Integrating the Healthcare Enterprise

IHE Eye Care
Technical Framework Supplement

Core Eye Care Workflow
(Improved Appointment Scheduling and No Archive)
(C-EYECARE)

Trial Implementation

Date: October 3, 2014

Author: IHE Eye Care Technical Committee

Email: eyecare@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 IHE Eye Care Infrastructure Technical Framework V3.7. 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 October 3, 2014 for trial implementation and may be available for testing at subsequent IHE Connectathons. The supplement may be amended based on the results of testing. Following successful testing it will be incorporated into the Eye Care Technical Framework. Comments are invited and can be submitted at http://ihe.net/Eye_Care_Public_Comments.

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: http://ihe.net.

Information about the IHE Eye Care domain can be found at: http://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://ihe.net/IHE_Process and http://ihe.net/Profiles.

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

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Introduction

Introduce a new Eye Care integration profile Core Workflow (C-EYECARE). Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

Profile Abstract

This Core Eye Care Workflow (C-Workflow) Profile addresses a scenario where organizations have a Practice Management System (PMS), Electronic Health Record System (EHR) and eye care diagnostic imaging and testing equipment (fundus cameras, slit lamps, refractive measurement devices, visual fields etc.).

This profile enables the consistent handling of patient identifiers and demographic data among the above types of systems. It includes support for features such as patient registration, appointment scheduling, eye care orders and equipment modality worklist. It reduces the implementation requirements of the other eye care workflows by not integrating an Image Archive (i.e., PACS system). **Therefore, users of this profile must understand that acquisition devices and users are responsible for the safe keeping of the images and/or measurements created upon their system. It is important for users to understand how this is accomplished so that patient data is protected**. How this is accomplished is outside the scope of IHE.

Open Issues and Questions

No open questions at this time.

Closed Issues

No issues at this time.

Volume 1 – Integration Profiles

1.7 History of Annual Changes

Add the following bullet to the end of the bullet list in Section 1.7

This Core Eye Care Workflow (C-Workflow) Profile addresses a scenario where organizations have a Practice Management System (PMS), Electronic Health Record System (EHR) and eye care diagnostic imaging and testing equipment (fundus cameras, slit lamps, refractive measurement devices, visual fields etc.).

