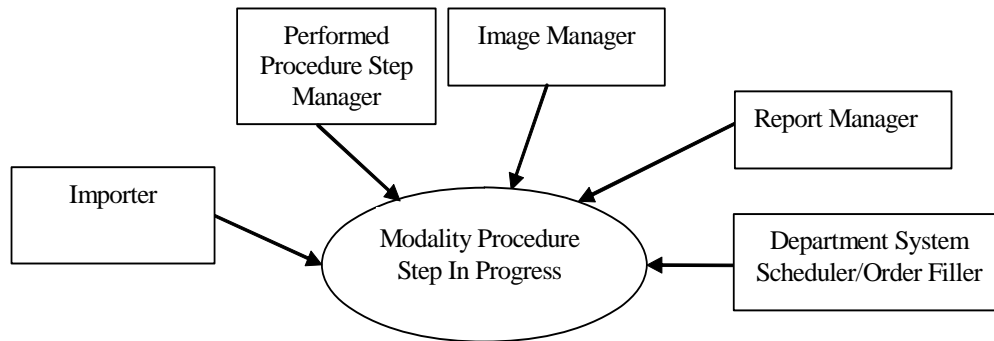
10 **This transaction includes a message from the Importer to the Performed Procedure Step Manager, which in turn issues the message to the Department System Scheduler/Order Filler, the Image Manager and the Report Manager that the Performed Procedure Step is in progress.**

15 **The receiving Performed Procedure Step Manager is grouped with the Image Manager or the Department System Scheduler/Order Filler, and shall support forwarding messages to two other destinations besides the Actor it is grouped with. It shall start issuing messages to the configured destinations immediately after it accepts the corresponding messages from the Importer.**

To allow for proper integration, the following considerations must be taken into account:

- 20 • **The Performed Procedure Step Manager must maintain PPS objects and then store them until corresponding N-CREATE and N-SET messages are transmitted to the Actor it is grouped with, and the two other Actors. If transmission to a destination fails, the Performed Procedure Step Manager shall try to repeat transmission periodically until it succeeds. The Performed Procedure Step Manager must not use failure of one or more of these transmissions as a reason for rejecting the initial transmission from the Importer;**
- 25 • **Because both the Image Manager and the Department System Scheduler/Order Filler incorporate the Performed Procedure Step Manager function, an infinite redistribution of PPS messages is possible. The Image Manager and the Department System Scheduler/Order Filler systems that provide the Performed Procedure Step Manager function shall be configurable to disable this function;**
- 30 **Transfer of the information to the system that the receiving Performed Procedure Step Manager is integrated with is outside the scope of the IHE Technical Framework (i.e., internal to an implementation).**

4.59.2 Use Case Roles



Actor: Department System Scheduler/Order Filler.

Role: Receives the PPS information forwarded by the PPS Manager.

5 **Actor: Image Manager.**

Role: Receives the PPS information forwarded by the PPS Manager.

Actor: Report Manager.

Role: Receives the PPS information forwarded by the PPS Manager.

Actor: Importer.

10 **Role: Informs the Performed Procedure Step Manager that a particular Performed Procedure Step has started.**

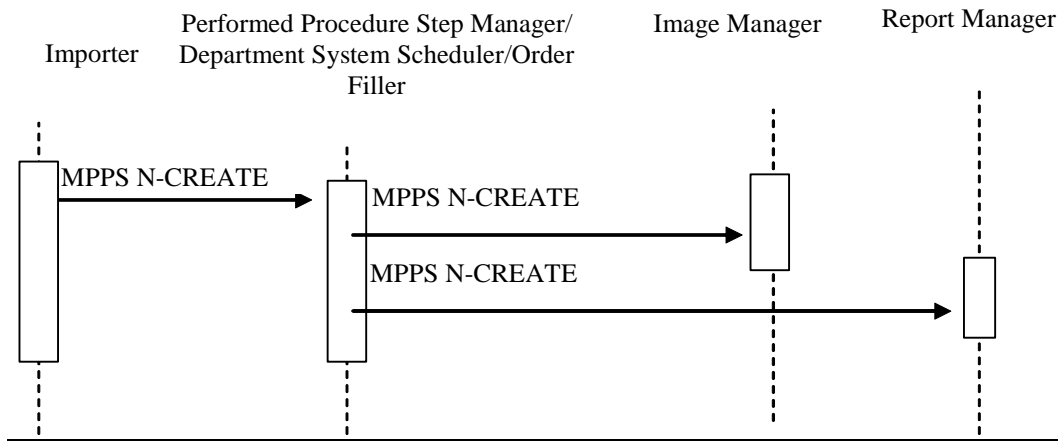
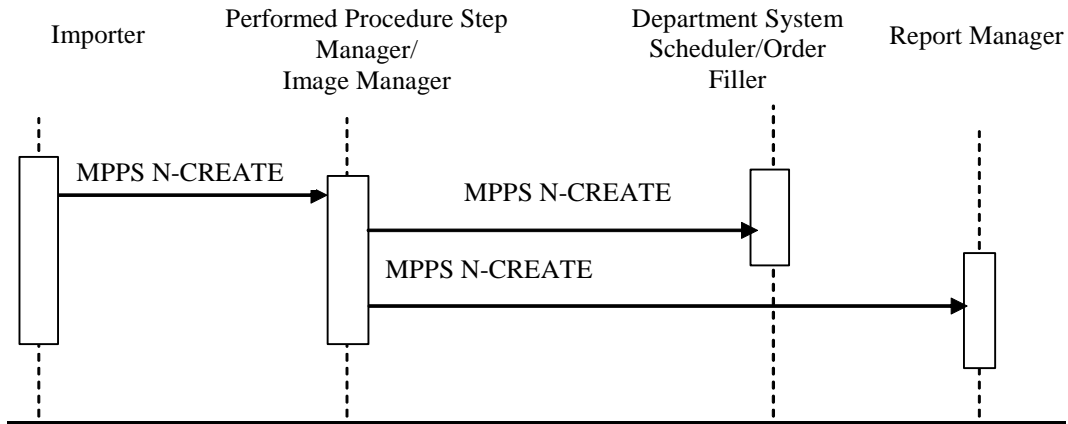
Actor: Performed Procedure Step Manager.

