Integrating the Healthcare Enterprise

IHE Endoscopy
Technical Framework Supplement

Endoscopy Image Archiving
(EIA)

Rev. 1.0 - Draft for Public Comment

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Author: IHE Endoscopy Technical Committee

Email: endoscopy@ihe.net

Please verify you have the most recent version of this document. See here for Trial Implementation and Final Text versions and here for Public Comment versions.

Foreword

This is a supplement to the forthcoming IHE Endoscopy Technical Framework. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

This supplement is published on December 19, 2016 for Public Comment. Comments are invited and may be submitted at http://www.ihe.net/endoscopy_public_comments. In order to be considered in development of the Trial Implementation version of the supplement, comments must be received by January 18, 2017.

This supplement describes changes to the existing technical framework documents.

"Boxed" instructions like the sample below indicate to the Volume Editor how to integrate the relevant section(s) into the relevant Technical Framework volume.

Amend Section X.X by the following:

Where the amendment adds text, make the added text **bold underline**. Where the amendment removes text, make the removed text **~~bold strikethrough~~**. When entire new sections are added, introduce with editor's instructions to "add new text" or similar, which for readability are not bolded or underlined.

General information about IHE can be found at: www.ihe.net.

Information about the IHE Endoscopy domain can be found at: http://www.ihe.net/IHE_Domains.

Information about the organization of IHE Technical Frameworks and Supplements and the process used to create them can be found at: http://www.ihe.net/IHE_Process and http://www.ihe.net/Profiles.

The current version of the IHE Endoscopy Technical Framework can be found at: http://www.ihe.net/Technical_Frameworks.

CONTENTS

Introduction to this Supplement

EIA defines specific implementations of established standards to achieve integration goals for endoscopy. Such integration promotes appropriate sharing of medical information to support optimal patient care.

The IHE Endoscopy Integration Profiles rely heavily on, and reference, the transactions defined in those other IHE Technical Framework documents.

Open Issues and Questions

None

Closed Issues

None

General Introduction

Update the following Appendices to the General Introduction as indicated below. Note that these are not appendices to Volume 1.

Appendix A - Actor Summary Definitions

Add the following actors to the IHE Technical Frameworks General Introduction list of actors:

None

Appendix B - Transaction Summary Definitions

Add the following transactions to the IHE Technical Frameworks General Introduction list of Transactions:

Transaction	Definition
Fill Endoscopy Order [ENDO-5]	The transaction that fills the endoscopy order.
Query Modality Worklist [ENDO-7]	The transaction that queries and retrieves the modality worklist.
Modality PS in Progress [ENDO-8]	The transaction that informs the start of the endoscopy procedure.
Modality PS Completed [ENDO-9]	The transaction that informs the end of the endoscopy procedure.
Modality Images/Videos Stored [ENDO-10]	The transaction that stores the images/videos acquired during the endoscopy Procedure.

Glossary

Add the following glossary terms to the IHE Technical Frameworks General Introduction Glossary:

None

Volume 1 – Profiles

Copyright Licenses

Add the following to the IHE Technical Frameworks General Introduction Copyright section:

Not applicable

Domain-specific additions

Not applicable

Add to Section …

X Endoscopy Image Archiving (EIA) Profile

The Endoscopy Image Archiving (EIA) defines a workflow focusing on the image information communication which is acquired during the endoscopy procedure.

The Acquisition Modality acquires the endoscopy orders from the Order Filler. And then the Acquisition Modality sends the images and videos acquired during the endoscopy procedure to the Image Archive.

The transactions of Modality Procedure Step in Progress/Completed and Storage commitment are defined as options.

The Acquisition Modality notifies the performed procedure information of the Performed Procedure Step Manager which is included in the Image Manager or the Performed Procedure Reporter.

X.1 EIA Actors, Transactions, and Content Modules

This section defines the actors, transactions, and/or content modules in this profile. General definitions of actors are given in the Technical Frameworks General Introduction Appendix A at http://www.ihe.net/Technical_Framework/index.cfm.

Figure X.1-1 shows the actors directly involved in the EIA Profile and the relevant transactions between them. If needed for context, other actors that may be indirectly involved due to their participation in other related profiles are shown in dotted lines. Actors which have a mandatory grouping are shown in conjoined boxes.

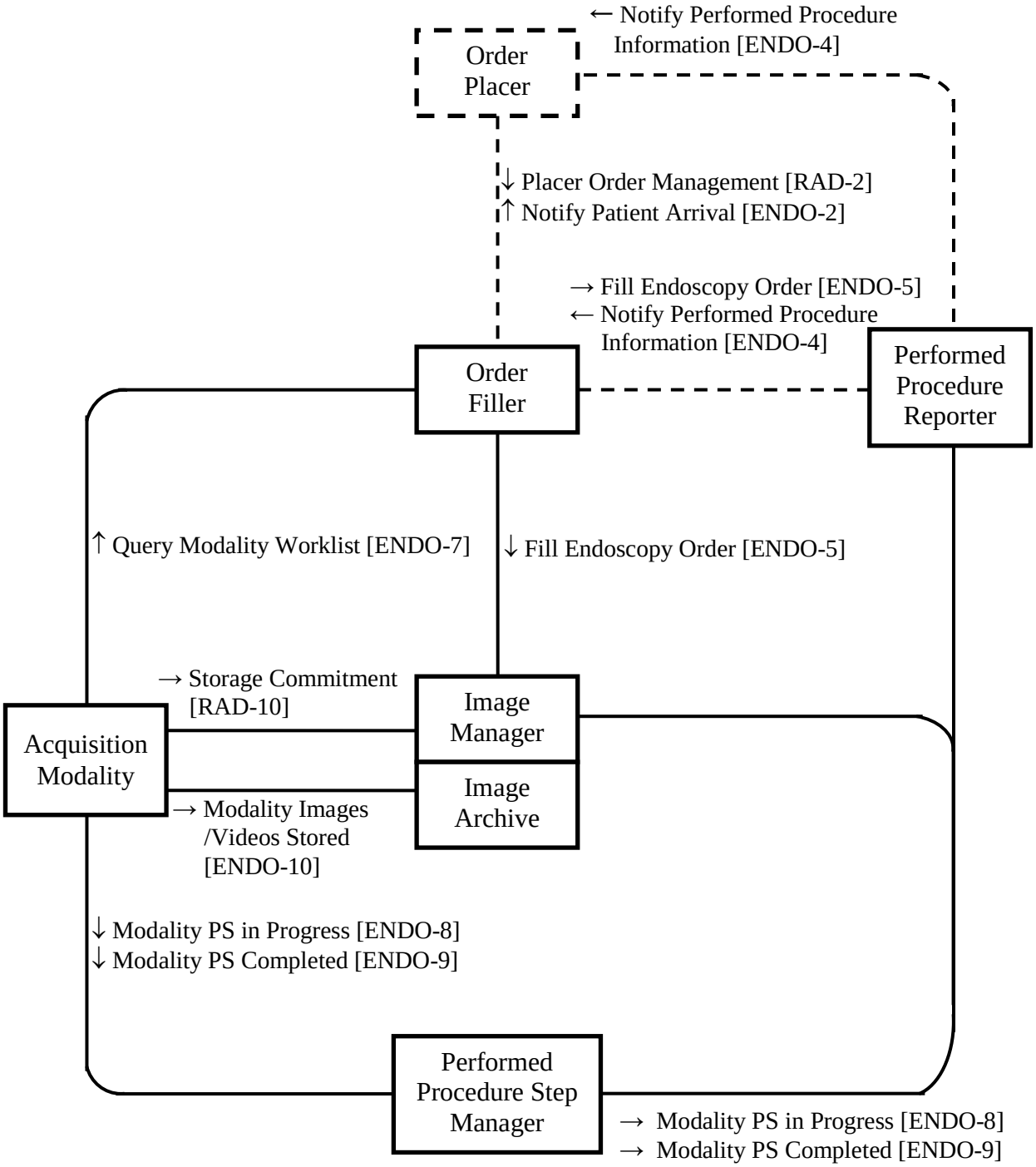

Figure X.1-1: EIA Actor Diagram

Table X.1-1 lists the transactions for each actor directly involved in the EIA Profile. To claim compliance with this profile, an actor shall support all required transactions (labeled "R") and may support the optional transactions (labeled "O").