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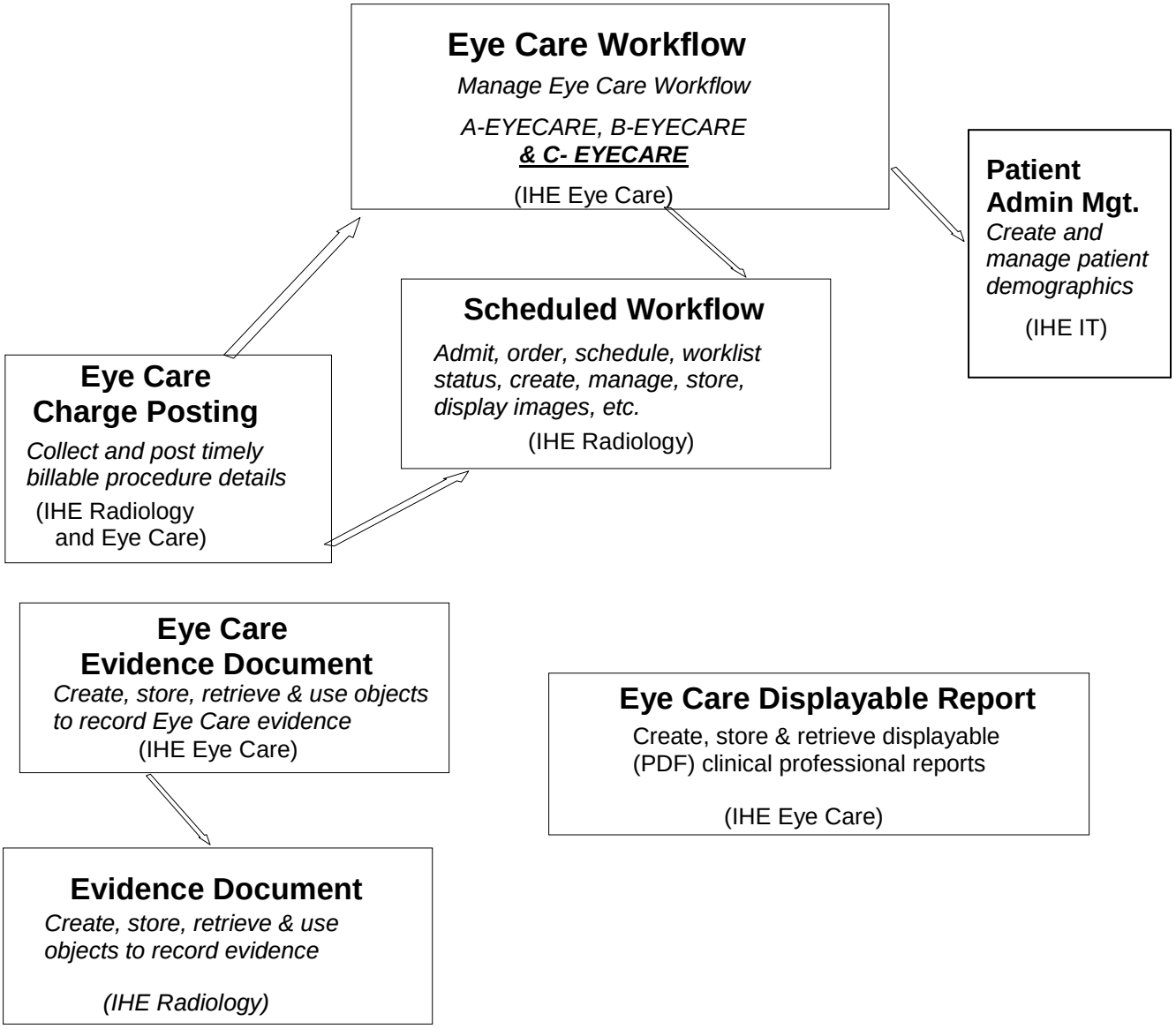
Add the following to Section 1.n:

1.n Copyright Permission

No changes.

2.1 Dependencies among Integration Profiles

Add the following to Figure 2-1



250 *Add the following to Table 2-1*

Core Workflow	RAD TF Scheduled Workflow	This profiles uses definitions from those specified	

Add the following section to Section 2.2

2.2.9 Core Workflow Integration Profile (C-EYECARE}

This Core Eye Care Workflow (C-Workflow) Profile addresses a scenario where organizations have a Practice Management System (PMS), Electronic Health Record System (EHR) and eye care diagnostic imaging and testing equipment (fundus cameras, slit lamps, refractive measurement devices, visual fields etc.).

This profile enables the consistent handling of patient identifiers and demographic data among the above types of systems. It includes support for features such as patient registration, appointment scheduling, eye care orders and equipment modality worklist. It reduces the implementation requirements of the other eye care workflows by not integrating an Image Archive (i.e., PACS system). **Therefore, users of this profile must understand that acquisition devices and users are responsible for the safe keeping of the images and/or measurements created upon their system. It is important for users to understand how this is accomplished so that patient data is protected**. How this is accomplished is outside the scope of IHE.

C-EYECARE specifies basic requirements for DICOM integration such as DICOM Modality Worklist and DICOM Storage. The DICOM features are a subset of the features defined in the Basic and Advanced Eye Care Workflow Integration Profiles. The appointment scheduling messages are not included in A-EYECARE or B-EYECARE and provide additional features.

C-EYECARE focuses on HL7 V2 messages that are commonly used in an eye care clinic, such as HL7 SIU (appointment scheduling) messages and HL7 ADT (out-patient registration). These HL7 messages are used to coordinate patient and appointment scheduling information between systems such as a PMS and EHR.