Role: Accepts Performed Procedure Step information from a Importer and transmits it to the Department System Scheduler/Order Filler, Image Manager and Report Manager.

154.59.3 **.Referenced Standards**

DICOM 2004 PS 3.4: Modality Performed Procedure Step SOP Class.

4.59.4 Interaction Diagram



5

4.59.4.1 Procedure Step In Progress Message

4.59.4.1.1 Trigger Event

The User begins the import procedure step from the Importer.

4.59.4.1.2 Message Semantics

- 10 The Importer importing Evidence Objects into the Enterprise uses a Modality Performed Procedure Step SOP Class (N-CREATE Service) to inform the Performed Procedure Step Manager that a specific Procedure Step has been started and is in progress. In turn, the Performed Procedure Step Manager uses the N-CREATE service to forward the information to the Department System Scheduler/Order Filler, Image Manager and Report

Manager. The Performed Procedure Step Manager shall use the same Performed Procedure Step SOP Instance UIDs during this interchange. The following aspects shall be taken into account during implementation of this step:

5 **4.59.4.1.2.1 Patient/Procedure/Scheduled Procedure Step Information**

The Importer shall ensure that the critical Patient information is valid and correct (See RAD TF-2: Appendix A.2). Additionally, if a Procedure Step has been scheduled for the importation it is also necessary to validate the Procedure information. Due to the fact that the Evidence Objects or Hardcopy to be imported are not native to the Enterprise, the validation process (by the User) of ensuring that the correct Patient is associated with the imported data is critical.

4.59.4.1.2.2 Required Attributes

15 **RAD TF-2: Appendix A.2 lists a number of attributes that shall be coerced by the Importer to ensure consistency between the information included in the imported SOP instances, the Performed Procedure Step attributes, the Patient Demographic Information and the Scheduled Procedure Step information, if applicable.**

4.59.4.1.2.3 Relationship between Scheduled and Performed Procedure Steps and the Imported DICOM Composite Object

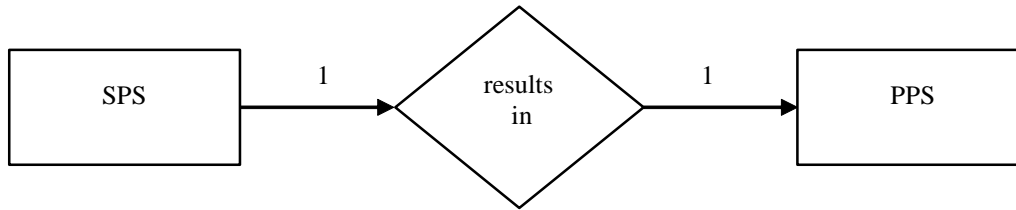
20 **When importing a DICOM Composite Object (e.g. from CD), the DICOM header information must either be preserved to ensure the integrity of the Study or coerced to fit within the local Enterprise. RAD TF-2: Appendix A.2 defines specific coercion requirement. For example, the Study Instance UID is one of the elements which must be maintained.**

25 **The original scheduling and performing of the studies to be imported is outside of the venue of the Enterprise. For this reason, the association of Evidence Objects from a study to be imported may have relationships which are not easily described.**

When digitizing Hardcopy and creating a new DICOM Composite Object, some of the original patient and study details may be derived from manual entry, OCR, configuration, etc. or may not be available. RAD TF-2: Appendix A.2 defines specific requirements.

30 **The relationship between Scheduled and Performed Procedure Step information for an importation is shown in the following 2 cases. Refer to RAD TF-2: Appendix A.2 for details of filling other attributes (Procedure ID, Accession Number, etc.) in each of these cases. In each case a MPPS N-Create Message is sent to notify the system that the performed procedure import is in progress**

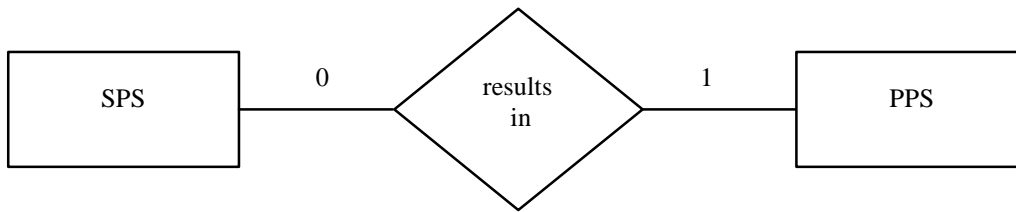
4.59.4.1.2.3.1 Scheduled Import



5 **In the SCHEDULED IMPORT option, the Scheduled Procedure Step information is provided by a Modality Worklist. There exists a 1-to-1 relationship between SPS and PPS. Information about the Scheduled Procedure Step and Requested Procedure shall be copied from the Scheduled Procedure Step object to the Performed Procedure Step Relationship Module (see RAD TF-2: Appendix A.2).**

10 **Examples: A Procedure Step was performed exactly as scheduled. It could also be that a Procedure Step was not exactly performed as scheduled, but without being rescheduled, e.g. multiple Portable Media exist for a single Patient Study.**

4.59.4.1.2.3.2 Unscheduled Import



15 **In the UNSCHEDULED IMPORT option the Importer does not receive Scheduled information. There is a 0-to-1 relationship between SPS and PPS. The Patient information is received through a Patient Demographics Query and no Scheduled Procedure Step or Requested Procedure information is available.**

4.59.4.1.2.3.3 Performed Protocol Sequence for Import

20 **The Performed Protocol Code Sequence (0040,0260) shall be present in the Import Modality Performed Procedure Step. It is used to provide information on how the import should be handled (e.g. Intepret the Evidence Objects, Destroy the associated Media).**

The Performed Protocol Code Sequence shall always contain one item with the value of (IRWF001, IHETFRAD, "Import").