Table X.1-1: EIA Profile - Actors and Transactions

Actors	Transactions	Optionality	Reference
Order Filler	Fill Endoscopy Order [ENDO-5]	O	ENDO TF-2:4.5
	Query Modality Worklist [ENDO-7]	R	ENDO TF-2:4.7
Performed Procedure Reporter	Modality PS in Progress [ENDO-8]	O	ENDO TF-2:4.8
	Modality PS Completed [ENDO-9]	O	ENDO TF-2:4.9
Acquisition Modality	Query Modality Worklist [ENDO-7]	R	ENDO TF-2:4.7
	Modality PS in Progress [ENDO-8]	O	ENDO TF-2:4.8
	Modality PS Completed [ENDO-9]	O	ENDO TF-2:4.9
	Modality Images/Videos Stored [ENDO-10]	R	ENDO TF-2:4.10
	Storage Commitment [RAD-10]	O	RAD TF-2:4.10
Image Manager/ Image Archive	Fill Endoscopy Order [ENDO-5]	O	ENDO TF-2:4.5
	Modality PS in Progress [ENDO-8]	O	ENDO TF-2:4.8
	Modality PS Completed [ENDO-9]	O	ENDO TF-2:4.9
	Modality Images/Videos Stored [ENDO-10]	R	ENDO TF-2:4.10
	Storage Commitment [RAD-10]	O	RAD TF-2:4.10
Performed Procedure Step Manager	Modality PS in Progress [ENDO-8]	O	ENDO TF-2:4.8
	Modality PS Completed [ENDO-9]	O	ENDO TF-2:4.9

X.1.1 Actor Descriptions and Actor Profile Requirements

Most requirements are documented in Transactions (Volume 2) and Content Modules (Volume 3). This section documents any additional requirements on profile's actors.

X.1.1.1 Order Filler

In each of the transactions assigned in Table X.1-1, the Order Filler shall implement the HL7®[1] v2.5.1 Message Semantics when such semantics are defined.

Note: The HL7 v2.5.1 message semantics maintain semantic equivalency with the HL7 v2.3.1 message semantics and the field correspondences are summarized in RAD TF-2 Appendix E.

[1] HL7 is the registered trademark of Health Level Seven International.

X.1.1.2 Image Manager/Image Archive

In each of the transactions assigned in Table X.1-1, the Image Manager/Image Archive shall implement the HL7 v2.5.1 Message Semantics when such semantics are defined.

Note: The HL7 v2.5.1 message semantics maintain semantic equivalency with the HL7 v2.3.1 message semantics and the field correspondences are summarized in RAD TF-2 Appendix E.

X.1.1.3 Performed Procedure Step Manager

The Performed Procedure Step Manager (which is grouped with both Order Fillers and Image Manager/Image Archives) shall be capable of being disabled via configuration. This avoids having two active PPS Managers creating confusion or forwarding loops.

X.2 EIA Actor Options

Options that may be selected for each actor in this profile, if any, are listed in the Table X.2-1. Dependencies between options when applicable are specified in notes.

Table X.2-1: EIA - Actors and Options

Actor	Option Name	Reference
Order Filler	No options defined	--
Performed Procedure Reporter	No options defined	--
Acquisition Modality	No options defined	--
Image Manager/ Image Archive	No options defined	--
Performed Procedure Step Manager	No options defined	--

X.3 EIA Required Actor Groupings

An actor from this profile (Column 1) shall implement all of the required transactions and/or content modules in this profile ***in addition to*** all of the transactions required for the grouped actor (Column 2).

Section X.5 describes some optional groupings that may be of interest for security considerations and Section X.6 describes some optional groupings in other related profiles.

Table X.3-1: EIA - Required Actor Groupings

EIA Actor	Actor to be grouped with	Reference	Content Bindings Reference
Order Filler	ENDO Endoscopy Workflow - Performed Procedure Reporter	ENDO TF-1:X.1	--

EIA Actor	Actor to be grouped with	Reference	Content Bindings Reference
	ENDO Endoscopy Image Archiving - Performed Procedure Step Manager	ENDO TF-1:X.1	--
Performed Procedure Reporter	None	--	--
Acquisition Modality	None	--	--
Image Manager	ENDO Endoscopy Image Archiving – Image Archive	ENDO TF-1:X.1	--
	ENDO Endoscopy Image Archiving - Performed Procedure Step Manager	ENDO TF-1:X.1	--
Image Archive	ENDO Endoscopy Image Archiving - Image Manager	ENDO TF-1:X.1	--
Performed Procedure Step Manager	None	--	--

X.4 EIA Overview

The primary features of the Endoscopy Image Archiving Profile are:

- Bridging HL7 orders into DICOM®[2] worklists
- Acquisition of DICOM data with proper structure and identifiers

X.4.1 Concepts

The Endoscopy Image Archiving is essentially based on a part of SWF designed for Radiology.

It has been defined to handle the specific circumstances in endoscopy field in the following points.

- To treat the video frames
- How to treat the acquired images after changing an endoscope during a procedure
- Not to treat the concept “discontinued” after starting a procedure

X.4.2 Use Cases

First of all, the most typical and the simplest use cases are defined.

In the endoscopy procedure, there are some use cases that multi-modality is used in one procedure. For example:

[2] DICOM is the registered trademark of the National Electrical Manufacturers Association for its standards publications relating to digital communications of medical information.

- Endoscope Video Processor and Endoscopic Ultrasound Processor are used in EUS (Endoscopic ultrasonography)
- Endoscope Video Processor and X Ray equipment are used in ERCP (Endoscopic retrograde cholangiopancreatography)

However, most of medical devices like PACS already installed in the hospital had been developed based on the assumption that just one modality is used in one procedure until being developed the multi-modality device like PET-CT.

It needs to maintain the compatibility with medical devices already installed in the hospital, so to handle the multi-modality procedure is the future challenge.

X.4.2.1 Use Case #1: Basic Endoscopy Procedure

X.4.2.1.1 Basic Endoscopy Procedure Use Case Description

The most typical use case involves endoscopy procedure being ordered, scheduled and performed for a registered patient.

The endoscopy order is scheduled and then the endoscopy procedure is performed, with imaging data being produced and status messages communicated to interested systems.

This case covers both inpatient and outpatient procedures. The patient may be new or known to the current healthcare facility.

X.4.2.1.2 Basic Endoscopy Procedure Process Flow

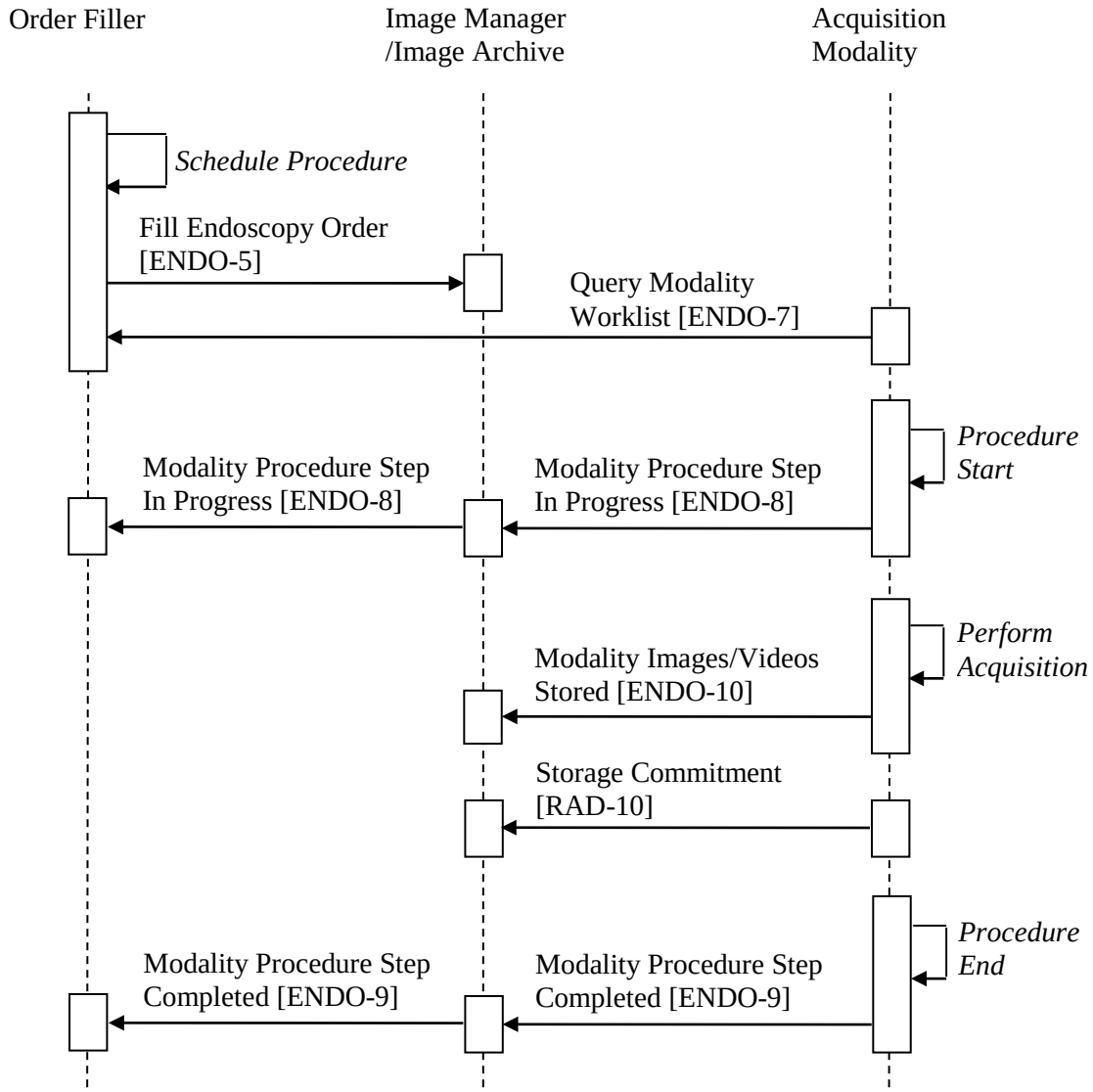

Figure X.4.2.1.2-1: Basic Process Flow in EIA Profile

Pre-conditions:

Transaction ENDO-8 and ENDO-9 should be implemented in pairs

Main Flow:

Section not applicable

Post-conditions:

Section not applicable

X.4.2.2 Use Case #2: Simple Endoscopy Procedure

X.4.2.2.1 Simple Endoscopy Procedure Use Case Description

The simplest use case consists of only required transactions.