25 **In addition, if the Scheduled Protocol Code Sequence (0040,0008) exists, it shall be copied to the Performed Protocol Code Sequence (0040,0260), unless modified by the operator. For both the Scheduled and Unscheduled Import, the Importer may have the ability to add/modify the Import Instructions (see RAD TF-2:4.5-4).**

4.59.4.1.3 Expected Actions

5 **The Department System Scheduler/Order Filler, Report Manager and the Image Manager/Image Archive receive information from the Performed Procedure Step Manager and in the scheduled case, link it with the Requested Procedure and Scheduled Procedure Step.**

How the Performed Procedure Step Manager, Department System Scheduler/Order Filler, Report Manager and the Image Manager/Image Archive uses the information contained within the Performed Protocol Sequence is currently undefined.

Addition of Section 4.60 – New transaction to support the storage of Import Procedure Step Completed/Discontinued.

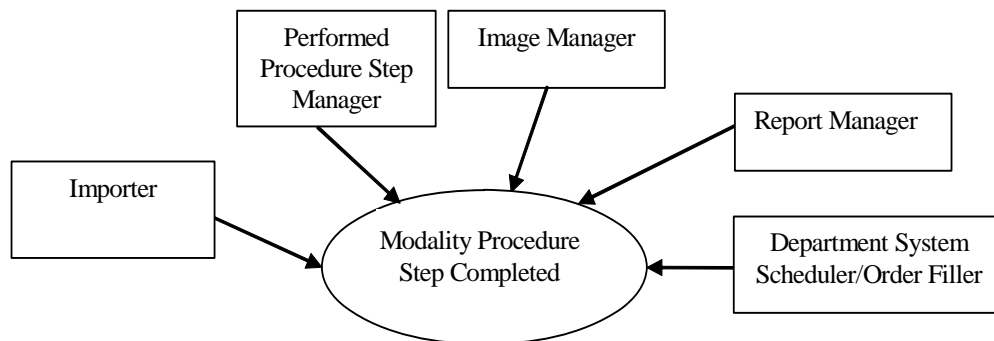
4.60 Import Procedure Step Completed/Discontinued

5 **This section corresponds to Transaction RAD-60 of the IHE Technical Framework. Transaction RAD-60 is used by the Department System Scheduler/Order Filler, Image Manager, Report Manager, Performed Procedure Step Manager and Importer actors.**

4.60.1 Scope

10 **This transaction includes a message from the Importer to the Performed Procedure Step Manager, which forwards the messages to the DSS/Order Filler, the Report Manager and the Image Manager that the Performed Procedure Step and importation has been completed. The Image Manager may need the information to co-locate Evidence Objects of the same study. The Modality Procedure Step Completed message does not necessarily mean that the set of Evidence Objects is complete or available for retrieval.**

4.60.2 Use Case Roles



15 **Actor: Department System Scheduler/Order Filler.**

Role: Receives the PPS information forwarded by the PPS Manager.

Actor: Image Manager.

Role: Receives the PPS information forwarded by the PPS Manager.

20 **Actor: Report Manager.**

Role: Receives the PPS information forwarded by the PPS Manager.

Actor: Importer.

Role: Informs the Performed Procedure Step Manager that a particular Performed Procedure Step and Importation is completed.

25 **Actor: Performed Procedure Step Manager.**

Role: Accepts Performed Procedure Step information from an Portable Media Importer or Evidence Creator and transmits it to the Department System Scheduler/Order Filler, Image Manager and Report Manager.

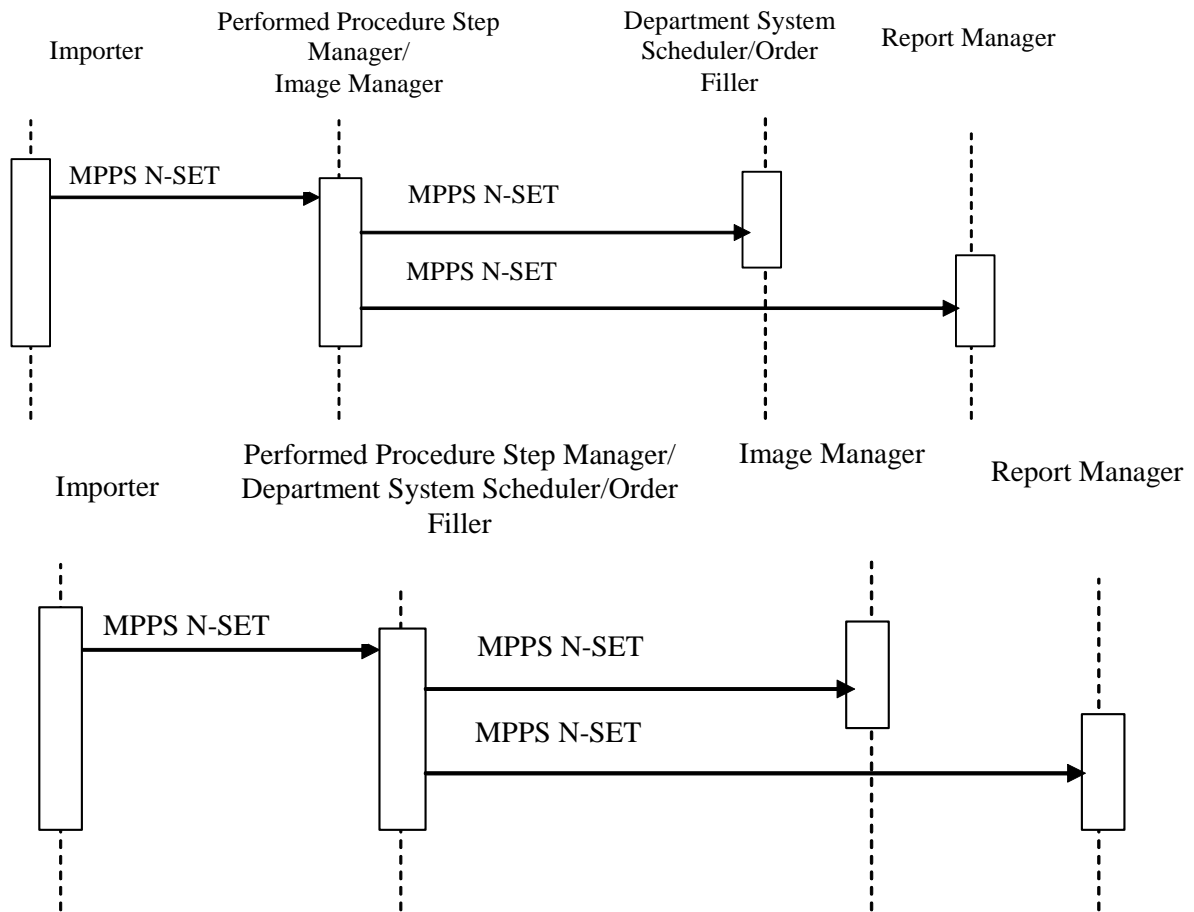
5 **4.60.3 Referenced Standards**

DICOM 2004 PS 3.4: Modality Performed Procedure Step SOP Class.

DICOM 2004 PS 3.16: DCMR Context Groups (Normative)

4.60.4 Interaction Diagram

10



Note: The diagram above shows the sequencing of messages for the Modality Performed Procedure Step SOP Class. Importers will also implement the Storage and Storage Commitment classes. The timing relationship between PPS messages and Storage and Storage Commitment messages is not specified. That is, PPS messages may occur before or after storage requests.

4.60.4.1 Procedure Step Completed/Discontinued

4.60.4.1.1 Trigger Event

User completes procedure step on the Importer.

4.60.4.1.2 Message Semantics

The Importer shall send Modality Performed Procedure Step SOP Class (N-SET service) to inform the Performed Procedure Step Manager that a specific Performed Procedure Step has been completed or discontinued.,

The final N-SET has either the MPPS status of "COMPLETED" or "DISCONTINUED". The Performed Procedure Step Manager forwards N-SETs to the Department System Scheduler/Order Filler, Image Manager and Report Manager.

When an N-SET is issued with a "DISCONTINUED" status, one or more Series of Instances may be referenced, if Evidence Objects were created and sent.

Note: DICOM specifies that when attributes are allowed to be set by an N-SET, the value provided by the last N-SET overrides any value set by an earlier N-CREATE or N-SET.

4.60.4.1.2.1 Retrieve AE Title

According to the DICOM Standard, the Importer has the ability to include the Retrieve AE Title attribute (0008,0054) in the Performed Series Sequence (0040,0340). This is an AE Title where the referenced SOP instances for the series may be retrieved. This Retrieve AE Title will often be zero length or be of short-term validity, due to the following situations:

- If an Importer supports a Retrieve SOP Class in an SCP Role, the Importer's Retrieve AE Title may be included; however, the Importer does not guarantee long-term availability.**
- A Retrieve AE Title of the Image Manager can be configured on the Importer. Otherwise, this field shall be sent zero length. Importer implementers shall not assume that the destination AE Title used for the Storage SCP or Storage Commitment SCP is the same as that for Image Retrieval.**

- **An Importer may receive the Retrieve AE Title in a Storage Commitment Message (N-EVENT REPORT). However, this information may be received well after the MPPS N-SET (Complete) was performed.**

5 **4.60.4.1.2.2 Import PPS Exception Management**

When the Modality Procedure Step is sent with the Status DISCONTINUED, the Procedure Step Discontinuation Reason Code Sequence (0040,0281) shall be sent with values defined in DICOM 2004 PS 3.16 Annex B Context ID 9300 or Table 4.60-1 (additional codes that are in the process of being added by DICOM).

10

Table 4.60-1 Context ID 9300 – Procedure Discontinuation Reasons Excerpt
Most Restrictive Use: Defined

<u>Coding Scheme Designator (0008,0102)</u>	<u>Code Value (0008,0100)</u>	<u>Code Meaning (0008,0104)</u>
<u>...</u>		
<u>DCM</u>	<u>xxxx1</u>	<u>Objects incorrectly formatted</u>
<u>DCM</u>	<u>xxxx2</u>	<u>Object Types not supported</u>
<u>DCM</u>	<u>xxxx3</u>	<u>Object Set incomplete</u>
<u>DCM</u>	<u>xxxx4</u>	<u>Media Failure</u>

The Reason Code when communicated to the DSS/Order Filler and Image Manager/Image Archive may imply canceling an order. It may also facilitate more accurate charge posting.

15

The Reason Code: "Incorrect Worklist Entry Selected" is used by the Importer to convey that the wrong Patient Demographics and/or Scheduled Procedure Step has been selected (incorrect patient or incorrect Requested procedure/order for the same patient). In this case some or all of the incorrectly imported Evidence Objects (for example the ones assigned to the wrong patient) may already have been stored to the Image Manager. (See sec 4.60.4.1.3.1).

20

Importer implementers are left free to decide how to correct the resultant evidence objects. The Importer shall include within the MPPS the list of imported objects that are or will be included in the Import Stored Transaction(s).

25

Note: When a PPS DISCONTINUED is sent with the reason code "incorrect worklist entry selected", evidence objects referenced in this PPS DISCONTINUED are Evidence Objects that may have been sent to the Image Manager/Archive. The IHE Technical Framework does not specify whether or not the Importer Actor needs to perform a Storage Commitment for these instances.