The endoscopy order is scheduled and then the endoscopy procedure is performed, with imaging data being produced and stored.

X.4.2.2.2 Simple Endoscopy Procedure Process Flow

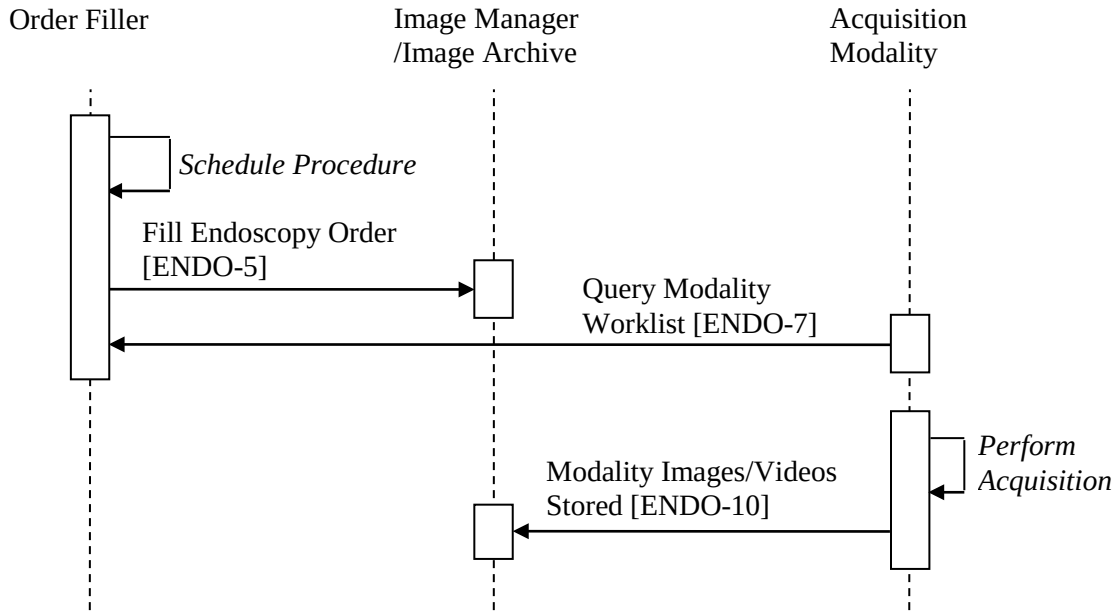

Figure X.4.2.2.2-1: Simple Process Flow in EIA Profile

Pre-conditions:

Section not applicable

Main Flow:

Section not applicable

Post-conditions:

Section not applicable

X.5 EIA Security Considerations

Refer to RAD TF-1: Appendix F Security Environment Considerations.

X.6 EIA Cross Profile Considerations

EWF- Endoscopy Ordering Workflow

Order Filler in Endoscopy Ordering Workflow have to be grouped with an Order Filler in order to manage ordering information.

PAM – Patient Administration Management

Patient Demographics Consumer and Patient Encounter Consumer in Patient Administration Management could be grouped with an Order Filler in order to manage patient information.

PDQ – Patient Demographics Query

Patient Demographics Consumer and Patient Encounter Consumer in Patient Demographics Query could be grouped with an Order Filler in order to manage patient information.

CT – Constant Time

Time Client in Constant Time could be grouped with an Order Filler, Performed Procedure Reporter, Acquisition Modality, Image Manager, Image Archive and Performed Procedure Step Manager in order to synchronize the entire system.

Appendices

None

Volume 2 – Transactions

Modify Section 3.5 as shown below:

3.5 Endoscopy Order [ENDO-5]

This transaction corresponds to Transaction ENDO-5 of the IHE Technical Framework.
Transaction ENDO-5 is used by the actors: Order filler**, ~~and~~** Performed Procedure Reporter**, and Image Manager**.

Modify Section 3.5.1 as shown below:

3.5.1 Scope

This transaction is the endoscopy order filling message from the Order Filler to the Performed Procedure Reporter **and Image Manager**.

Modify Section 3.5.2 as shown below:

3.5.2 Actor Roles

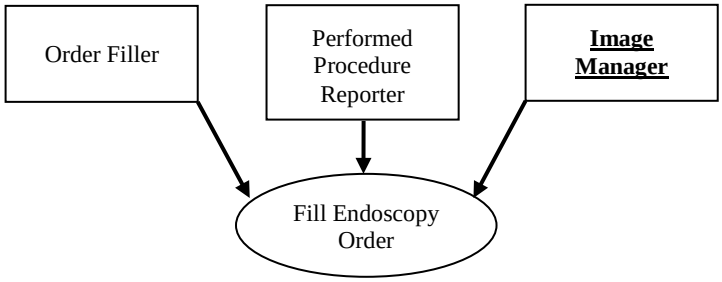

Figure 3.5.2-1: Use Case Diagram

Table 3.5.2-1: Actor Roles

Actor:	Order Filler
Role:	Provide endoscopy order filling information.
Actor:	Performed Procedure Reporter
Role:	Receives endoscopy filling information.
Actor:	**Image Manager**

Role:	**Receives endoscopy filling information.**

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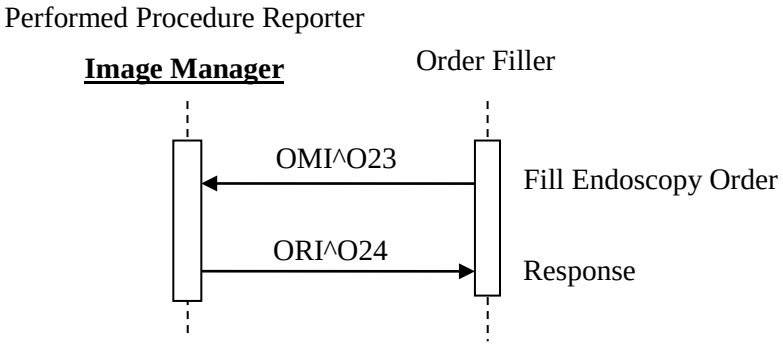
Modify Section 3.5.4 as shown below:

3.5.4 Interaction Diagram



360 **Figure 3.5.4-1: OMI Interaction Diagram**

Add Section 3.7

3.7 Query Modality Worklist [ENDO-7]

This section corresponds to Transaction ENDO-7 of the IHE Technical Framework. Transaction ENDO-7 is used by the Order Filler and Acquisition Modalities.

It is essentially based on similar transaction RAD-5 designed for Radiology. The Radiology TF requires that the Acquisition Modality support at least one of the Worklist Query choices (i.e., patient and/or Broad). Endoscopy requires that the Acquisition Modality supports the patient based query as mandatory and the broad query as optional.

3.7.1 Scope

This transaction takes place at the Acquisition Modality at the point of acquisition. When a patient arrives for the scheduled procedure, the endoscopist 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. The endoscopist at the Acquisition Modality uses the DICOM Modality Worklist to query the Order Filler for Scheduled Procedure Steps. The list is downloaded to the Acquisition Modality. In the "Modality Images Stored" transaction, part of this information will be included in the header of the generated images (See Appendix A). Without the "Query Modality Worklist" transaction, or when no information is available, the endoscopist has to manually enter the information in the header of the generated images.

3.7.2 Actor Roles

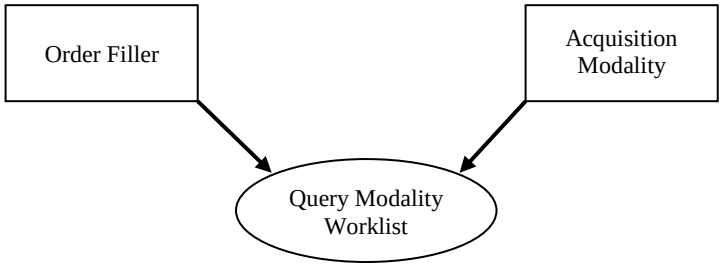


Figure 3.7.2-1: Use Case Diagram

Table 3.7.2-1: Actor Roles

Actor:	Acquisition Modality
Role:	Responsible for requesting and receiving data from the Order Filler, with the ability to validate the data and correct some discrepancies.
Actor:	Order Filler

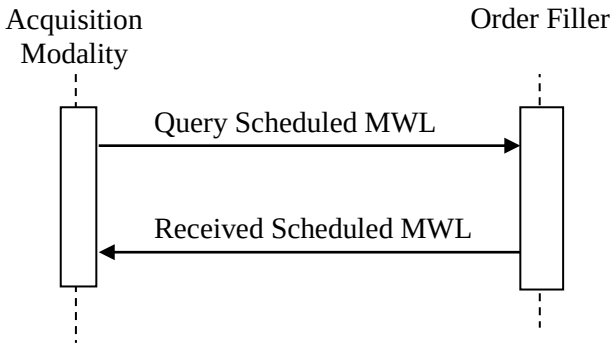
Role:	Responsible for accepting requests for MWL from an Acquisition Modality, performing the query, and sending the response back.

Transaction text specifies behavior for each role. The behavior of specific actors may also be specified when it goes beyond that of the general role.

3.7.3 Referenced Standards

DICOM 2015 PS 3.4: Modality Worklist SOP Class

3.7.4 Interaction Diagram



3.7.4.1 Query Scheduled MWL Message

This is the Worklist query message sent to the Order Filler.

3.7.4.1.1 Trigger Events

The patient arrives at the modality for a procedure.

3.7.4.1.2 Message Semantics

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

Acquisition Modalities shall support individually each one of the required query keys listed in Table 3.7.4.1.2.2-1: Return and matching keys for modality worklist.

1. **The Patient Based Query (mandatory):** Query for a worklist specific for a particular patient. The SCU shall support the matching key attributes listed in Table 3.7.4.1.2-1. Supporting the combinations of these matching key attributes would be preferable.

Table 3.7.4.1.2-1: MWL Keys for Query by Patient

Matching Key Attribute	Tag
Patient's Name	(0010,0010)
Patient ID	(0010,0020)
Accession Number	(0008,0050)
Scheduled Procedure Step Description	(0040,0007)

2. **The Broad Query (optional):** Query for a broad worklist. The SCU shall support the matching key attributes listed in Table 3.7.4.1.2-2. Supporting the combinations of these matching key attributes would be preferable.

Table 3.7.4.1.2-2: MWL Keys for the Broad Worklist Queries

Matching Key Attribute	Tag
Scheduled Procedure Step Start Date	(0040,0002)
Modality	(0008,0060)
Scheduled Station AE-Title	(0040,0001)

3.7.4.1.2.1 Examples for the Use of Matching Key Attributes

- Using the Scheduled Procedure Step Start Date: query for all the procedures in my department that are scheduled for the start date specified.
- Using the Modality key: query for all the procedures that are scheduled on this type of modality (e.g., all ES exams).
- Using AE Title key: query for all the procedures that are scheduled on the modality with the specified AE Title.
- Using the Patient ID key: query for all the procedures that are scheduled for a patient.
- Using the Scheduled Procedure Step Start Date and Modality keys: query for all the ES procedures that are scheduled for today.
- Using the Patient ID and Scheduled Procedure Step Description keys: query for specified procedures that are scheduled for a patient (e.g., upper endoscopy exams for a patient).

Note 1: DICOM defines that dates and times are matched by their meaning, not as literal strings. If an application is concerned about how a single value matching of dates and times is performed by another application, it may consider using range matching instead (e.g., "<today>-<today>"), which is always performed by meaning.

Note 2: Applications are recommended to append a wildcard "*", if one was not previously entered by the user, at the end of each component of the structured Patient Name.

3.7.4.1.2.2 Matching Keys and Return Keys

The Modality is required to query for specific attributes (return keys) that will be inserted into the image objects. The requirements for the attributes in the stored images are defined in Section 3.10 and Appendix A. There are additional attributes that may be queried for use on the Acquisition Modality (e.g., displayed for the user) but might not be inserted into the composite image object.

Table 3.7.4.1.2.2-1 summarizes the matching key requirements and lists the optional and required attributes that may be requested by the SCU and shall be returned by the SCP in order to make these available to the user at the Acquisition Modality. Requirements indicated with R+ or R+* highlight the requirements added by the IHE Technical Framework. See RAD TF-2:2.2 for more information. All display requirements are an addition to the DICOM Standard requirements for the Modality Worklist SOP Class.

Table 3.7.4.1.2.2-1: Return and Matching Keys For Modality Worklist

Attribute Name	Tag	Query Keys Matching		Query Keys Return	
		SCU	SCP	SCU	SCP
Scheduled Procedure Step					
Scheduled Procedure Step Sequence	(0040,0100)			[IHE-1]	[IHE-2]
>Scheduled Station AE Title	(0040,0001)	R+	R	R+*	R
>Scheduled Procedure Step Start Date	(0040,0002)	R+	R	R+	R
>Scheduled Procedure Step Start Time	(0040,0003)	O	R	R+	R
> Scheduled Procedure Step Location	(0040,0011)	O	O	O	O
>Modality	(0008,0060)	R+	R	R+*	R
>Scheduled Performing Physician's Name	(0040,0006)	O	R	O	R
>Scheduled Procedure Step ID	(0040,0009)	O	O	R+*	R
>Scheduled Protocol Code Sequence	(0040,0008)				
>>Code Value	(0008,0100)	O	O	R+*	R
>>Coding Scheme Version	(0008,0103)	O	O	O	O
>>Coding Scheme Designator	(0008,0102)	O	O	R+*	R
>>Code Meaning	(0008,0104)	O	O	R+*	R+
>Scheduled Procedure Step Description	(0040,0007)	R+	R+	R+	R
Requested Procedure					
Requested Procedure Comments	(0040,1400)	O	O	O	O

Attribute Name	Tag	Query Keys Matching		Query Keys Return	
		SCU	SCP	SCU	SCP
Requested Procedure Description	(0032,1060)	O	O	R+*	R
Requested Procedure Code Sequence	(0032,1064)				
>Code Value	(0008,0100)	O	O	R+*	R
>Coding Scheme Version	(0008,0103)	O	O	O	O
>Coding Scheme Designator	(0008,0102)	O	O	R+*	R
>Code Meaning	(0008,0104)	O	O	R+*	R+
Requested Procedure ID	(0040,1001)	O	O	R+*	R
Names of Intended recipients of results	(0040,1010)	O	O	O	O
Study Instance UID	(0020,000D)	O	O	R+*	R
Referenced Study Sequence **[IHE-3]**	(0008,1110)				
>Referenced SOP Class UID	(0008,1150)	O	O	R+*	R
>Referenced SOP Instance UID	(0008,1155)	O	O	R+*	R
Imaging Service Request					
Imaging Service Request Comments	(0040,2400)	O	O	O	O
Accession Number	(0008,0050)	R+ (Note 1)	R+ (Note 1)	R+	R+ [IHE-3]
Requesting Physician	(0032,1032)	O	O	O	R
Requesting Service	(0032,1033)	O	O	O	O
Referring Physician's Name	(0008,0090)	O	O	R+	R
Visit Identification					
Admission ID	(0038,00100	O	O	O	R
Visit Status					
Current Patient Location	(0038,0300)	O	O	O	R
Visit Relationship					
Referenced Patient Sequence	(0008,1120)				
>Referenced SOP Class UID	(0008,1150)	O	O	O	R
>Referenced SOP Instance UID	(0008,1155)	O	O	O	R
Patient Identification					
Patient's Name	(0010,0010)	R+	R	R+	R
Patient ID	(0010,0020)	R+	R	R+	R
Other Patient ID's	(0010,1000)	O	O	O	O
Patient Demographic					
Patients Birth Date	(0010,0030)	O	O	R+	R
Patient's Sex	(0010,0040)	O	O	R+	R
Confidentiality constraint on patient data	(0040,3001)	O	O	O	R

Attribute Name	Tag	Query Keys Matching		Query Keys Return	
		SCU	SCP	SCU	SCP
Ethnic Group	(0010,2160)	O	O	O	O
Patient Comment	(0010,4000)	O	O	O	O
Patient Medical					
Patient State	(0038,0500)	O	O	O	R
Pregnancy Status	(0010,21C0)	O	O	O	R
Medical Alerts	(0010,2000)	O	O	O	R
Additional Patient History	(0010,21B0)	O	O	O	O
Contrast Allergies	(0010,2110)	O	O	O	R
Patient Weight	(0010,1030)	O	O	O	R
Special Needs	(0038,0050)	O	O	O	R

Note 1: The matching performed by the SCP for the Accession Number attributes shall be single value (SV) matching.