The Reason Codes “Equipment Failure”, Objects incorrectly formatted”, “Object Types not Supported”, “Object Set incomplete” and “Media Failure” will be used to indicate that the expected Evidence Objects have been imported.

5 **4.60.4.1.2.3 Billing and Material Management Option**

The message semantics are defined in the DICOM Service Class section of the DICOM 2004 Modality Performed Procedure Step SOP Class. It is the responsibility of the Importer to ensure that the patient and procedure information is sent to the Department System Scheduler/Order Filler.

10 **The Attributes defined in Table 4.60-2 provide a means to transmit material management codes from the importer to the DSS/Order Filler that uses them for calculation of charges to be posted to the Charge Processor;**

15 **An importer that supports the BILLING AND MATERIAL MANAGEMENT option shall be able to provide content within the Billing Procedure Step Sequence and the Billing Supplies and Devices Sequence. If the Billing Procedure Step is used, the Import Billing Code Table shall be configured on the Importer. This table shall be synchronized with the Department System Scheduler/Order Filler. The codes provided by the Importer might not be the same as the code the Department System Scheduler/Order Filler is required to use when posting Charges to the Charge Processor.**

20 **The Billing Item Sequence provides the mechanism to track the number of media imported. See Table 4.60.3 for the list of Coded Values that may be specified in the Billing Item sequence when there are charges associated with importing items such as as a CD or digitizing a Radiological Film. Multiple codes may be present.**

25

Table 4.60-2 Billing and Material Management Code Module Attributes Excerpt

<u>Attribute name</u>	<u>Tag</u>	<u>Attribute Description</u>
<u>Billing Procedure Step Sequence</u>	<u>(0040,0320)</u>	<u>Contains billing codes for the Procedure Type performed within the Procedure Step. The sequence may have zero or more Items It may be zero-length if the Billing Supplies and Devices Sequence is populated.</u>
<u>> Code Value</u>	<u>(0008,0100)</u>	
<u>> Coding Scheme Designator</u>	<u>(0008,0102)</u>	
<u>> Code Meaning</u>	<u>(0008,0104)</u>	
<u>...</u>		
<u>Billing Supplies and Devices Sequence</u>	<u>(0040,0324)</u>	<u>Contains billing codes for chemicals, supplies and devices for billing used in the Performed Procedure</u>

		<u>Step. The sequence may have one or more Items.</u>
<u>>Billing Item Sequence</u>	<u>(0040,0296)</u>	<u>Codes values of chemicals, supplies or devices required for billing. The sequence may have zero or one Items.</u>
<u>>> Code Value</u>	<u>(0008,0100)</u>	
<u>>> Coding Scheme Designator</u>	<u>(0008,0102)</u>	
<u>>> Code Meaning</u>	<u>(0008,0104)</u>	
<u>>Quantitv Sequence</u>	<u>(0040,0293)</u>	<u>Sequence containing the quantity of used chemicals or devices. The sequence may have zero or one Items.</u>
<u>>>Quantity</u>	<u>(0040,0294)</u>	<u>Numerical quantity value. Specifies the number of media imported or digitized.</u>
<u>...</u>		

Table 4.60-3 Context ID xxxx – Import Device Media

<u>Coding Scheme Designator (0008,0102)</u>	<u>Code Value (0008,0100)</u>	<u>Code Meaning (0008,0104)</u>
<u>DCM</u>	<u>xxxx1</u>	<u>Sheet Film Scanned</u>
<u>DCM</u>	<u>xxxx2</u>	<u>Cine Film Scanned</u>
<u>DCM</u>	<u>xxxx3</u>	<u>Video Tape Scanned</u>
<u>DCM</u>	<u>xxxx4</u>	<u>Page Scanned</u>
<u>DCM</u>	<u>xxxx5</u>	<u>Entire Document Scanned</u>
<u>DCM</u>	<u>xxxx6</u>	<u>CD Imported</u>
<u>DCM</u>	<u>xxxx7</u>	<u>DVD Imported</u>
<u>DCM</u>	<u>xxxx8</u>	<u>MOD Imported</u>
<u>DCM</u>	<u>xxxx9</u>	<u>Studies Imported</u>
<u>DCM</u>	<u>xxxx10</u>	<u>Images Imported</u>

4.60.4.1.3 Expected Actions

- 5 **The Image Manager, Report Manager and Department System Scheduler/Order Filler receive information about the Performed Procedure Step being complete or discontinued. The Image Manager, Report Manager and Department System Scheduler are not required to act on intermediate N-SET messages with the MPPS Status "IN PROGRESS".**
- 10 **In the case of the Scheduled Import, the Requested Procedure may be considered complete if all Performed Procedure Steps related to all Scheduled Procedure Steps have been completed or properly discontinued.**

4.60.4.1.3.1 Import PPS Exception Management

When an import exception occurs, the DSS/Order Filler or Image Manager/Archive shall use the reason codes in the final N-SET sent with the status of DISCONTINUED.

5 **When the Modality Procedure Step is received with the Status DISCONTINUED, the receiver shall interpret the Performed Procedure Step Discontinuation Reason Code Sequence (0040,0281) values as defined in DICOM (See Section 4.60.4.1.2.2). When received by the Department System Scheduler/Order Filler and the Image Manager/Archive, the Reason Code may indicate the necessity for modification or canceling of an order. With the Reason Code: “Incorrect Worklist Entry Selected”, the Importer Actor conveys that the wrong SPS or Patient has been selected (e.g. incorrect patient or incorrect Requested procedure/order for the same patient). In this case the Image Manager and Department System Scheduler shall take the appropriate action to ensure that already received incorrect instances (i.e. SOP Instances referenced by this Discontinued PPS) are not mistakenly used. If the images, presentation states, or key image notes are not actually deleted, the Image Manager shall:**

- **not return SOP Instance UIDs for the images in query responses,**
- **not return such images in Patient, Study, Series, or Instance level retrievals,**

10 **On the DSS and Image Manager, the Order/Requested Procedure status shall be corrected to indicate that the discontinued PPS (with wrong worklist entry selected) is not valid. Therefore the Order Filler/Department System Scheduler shall not query for those instances with an Image Availability transaction [RAD-49].**

15 **When the Modality Procedure Step is received with the Status DISCONTINUED, it shall include a Reason Code from the enumerated list (See Table 4.60-1). The Reason Code indicates that all of the Evidence Objects could not be imported. Typically this will be because some of the DICOM Composite Objects are not supported by the local Enterprise. How the local Enterprise deals with this situation is up to local policies and is out of scope of the Technical Framework.**

4.60.4.1.3.2 Billing and Material Management Option

20 **When a DSS/Order Filler supports the BILLING AND MATERIAL MANAGEMENT option, it shall use the billing codes and/or material usage information provided in the final N-SET for calculation of charges that it will eventually post to the Charge Processor. It is recommended that DSS/Order Filler verifies the consistency of provided billing codes with Requested Procedure Code and Performed Procedure Step Protocol codes supplied in the same N-SET.**

Addition of Section 4.61. – New transaction to support the storage of Imported Objects.

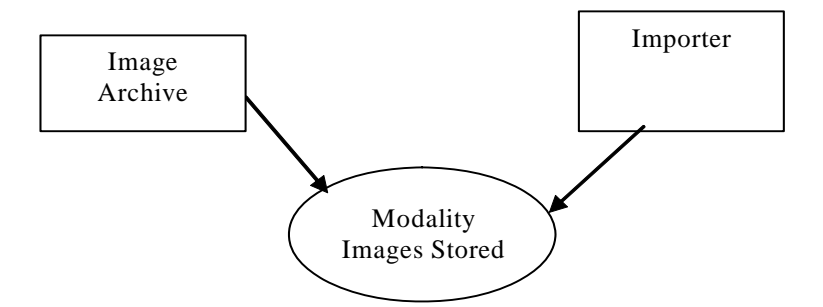
4.61. Imported Objects Stored

5 **This section corresponds to Transaction RAD-61 of the IHE Technical Framework. Transaction RAD-61. is used by the Image Archive and the Importer actors.**

4.61.1 Scope

10 **In the Imported Objects Stored transaction, the Importer sends the Evidence Objects to the Image Archive. The reconciled information provided from the Modality Worklist transaction (see RAD TF-2: 4.5) or the Patient Demographics Query (see ITI TF-2:4.21) shall be included in the headers of the generated images.**

4.61.2 Use Case Roles



:

15 **Actor: Image Archive**

Role: Accept and store DICOM Composite Objects from the Portable Media Importer.

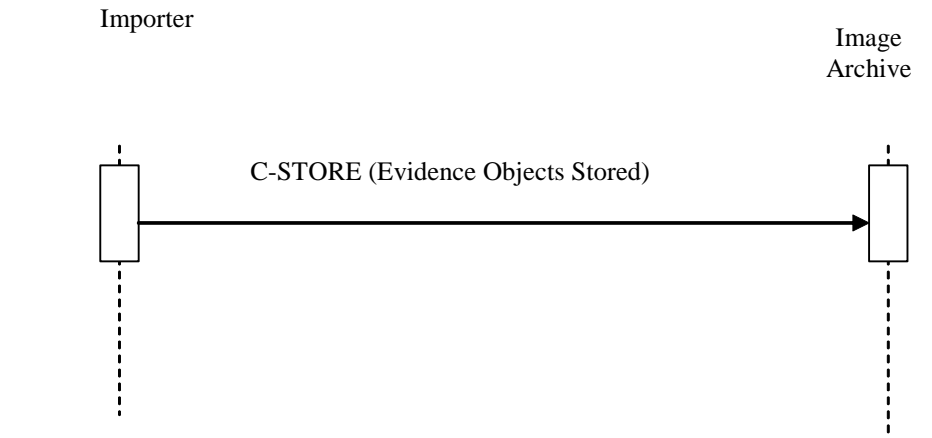
Actor: Importer

Role: Transmit imported DICOM object data to Image Archive

4.61.3 Referenced Standards

20 **DICOM 2004 PS 3.4: Storage Service Class, Section B.4.1 Conformance as an SCP**
DICOM 2004 PS 3.3 SOP Information Objects, Common Module Attribute

4.61.4 Interaction Diagram



5 **4.60.4.1 Evidence Objects Stored**

4.61.4.1.1 Trigger Events

The Importer can transfer Evidence objects to the Image Archive sequentially within one or more DICOM associations, as the Evidence objects become available or collectively.

4.61.4.1.1.1 UIDs

- 10 **Valid DICOM UIDs are universally unique, so there should be no risk of collision with local UIDs. When a valid set of DICOM UIDs is present, the importer shall use this set and not change them. If the importer detects incorrect UIDs or an inconsistent set of UIDs, then it may correct or re-generate UIDs. The UIDs are used as references between objects, and if they are altered, the Importer shall maintain referential integrity. Additional details**
- 15 **about when it is appropriate for an Importer to trigger the creation of a new Study/Series/Image Instance are described in RAD TF-2: 4.8.4.1.1.1 “Study UIDs and Series UIDs”.**

4.61.4.1.2 Message Semantics

- 20 **The Importer uses the DICOM C-STORE message to transfer the DICOM Composite Objects. The Importer is the DICOM Storage SCU and the Image Archive is the DICOM Storage SCP.**

If the import was scheduled, the User validates the available information for the patient and the Scheduled Procedure Step/Requested Procedure and coerces the Patient/Order Information as required (See Section RAD TF-2:Appendix A.2).

5 **If the import was not scheduled, the User validates the available information for the patient and coerces the Patient Information as required (See Section RAD TF-2:Appendix A.2).**

It is a requirement that certain information be recorded in the image header. The details of the mapping to DICOM instances are specified in RAD TF-2: Appendix A.2.