(IHE-1): SCU implementations may choose to obtain the values contained in attributes that are part of the Scheduled Procedure Step sequence in either one of three ways. The first one is to request a universal match on the sequence attribute (zero length attribute). The second one is a universal sequence match (zero length item) for all attributes of the Scheduled Procedure Step sequence. The third one is to request a universal attribute match for selected attributes contained in the Scheduled Procedure Step sequence.

(IHE-2): SCP implementations shall support, per the DICOM Standard, three ways to let the Query SCU obtain the values contained in attributes that are part of the Scheduled Procedure Step sequence. The first one is to support a universal match on the sequence attribute (zero length attribute), and all managed attributes will be returned. The second one is to support a universal sequence match (zero length item) for all attributes of the Scheduled Procedure Step sequence, and all managed attributes will be returned. The third one is to support a universal attribute match for selected attributes contained in the Scheduled Procedure Step sequence, and the managed attributes that were selected will be returned.

(IHE-3): A value (Non empty field) shall be returned in the Accession Number attribute if the field was requested by the MWL SCU.

3.7.4.1.3 Expected Actions

The Order Filler performs the query and sends the DICOM Modality Worklist to the Acquisition Modality.

3.7.4.2 Receive Schedule MWL Message

This is the message that the Order Filler sends to the modality as a reply containing DICOM Modality Worklist information.

3.7.4.2.1 Trigger Events

The Order Filler had received a query for a MWL.

3.7.4.2.2 Message Semantics

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, while other attributes are managed internally by the Order Filler.

The Order Filler will determine the Requested Procedures needed to fulfill the Order, and decompose the Requested Procedures into one or more Scheduled Procedure Steps, assigning proper Scheduled Protocol Codes. The Order Filler shall support the definition of multiple Protocol Codes in 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 - the Order Filler shall be configurable to provide such codes.

In addition to these Coded Values further instructions for the endoscopist may be specified. It is recommended to use the Scheduled Procedure Step Description in order to specify the procedures that are scheduled for a patient (e.g., upper endoscopy exams for a patient).

The organization operating the Order Filler and the Modalities is responsible for synchronizing Procedure and Protocol Codes between all the systems that use such codes. IHE does not yet define a common mechanism for code synchronization or access.

Regarding the origin and mappings of the attributes returned in a MWL query, refer to RAD TF-2 Appendix B: HL7 Order Mapping to DICOM MWL.

The details of the C-FIND Response from the DICOM MWL SOP Class are depicted in Table 3.7.4.1.2.2-1 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 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.

It is the responsibility of the Order Filler to ensure that the patient and procedure information is current in the Modality Worklist response. The Order Filler receives patient and procedure updates through Transactions ENDO-1 and RAD-12.

3.7.4.2.3 Expected Actions

The endoscopist checks for the existence of the Scheduled Procedure Steps, validates the displayed patient and procedure information, and checks the given information.

3.7.5 Security Considerations

Section not applicable

Add Section 3.8

3.8 Modality Procedure Step In Progress [ENDO-8]

This section corresponds to Transaction ENDO-8 of the IHE Technical Framework. Transaction ENDO-8 is used by the Image Manager, Performed Procedure Step Manager, Performed Procedure Reporter and Acquisition Modality Actors.

It is essentially based on similar transactions RAD-6 designed for Radiology. In the endoscopy procedure, the following relationship types between Scheduled Procedure Step (SPS) and Performed Procedure Step (PPS) should be considered.

- *1 to 1*
- *0 to 1*

There is a use case that an endoscope is exchanged during the procedure because of some reason like insertion trouble by lesion. In this case, the relationship type between Scheduled Procedure Step (SPS) and Performed Procedure Step (PPS) should be "1 to 1" finally.

3.8.1 Scope

This transaction includes a message from the Acquisition Modality to the Performed Procedure Step Manager, which in turn issues the message to the Image Manager and the Performed Procedure Reporter that the Performed Procedure Step is in progress. This may be an unscheduled procedure step. The receiving Performed Procedure Step Manager is grouped with the Image Manager or the Performed Procedure Reporter, 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 Acquisition Modality.

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

- The Performed Procedure Step Manager must maintain proper 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 Acquisition Modality;
- Because both the Image Manager and the Performed Procedure Reporter incorporate the Performed Procedure Step Manager function, an infinite redistribution of PPS messages is possible. The Image Manager and the Performed Procedure Reporter that provide the Performed Procedure Step Manager function shall be configurable to disable this function;

- 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).

3.8.2 Actor Roles

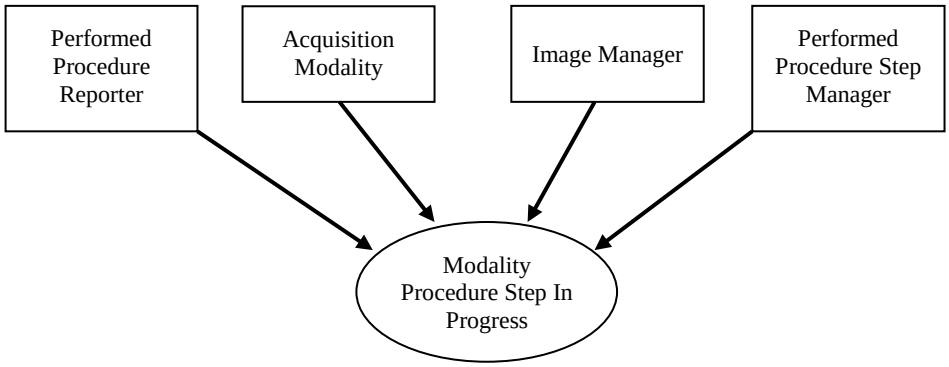


Figure 3.8.2-1: Use Case Diagram

Table 3.8.2-1: Actor Roles

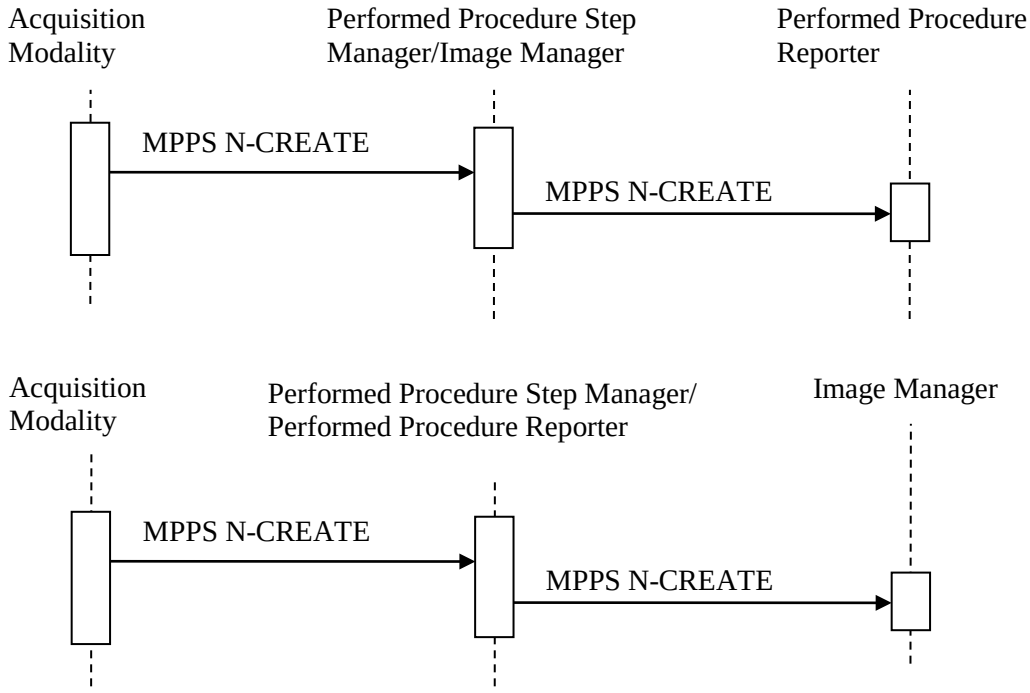
Actor:	Image Manager.
Role:	Receives the PPS information forwarded by the PPS Manager.
Actor:	Performed Procedure Reporter
Role:	Receives the PPS information forwarded by the PPS Manager.
Actor:	Acquisition Modality.
Role:	Informs the Performed Procedure Step Manager that a particular Performed Procedure Step has started.
Actor:	Performed Procedure Step Manager.
Role:	Accepts Performed Procedure Step information from an Acquisition Modality and transmits it to the Image Manager and the Performed Procedure Reporter.

Transaction text specifies behavior for each Role. The behavior of specific actors may also be specified when it goes beyond that of the general Role.