Per the DICOM Standard, the Importer shall create a new series for its created images (e.g. Digitization of Films) and not extend series containing source images.

10

4.61.4.1.2.1 Original Attributes Sequence

When coercing (i.e. replacing or deleting attributes) from the original Evidence Objects, the Importer shall create or add to the “Original Attributes Sequence” (See Table 4.61.4.1.2-1) at the top level and store the original values of those altered DICOM elements underneath it as defined in RAD TF-2: Appendix A.2.

15

The Importer shall use the “Original Attribute Sequence” to preserve information about the original non-digitized data (e.g. Originating Institution, Time of the import, specific attributes from the originating Institution). The mechanism and values which are preserved is out of scope for the Technical Framework.

20

Table 4.61.4.1.2-1 Original Attributes Sequence

<u>Attribute Name</u>	<u>Tag</u>	<u>Type</u>	<u>Attribute Description</u>
...			
<u>Original Attributes Sequence (Note 1,2)</u>	<u>(0400,0561)</u>	<u>R+</u>	<u>Sequence of Items containing all attributes that are specified by the User from the Original dataset.</u> <u>One or more Items may be permitted in this sequence.</u>
<u>>Source of Previous Values</u>	<u>(0400,0564)</u>	<u>R+</u>	<u>Identification of the Enterprise which originated the Films or Documents.</u>
<u>>Attribute Modification Datetime</u>	<u>(0400,0562)</u>	<u>R</u>	<u>Date and Time of the hardcopy scan</u>
<u>>Modifying System</u>	<u>(0400,0563)</u>	<u>R</u>	<u>Identification of the local Enterprise</u>
<u>>Reason for the Attribute Modification</u>	<u>(0400,0565)</u>	<u>R</u>	<u>Reason for the attribute modification. Defined terms are:</u>

<u>Attribute Name</u>	<u>Tag</u>	<u>Type</u>	<u>Attribute Description</u>
			<p>COERCE = Replace values of attributes such as Patient Name, ID, Accession Number, for example, during import of media from an external institution, or reconciliation against a master patient index.</p> <p>CORRECT = Replace incorrect values, such as Patient Name or ID, for example, when incorrect worklist item was chosen or operator input error.</p>
<u>>Modified Attribute Sequence</u>	<u>(0400,0550)</u>	<u>R</u>	<u>Sequence containing a single item that contains all the Attributes that supplied by the User from the Original Films or Documents..</u>
<u>>>Any Attribute from the main data set that was modified</u>			

Note 1: A new original attribute sequence is added every time the DICOM Objects are imported.

Note 2: For digitized hardcopy the “old values” would be information the operator manually enters. It is expected that there would be only one sequence in this case.

5 **4.61.4.1.2.2 Contributing Equipment Sequence**

10 **In order to preserve the fact that these Evidence Objects have been imported into the Enterprise, the Contributing Equipment Sequence shall be used (See Table 4.61.4.1.2-2). This will allow the local Institution to make decisions based upon the fact that a set of Evidence Objects has been imported (e.g. Schedule an over-read based upon an import, delete the imported Evidence Objects after a prescribed amount of time). The behavior of how Imported Evidence Objects are used and maintained is out of scope of the Technical Framework.**

Table 4.61.4.1.2-2 Contributing Equipment Sequence

<u>Attribute Name</u>	<u>Tag</u>	<u>Type</u>	<u>Attribute Description</u>
<u>>Purpose of Reference Code Sequence</u>	<u>(0040,A170)</u>	<u>R</u>	<u>Describes the purpose for which the related equipment is being referenced. See C.12.1.1.4 for further explanation. (See Table 4.61.4.1.2-3)</u>
<u>>>Include ‘Code Sequence Macro’ Table 8.8-1</u>			<u>Defined Context ID 7005.</u>
<u>>Manufacturer</u>	<u>(0008,0070)</u>	<u>R</u>	<u>Manufacturer of the equipment that contributed to the composite instance. (Manufacturer of Portable Media Importer or Digitizer.)</u>

<u>>Institution Name</u>	<u>(0008,0080)</u>	<u>R+</u>	<u>Institution where the equipment that contributed to the composite instance is located.</u> <u>(Institution where the Import is being done.)</u>
<u>>Station Name</u>	<u>(0008,1010)</u>	<u>R+</u>	<u>User defined name identifying the machine that contributed to the composite instance.</u> <u>(User defined name identifying the machine that is performing the import.)</u>
<u>>Contribution DateTime</u>	<u>(0018,A002)</u>	<u>R+</u>	<u>The Date & Time when the equipment contributed to the composite instance.</u> <u>(The Date & Time of the import.)</u>

The following table should be used to provide describe the equipment that has done the import. This information may be used by an Institution at a later time to take actions specific to data imported into the Enterprise.

5

Table 4.61.4.1.2-3 Context ID 7005 – Contributing Equipment

Most Restrictive Use: Defined

<u>Coding Scheme Designator (0008,0102)</u>	<u>Code Value (0008,0100)</u>	<u>Code Meaning (0008,0104)</u>
<u>DCM</u>	<u>xxxxx1</u>	<u>Portable Media Importer Equipment</u>
<u>DCM</u>	<u>xxxxx2</u>	<u>Film Digitizer Equipment</u>
<u>DCM</u>	<u>xxxxxx3</u>	<u>Document Digitizer Equipment</u>

4.61.4.1.3 Expected Actions

The Image Archive will store the received DICOM objects.

10

The DICOM Images, Evidence Documents and Diagnostic Reports shall be stored such that they can be later retrieved (See RAD TF- 2:4.16, RAD TF-2:4.17, RAD TF-2:4.27 and RAD TF-2:4.3) in a fashion meeting the requirements defined for a DICOM Level 2 Storage SCP (Refer to DICOM PS 3.4 B.4.1).

15

4.61.4.1.3.1 DICOM Storage SOP Classes

The DICOM Standard defines a number of image specific storage SOP classes, as well as other DICOM SOP Classes for DICOM SR, encapsulated pdfs, etc. All standard attributes and private elements shall be stored.