3.8.3 Referenced Standards

DICOM 2015 PS 3.4: Modality Performed Procedure Step SOP Class.

3.8.4 Interaction Diagram



3.8.4.1 Procedure Step In Progress Message

This refers to the MPPS N-CREATE message sent from the Acquisition Modality to the Performed Procedure Step Manager/Image Manager/Performed Procedure Reporter.

3.8.4.1.1 Trigger Events

Endoscopist at the Acquisition Modality starts the endoscopy procedure.

3.8.4.1.2 Message Semantics

The Acquisition Modality uses the 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 Performed Procedure Reporter/Image Manager. The SOP Instance UID value of the Performed Procedure Step shall be conveyed in the Affected SOP Instance UID (0000,1000) during this interchange (see also corresponding notes in RAD TF-2: A.1). The following aspects shall be taken into account during implementation of this step:

3.8.4.1.2.1 Patient/Procedure/Scheduled Procedure Step Information

The Acquisition Modality shall ensure that the Patient/Procedure/Scheduled Procedure Step information it has is valid and current.

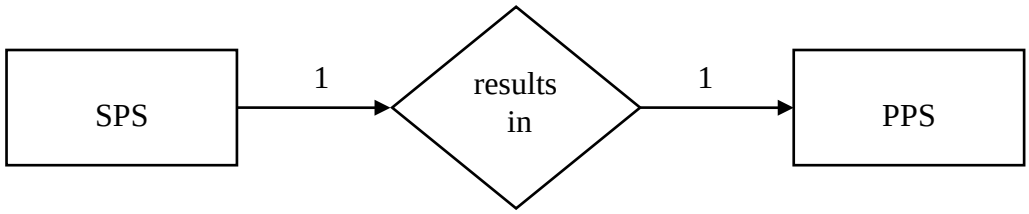
3.8.4.1.2.2 Required Attributes

Appendix A lists a number of attributes that have to be properly handled by the Acquisition Modality to ensure consistency between the Performed Procedure Step object attributes, Scheduled Step information in the Modality Worklist, and the information included in the generated SOP instances.

3.8.4.1.2.3 Relationship between Scheduled and Performed Procedure Steps

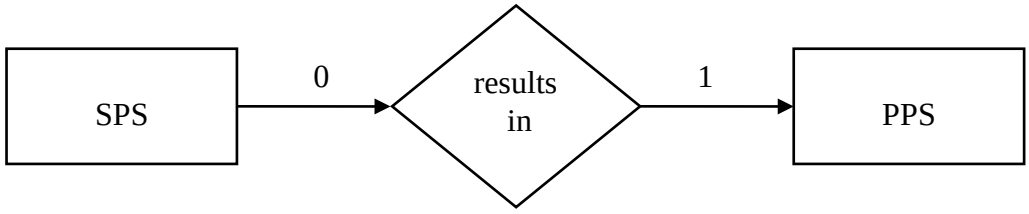
The relationship between Scheduled and Performed Procedure Step information is shown in the following 2 cases. Refer to Appendix A for details of forming attributes (Study Instance UID, Procedure ID, Accession Number, etc.) in each of these cases.

3.8.4.1.2.3.1 Simple Case



This case indicates 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 appendix A).

3.8.4.1.2.3.2 Unscheduled Case



This case indicates a 0-to-1 relationship between SPS and PPS. Information about the Scheduled Procedure Step and, possibly, Requested Procedure is not available to the Acquisition Modality due to different reasons (emergency procedure, Modality Worklist SCP not available, etc.).

3.8.4.1.3 Expected Actions

The Performed Procedure Reporter and the Image Manager receive information from the Performed Procedure Step Manager and link it with the Requested Procedure and Scheduled Procedure Step. If the Requested Procedure ID is transmitted empty (Unscheduled Performed Procedure Step case), the Performed Procedure Reporter and the Image Manager shall create an exception that must be manually resolved to link the Performed Procedure Step to the appropriate procedure.

3.8.5 Security Considerations

Section not applicable

Add Section 3.9

3.9 Modality Procedure Step Completed [ENDO-9]

This section corresponds to Transaction ENDO-9 of the IHE Technical Framework. Transaction ENDO-9 is used by the Image Manager, Performed Procedure Step Manager, Performed Procedure Reporter and Acquisition Modality Actors.

It is essentially based on similar transactions RAD-7 designed for Radiology. The main difference is that "Discontinued" at the modality is not used in endoscopy procedure. If the endoscope procedure has been started, it is regarded as the procedure has been done even if the Images/Videos are not captured during the procedure.

3.9.1 Scope

This transaction includes a message from the Acquisition Modality to the Performed Procedure Step Manager, which in turn issues the message to the Image Manager and the Performed Procedure Reporter that the Performed Procedure Step has been completed. The Image Manager may need the information to co-locate images of the same study. The Modality Procedure Step Completed message does not necessarily mean that the set of images is complete or available for retrieval.

3.9.2 Actor Roles

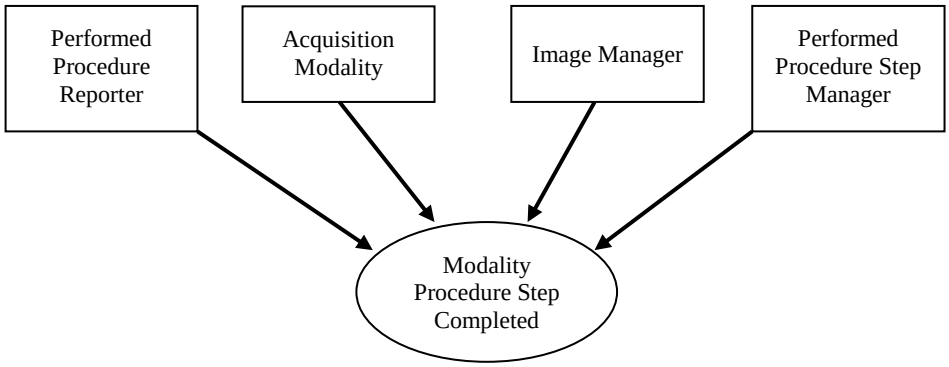


Figure 3.9.2-1: Use Case Diagram

Table 3.9.2-1: Actor Roles

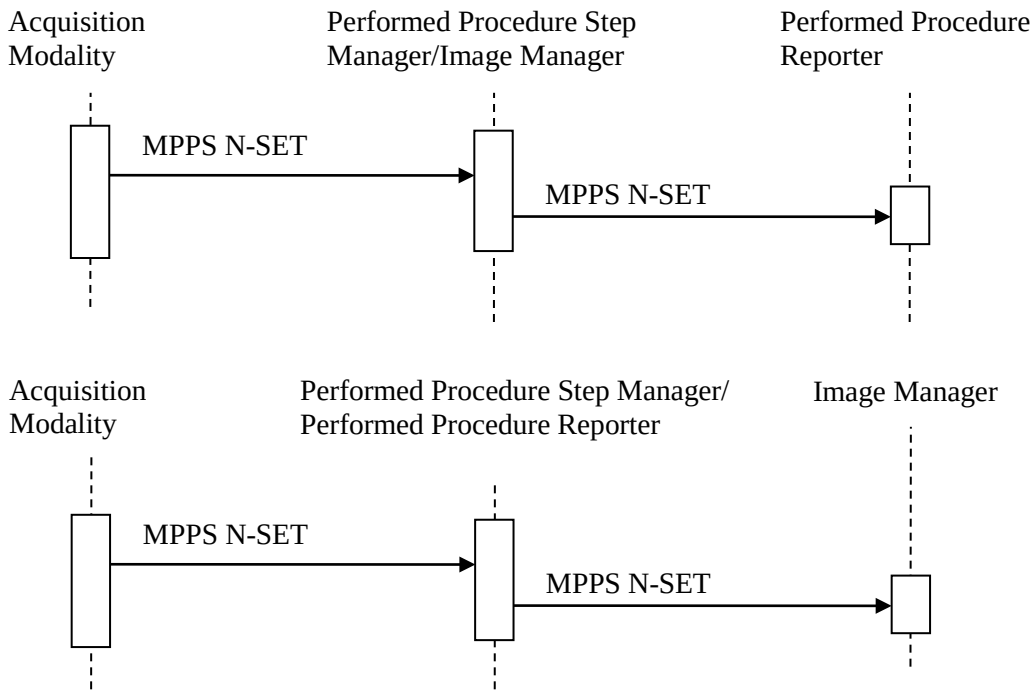
Actor:	Image Manager.
Role:	Receives the PPS information forwarded by the PPS Manager.
Actor:	Performed Procedure Reporter
Role:	Receives the PPS information forwarded by the PPS Manager.
Actor:	Acquisition Modality.
Role:	Informs the Performed Procedure Step Manager that a particular Performed Procedure Step has started.
Actor:	Performed Procedure Step Manager.
Role:	Accepts Performed Procedure Step information from an Acquisition Modality and transmits it to the Image Manager and the Performed Procedure Reporter.

Transaction text specifies behavior for each Role. The behavior of specific actors may also be specified when it goes beyond that of the general Role.

3.9.3 Referenced Standards

DICOM 2015 PS 3.4: Modality Performed Procedure Step SOP Class.

3.9.4 Interaction Diagram



Note: The diagram above shows the sequencing of messages for the Modality Performed Procedure Step SOP Class. Acquisition Modalities 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.

3.9.4.1 Procedure Step Completed Message

This refers to the MPPS N-SET message sent from the Acquisition Modality to the Performed Procedure Step Manager/Image Manager/Performed Procedure Reporter.

3.9.4.1.1 Trigger Events

Endoscopist at the Acquisition Modality completes the endoscopy procedure.

3.9.4.1.2 Message Semantics

The Acquisition Modality uses the 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.

The N-SET has the MPPS status of "COMPLETED". The Performed Procedure Step Manager sends corresponding N-SETs to the Performed Procedure Step Manager/Image Manager/Performed Procedure Reporter.

3.9.4.1.3 Expected Actions

The Performed Procedure Step Manager/Image Manager/Performed Procedure Reporter receive information about the Performed Procedure Step being completed.

3.9.5 Security Considerations

Section not applicable

3.10 Modality Images/Videos Stored [ENDO-10]

This section corresponds to Transaction ENDO-10 of the IHE Technical Framework. Transaction ENDO-10 is used by the Image Archive and Acquisition Modality Actors.

It is essentially based on similar transactions RAD-8 designed for Radiology. However, there are some differences compared with the radiology scenario.

- *The video frames are treated in endoscopy procedure routinely.*
- *The images acquired after changing the endoscope during the procedure in the same performed procedure step should be treated as same series images.*

3.10.1 Scope

In the Modality Images/Videos Stored transaction, the Acquisition Modality sends the acquired images and videos to the Image Archive. The information provided from the Modality Worklist transaction (see Section 3.7) shall be included in the headers of the generated images and videos.

3.10.2 Actor Roles

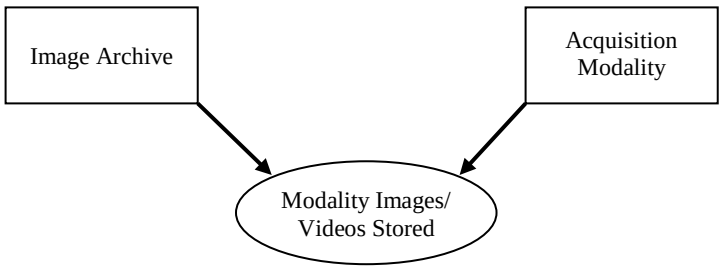


Figure 3.10.2-1: Use Case Diagram

Table 3.10.2-1: Actor Roles

Actor:	Acquisition Modality
Role:	Transmit acquired images and videos to Image Archive.
Actor:	Image Archive.
Role:	Accept and store images and videos from Acquisition Modalities

Transaction text specifies behavior for each Role. The behavior of specific actors may also be specified when it goes beyond that of the general Role.

3.10.3 Referenced Standards

DICOM 2015 PS 3.4: Storage Service Class.

3.10.4 Interaction Diagram

685

3.10.4.1 Images/Videos Stored

This is the Images/Videos store message sent to Image Archive.

3.10.4.1.1 Trigger Events

690 The Acquisition Modality can transfer images to the Image Archive sequentially within one or more DICOM associations, as the images become available or collectively.

3.10.4.1.1.1 Study UIDs and Series UIDs

Study UID creation details and timing are clearly defined by the IHE. The Radiology Scheduled Workflow and Patient Reconciliation Profiles explain how the Study information and identifiers
695 such as the Study Instance UID are generated by the Order Filler and made available to the modality through the Modality Worklist. Generation of these items by the modality or workstation are restricted in general and are only permitted in specifically outlined exception cases, when a PPS is unscheduled (ENDO TF-2: Appendix A, Table A.1-2).

Series UID creation must be compatible with a number of DICOM rules.

700 ##### 3.10.4.1.2 Message Semantics

The Acquisition Modality uses the DICOM C-STORE message to transfer the images/videos. The Acquisition Modality is the DICOM Storage SCU and the Image Archive is the DICOM Storage SCP.

The endoscopist validates the available information for the patient and the Scheduled Procedure
705 Step/Requested Procedure. It is a requirement that certain information be recorded in the image/videos header. The details of the mapping to DICOM image/video instances are specified

in appendix A. Effectively, his appendix strengthens the type definition of some DICOM attributes for the IHE Technical Framework.

3.10.4.1.3 Expected Actions

The Image Archive will store the received DICOM objects.

The DICOM objects shall be stored such that they can be later retrieved (See RAD TF-2: 4.16 Retrieve Images) in a fashion meeting the requirements defined for a DICOM Level 2 Storage SCP (Refer to DICOM PS 3.4 B.4.1).

3.10.4.1.3.1 Endoscopy Images/Videos Storage Option

Acquisition Modalities that support the Endoscopy Images/Videos Storage Option shall support at least one of the SOP classes defined by Table 3.10.4.1.3.1-1.

Image Archives that support Endoscopy Images/Videos Storage Option shall support all of the SOP classes listed in Table 3.10.4.1.3.1-1.

Table 3.10.4.1.3.1-1: Endoscopy Images/Videos Storage SOP Classes

Storage Format	SOP Class UID	SOP Class Name
Single Frame	1.2.840.10008.5.1.4.1.1.77.1.1	VL Endoscopic image Storage
	1.2.840.10008.5.1.4.1.1.7	Secondary Capture image Storage
	1.2.840.10008.5.1.4.1.1.6.1	Ultrasound image Storage
Multi Frame	1.2.840.10008.5.1.4.1.1.3.1	Ultrasound Multi-frame image Storage
Video Frame	1.2.840.10008.5.1.4.1.1.77.1.1.1	Video Endoscopic Image Storage

Transfer Syntaxes are identified and grouped into three categories: uncompressed, lossy compressed, and lossy compressed for video Frames as per Table 3.10.4.1.3.1-2.

Table 3.10.4.1.3.1-2: Endoscopy Images/Videos Transfer Syntaxes

Category	SOP Class UID	SOP Class Name
Uncompressed	1.2.840.10008.1.2	Implicit VR Little Endian: Default Transfer Syntax for DICOM
Lossy Compressed	1.2.840.10008.1.2.4.50	JPEG Baseline (Process 1): Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression
Lossy Compressed for Video Frames	1.2.840.10008.1.2.4.100	MPEG2 Main Profile @ Main Level
	1.2.840.10008.1.2.4.101	MPEG2 Main Profile @ High Level
	1.2.840.10008.1.2.4.102	MPEG-4 AVC/H.264 High Profile / Level 4.1
	1.2.840.10008.1.2.4.103	MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1
	1.2.840.10008.1.2.4.104	MPEG-4 AVC/H.264 High Profile / Level 4.2 For 2D Video

	1.2.840.10008.1.2.4.105	MPEG-4 AVC/H.264 High Profile / Level 4.2 For 3D Video
	1.2.840.10008.1.2.4.106	MPEG-4 AVC/H.264 Stereo High Profile /Level 4.2

At an endoscopy procedure, an endoscopist makes a diagnosis based on the real time image displayed on the observation monitor during the procedure. Acquired images/videos during the procedure are used for reference, not for diagnosis.

Therefore, Images/videos of endoscope are often acquired by lossy compressed format in order to save the storage volume of Image Archive.

Acquisition Modalities that support Single Frame or Multi Frame format of Endoscopy Images/Videos Storage SOP classes specified in Table 3.10.4.1.3.1-1 shall support both Uncompressed and lossy compressed transfer syntax in Table 3.10.4.1.3.1-2.

Acquisition Modalities that support Video Frame format of Endoscopy Images/Videos Storage SOP classes specified in Table 3.10.4.1.3.1-1 shall support at least one lossy compressed for video frames transfer syntax in Table 3.10.4.1.3.1-2.

Image Archives shall be able to negotiate, offer and accept any of the transfer syntaxes listed in Table 3.10.4.1.3.1-2. (It depends on the system configuration and/or user storage selection).

Acquisition Modalities and Image Archives may support transfer syntaxes beyond what is specified in Table 3.10.4.1.3.1-2.