- 5 **It is expected that the product's DICOM Conformance Statement will state which DICOM Storage SOP Classes it claims to support. Non-supported SOP Classes shall be rejected by the Image Manager/ Image Archive in the C-Store association. How the Institution deals with situations where DICOM Objects from the Importer cannot be stored is out of scope of the Technical Framework.**

5 Transaction Options on other Domain Profiles

5

Added new IHE Radiology Transactions to Table 5.1-2 Audit trigger events Description Section 5.1.1

Table 5.1-2 Audit Record trigger events

IHE Radiology Transaction	ATNA Trigger Event(s)	Audit Recording Requirements
Patient Registration [1]	Patient-record-event	Sender (ADT) shall audit. Receiver (Order Placer, DSS/OF) shall audit when PHI is presented
Placer Order Management [2]	Order-record-event	Sender (Order Placer) shall audit. Receiver (DSS/OF) shall audit when PHI is presented
Filler Order Management[3]	Order-record-event	Sender (DSS/OF) shall audit
Procedure Scheduled [4]	Procedure-record-event	Sender (DSS/OF) shall audit
Query Modality Worklist [5]	Query Information	DSS/OF shall audit
Modality Procedure Step In Progress [6]	None	
Modality Procedure Step Completed [7]	None	
Modality Images Stored [8]	Begin-storing-instances	Sender (Acq. Mod) shall audit
	Instances-Stored	Receiver (IM/IA) shall audit
Modality Presentation State Stored [9]	Begin-storing-instances	Sender (Acq. Mod) shall audit
	Instances-Stored	Receiver (IM/IA) shall audit
Storage Commitment [10]	None	
Images Availability Query [11]	Images Availability Query	Sender (IM/IA) shall audit
Patient Update [12]	Patient-record-event	Sender (ADT) shall audit. Receiver (Order Placer, DSS/OF) shall audit when PHI is presented
Procedure Update [13]	Procedure-record-event	Sender (DSS/OF) shall audit
Query Images [14]	Query Information	IM/IA shall audit
Query Presentation States [15]	Query Information	IM/IA shall audit
Retrieve Images [16]	Instances-Stored	Sender (IM/IA) shall audit

IHE Technical Framework Supplement – IRWF Profile Draft for Trial Implementation

	Study-used	Image Display shall audit
Retrieve Presentation States [17]	Instances-Stored	Sender (IM/IA) shall audit
	Study-used	Image Display shall audit
Creator Images Stored [18]	Begin-storing-instances	Sender (Evidence Creator) shall audit
	Instances-Stored	Receiver (IM/IA) shall audit
Creator Presentation State Stored [19]	Begin-storing-instances	Sender (Evidence Creator) shall audit
	Instances-Stored	Receiver (IM/IA) shall audit
Creator Procedure Step In Progress [20]	None	
Creator Procedure Step Completed [21]	None	
Print Request with Presentation LUT [23]	PHI-export	Sender (Print Composer) shall audit
Report Submission [24]	Begin-storing-instances	Sender (Report Creator) shall audit
	Instances-Stored	Receiver (Report Manager) shall audit
Report Issuing [25]	Begin-storing-instances	Sender (Report Manager) shall audit
	Instances-Stored	Receiver (Report Repository) shall audit
Query Reports [26]	Query Information	Report Repository/External Report Repository shall audit
Retrieve Reports [27]	Instances-Stored	Sender (Report Repository) shall audit
	Study-used	Report Reader shall audit
Structured Report Export [28]	Instances-Stored	Sender (Report Manager) shall audit
Key Image Note Stored [29]	Begin-storing-instances	Sender (Evidence Creator, Acq. Modality) shall audit
	Instances-Stored	Receiver (IM/IA) shall audit
Query Key Image Notes [30]	Query Information	IM/IA shall audit
Retrieve Key Image Notes [31]	Instances-Stored	Sender (IM/IA) shall audit
	Study-used	Image Display shall audit
Authenticate Node [ITI-19]	Node-Authentication-failure	Any secure node
Maintain Time [ITI-1]	None	
Record Audit Event [ITI-20]	None	
Charge Posted [35]	PHI-export	Sender (DSS/OF) shall audit
Account Management [36]	PHI-export	Sender (ADT) shall audit
Query Post-Processing Worklist [37]	Query Information	Post-Processing Manager shall audit
Workitem Claimed [38]	None	
Workitem PPS In-Progress [39]	None	
Workitem PPS Completed [40]	None	
Workitem Completed [41]	None	
Performed Work Status Update [42]	None	
Evidence Document Stored [43]	Begin-storing-instances	Sender (Acq. Modality / Evidence Creator) shall audit
	Instances-Stored	Receiver (IM/IA) shall audit

Query Evidence Documents [44]	Query Information	IM/IA shall audit
Retrieve Evidence Documents [45]	Instances-Stored	Sender (IM/IA) shall audit
	Study-used	Image Display shall audit
Query Reporting Worklist [46]	Query Information	Report Manager shall audit
<u>Distribute Imaging Information on Media [47]</u>	PHI-export	Portable Media Creator shall audit
	PHI-import	Portable Media Importer shall audit
	Study-used	Image Display, Report Reader, Print Composer shall audit
Appointment Notification [48]	None	
Instance Availability Notification [49]	None	
<u>Import Procedure Step In Progress [59]</u>	<u>None</u>	
<u>Import Procedure Step Completed [60]</u>	<u>None</u>	
<u>Imported Objects Stored [61.]</u>	<u>Begin-storing-instances</u>	<u>Sender Importer shall audit</u>
	<u>Instances-Stored</u>	<u>Receiver (IM/IA) shall audit</u>
<u>Patient Demographics Query [TI-21]</u>	<u>Query Information</u>	<u>Patient Demographics Supplier shall audit</u>