3.10.5 Security Considerations

Section not applicable

Appendices

Appendix A – Attribute Consistency between Modality Worklist, Composite IODs, Modality Performed Procedure Step

This appendix is an integral part of the IHE Technical Framework. It reflects IHE's adoption of DICOM-defined attribute consistency (Annex J, PS.3.17, since DICOM 2006; before: Annex M, PS3.4). It includes two sections:

- The first section contains the IHE clarifications, additions and a summary of DICOM, PS.3.17, Annex J that relate to image acquisition. IHE requires that Modality Actors support the Attribute mapping defined in this table as they implement MWL, various IOD Storage and PPS SOP Classes for Transactions ENDO-8 and ENDO-9. IHE restates or extends some of the DICOM requirements as well as select some of the choices offered or enforce some of the recommendations of DICOM. A few additional IHE recommendations are also specified.
- The second section defines additional IHE requirements for consistency of DICOM C-FIND Return Key Attributes.

A.1 Image Acquisition Integration-critical Attributes

The tables below describe requirements, recommendations or explanations on integration-critical attributes for image/video acquisition cases. They define which integration-critical attributes need to be equal (copied or generated locally), in order to correctly relate scheduled and performed procedure steps for the PPS cases described in Section 3.8.4.1.2.3.

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 4th columns define where attribute values come from: all defined attribute values of one table row are equal.
- These columns read left to right: MWL return values (2nd column), if existing, shall be used as the source for copies to Image/ Standalone or MPPS IODs.
- The MWL column is omitted if the described case does not include any MWL return values, or to simplify the table (as in the Append Case in Table A.1-3).

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.
- **"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.
- **"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.
- **"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).
- **"Equal (copied from MWL)"** in a table cell means that the actor shall use a value that it already knows from an MWL query result obtained for the same SPS in the append case.
- **"Source-1"**, **"Copy-1"** or **"Equal-1"** etc., are corresponding mapping attribute values, if several sources appear in one table row.
- **"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.
- **"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:

- An attribute from the column "Modality Worklist" shall be requested by a MWL SCU (Acquisition Modality) as a return key in its C-FIND Requests. The Order Filler shall return attribute values in the Modality Worklist C-FIND response (for a complete description, see Table 3.7.4.1.2.2-1).
- The MWL return attribute values, if available as a source, shall be used by the Acquisition Modality in filling the attribute shown on the corresponding rows both for Composite Instances and MPPS Instances.
- If the MWL value is not existing ("n.a."), then the Modality shall generate certain values internally

- The PPS Manager, Image Manager and Order Filler roles shall be capable of handling the attributes shown in the corresponding row of the column titled "MPPS IOD" as defined by the SCP Type and the additional notes.
- An empty Referenced Study Sequence (0008,1110) in a MPPS Instance indicates an unscheduled case (no Scheduled Procedure Step involved).

Table A.1-1: Simple Case - required mapping of corresponding attributes

In the simple normal case, a Procedure Step is performed exactly as scheduled.

DICOM attribute	Modality Worklist → Filling values for:				
	(return attribute values)	Image IOD		MPPS IOD	
Study Instance UID (0020,000D)	Source	Copy		**Scheduled Step Attributes Sequence** (0040,0270)	Copy
Referenced Study Sequence (0008,1110)	Source	Copy			Copy
Accession number (0008,0050)	Source	Copy See (IHE-A.1.1)			Copy See (IHE-A.1.1)
Requested Procedure ID (0040,1001)	Source	**Requested Attributes Sequence** (0040,0275)	Copy		Copy
Requested Procedure Description (0032,1060)	Source		Copy		Copy
Scheduled Procedure Step ID (0040,0009)	Source		Copy		Copy
Scheduled Procedure Step Description (0040,0007)	Source		Copy		Copy
Scheduled Protocol Code Sequence (0040,0008)	Source		Copy		Copy
Performed Protocol Code Sequence (0040,0260)	n.a.	Equal (internally generated). Recommendation: Absent if the value is not known. Is non-empty if Assisted Protocol Setting Option is supported (see Section 4.6.4.1.2.4).		Equal (internally generated). Shall be zero length if the value is not known, e.g., Assisted Protocol Setting not supported.	
Study ID (0020,0010)	n.a.	Equal (internally generated). Recommendation: use Requested Procedure ID.		Equal (internally generated). Recommendation: use Requested Procedure ID.	
Performed Procedure Step ID (0040,0253)	n.a.	n.a.		Equal (internally generated).	
Performed Procedure Step Start Date (0040,0244)	n.a.	n.a.		Equal (internally generated).	
Performed Procedure Step	n.a.	n.a.		Equal (internally generated).	

DICOM attribute	Modality Worklist (return attribute values)	Filling values for: Image IOD	Filling values for: MPPS IOD
Start Time (0040,0245)			
Performed Procedure Step Description (0040,0254)	n.a.	n.a.	Equal (internally generated).
Requested Procedure Code Sequence (0032,1064)	Value shall be used for Procedure Code Sequence as specified below.	n.a.	n.a.
Procedure Code Sequence (0008,1032)	n.a.	n.a.	Copy from: Requested Procedure Code Sequence (0032,1064). Recommendation: empty, if empty in MWL or performed acquisition is different to what was scheduled.
Referenced SOP Class UID (0008,1150)	n.a.	n.a.	Equal (internally generated). See (IHE-A.1.2)
Referenced SOP Instance UID (0008,1155)	n.a.	n.a.	Equal (internally generated). See (IHE-A.1.3)
Protocol Name (0018,1030)	n.a.	n.a.	**Performed Series Sequence** (0040,0340): Equal (internally generated)

- (IHE-A.1.1) A Zero Length Accession Number (One of the options proposed by DICOM PS 3.17 Annex J) 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.
- (IHE-A.1.2) 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.
- (IHE-A.1.3) 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.

Table A.1-2: Unscheduled Case - required mapping of corresponding attributes

DICOM attribute	Filling values for:			
	Image IOD		MPPS IOD	
Study Instance UID (0020,000D)	Equal (internally generated).		**Scheduled Step Attributes Sequence** (0040,0270)	Equal (internally generated).
Referenced Study Sequence (0008,1110)	n.a.			Shall be empty.
Accession number (0008,0050)	Shall be empty (zero length).			Shall be empty.
Requested Procedure ID (0040,1001)	**Requested Attributes Sequence** (0040,0275)	n.a.		Shall be empty.
Requested Procedure Description (0032,1060)				Shall be empty.
Scheduled Procedure Step ID (0040,0009)				Shall be empty.
Scheduled Procedure Step Description (0040,0007)				Shall be empty.
Scheduled Protocol Code Sequence (0040,0008)				Shall be empty.
Performed Protocol Code Sequence (0040,0260)	Equal (internally generated). Recommendation: Absent if the value is not known. Is non-empty if Assisted Protocol Setting Option is supported (see 4.6.4.1.2.4).		Equal (internally generated). Shall be zero length if the value is not known, e.g., Assisted Protocol Setting not supported.	
Study ID (0020,0010)	Equal (internally generated)		Equal (internally generated)	
Performed Procedure Step ID (0040,0253)	n.a.		Equal (internally generated).	
Performed Procedure Step Start Date (0040,0244)	n.a.		Equal (internally generated).	
Performed Procedure Step Start Time (0040,0245)	n.a.		Equal (internally generated).	
Performed Procedure Step Description (0040,0254)	n.a.		Equal (internally generated).	
Requested Procedure Code Sequence (0032,1064)	n.a.		n.a.	
Procedure Code Sequence (0008,1032)	n.a.		Shall be empty.	
Referenced SOP Class UID (0008,1150)	n.a.		Equal (internally generated). See (IHE-A.2.1)	
Referenced SOP Instance UID (0008,1155)	n.a.		Equal (internally generated). See (IHE-A.2.2)	

DICOM attribute	Filling values for:		
	Image IOD	MPPS IOD	
Protocol Name (0018,1030)	n.a.	**Performed Series Sequence** (0040,0340)	Equal (internally generated)

- (IHE-A.2.1) 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.
- (IHE-A.2.2) 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.

A.2 Context-critical Attributes

This section extends the above table with additional IHE Requirements based on a number of context-critical attributes (Type 2 in DICOM) common to most images and standalone IODs when provided in response to a C-FIND Request in Return Key Attributes. The content of this table is strictly consistent with PS 3.17 Annex J of DICOM.

Modality Worklist	Images IOD	MPPS IOD
Patient Name	Patient Name (note 1)	Patient Name (note 1)
Patient ID	Patient ID (note 1)	Patient ID (note 1)
Patient's Birth Date	Patient's Birth Date (note 2)	Patient's Birth Date (note 2)
Patient's Sex	Patient's Sex (note 2)	Patient's Sex (note 2)
Referring Physician's Name	Referring Physician's Name (note 2)	----

Note 1: This Attribute may be zero length when the Order Filler providing the Modality Worklist service is not accessible. Pre-registered values for Patient ID and Patient Name will be used in the Unidentified Patient cases defined in the IHE Technical Framework.

Note 2: Attribute may be zero length when the Order Filler providing Modality Worklist service is not accessible or the Attributes returned by MWL are zero length.

Volume 3 – Content Modules

This section is not applicable.

Volume 4 – National Extensions

Add appropriate Country section

This section is not applicable.