C-EYECARE supports an optional feature to perform billing services between a Charge Processer (often part of a PMS system) and a Department Scheduling System/Order Filler (often part of an EHR system). It utilizes a transaction based upon a HL7 DFT (Detailed Financial Transaction) message.

2.3 Actors Descriptions

Add column to Table 2.3-1

Appointment Scheduler – An information system responsible for scheduling patient appointments. It performs scheduling features such as, new appointment, confirmed appointment, patient checked in, cancelled, deleted, etc.

Appointment Consumer – An information system responsible for consuming patient appointment information. It updates its system with the appointment information and statuses.

Image Storage/Display – A system responsible for receiving DICOM SOP Instances, storing those SOP Instances, and the ability to present them for viewing to the user.

Patient Registration Source – A system responsible for the generation of patient demographic and visit information. It registers new patients and provides updates.

Patient Registration Consumer– A system responsible for consuming patient demographic and visit information.

Add column to Table 2.3-1 and row for Image Storage/Display

Table 2.3-1: Integration Profile Actors

Actor \ Integration Profile	Core EYE CARE Workflow
Acquisition Modality	**X**
Acquisition Modality Importer	**X**
Appointment Scheduler	**X**
Appointment Consumer	**X**
Charge Processor	**X**
Department System Scheduler/Order Filler	**X**
Evidence Creator	
Image Archive	
Image Display	
Image Manager	
Image Storage/Display	**X**
Patient Registration Source	**X**
Patient Registration Consumer	**X**
Performed Procedure Step Manager	
Report Creator	
Report Reader	
Report Repository	

2.4 Transaction Descriptions

Add column to Table 2.4-1

Patient Registration – The Patient Registration Source Actor registers and/or updates patient information and forwards this data to other information systems [EYECARE-15].

Appointment Scheduling Management – The Appointment Scheduler Actor generates new patient appointments and manages the appointment updates, status changes, etc. This information is forwarded to other information systems [EYECARE-16].

Add column to Table 2.4-1

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Table 2.4-1: Integration Profile Transactions

Transaction \ Integration Profile	Core EYE CARE Workflow
Patient Encounter Management [ITI-31]	
Patient Registration [EYECARE-15]	**X**
Placer Order Management [RAD-2]	
Filler Order Management [RAD-3]	
Appointment Scheduling Management [EYECARE-16]	**X**
Procedure Scheduled [RAD-4]	
Query Modality Worklist [EYECARE-1]	**X**
Modality Procedure Step In Progress [RAD-6]	
Modality Procedure Step Completed [EYECARE-6]	
Modality Images/Evidence Stored [EYECARE-2]	**X**
Storage Commitment [CARD-3]	
Patient Update [RAD-12]	
Procedure Update [RAD-13]	
Query Images [EYECARE-5]	
Retrieve Images [EYECARE-3]	
Charge Posted [RAD-35]	
Eye Care Charge Posted [EYECARE-17]	**X**
Account Management [RAD-36]	
Query Evidence Documents [EYECARE-4]	
Retrieve Evidence Documents [RAD-45]	
Displayable Report Storage [EYECARE-7]	
Query Displayable Report [EYECARE-8]	
Retrieve Displayable Report [EYECARE-9]	

11 Core EYE CARE Workflow (C-EYECARE)

This Core Eye Care Workflow (C-Workflow) Profile addresses a scenario where organizations have a Practice Management System (PMS), Electronic Health Record System (EHR) and eye care diagnostic imaging and testing equipment (fundus cameras, slit lamps, refractive measurement devices, visual fields etc.).

This profile enables the consistent handling of patient identifiers and demographic data among the above types of systems. It includes support for features such as patient registration, appointment scheduling, eye care orders and equipment modality worklist. It reduces the implementation requirements of the other eye care workflows by not integrating an Image Archive (i.e., PACS system). **Therefore, users of this profile must understand that acquisition devices and users are responsible for the safe keeping of the images and/or measurements created upon their system. It is important for users to understand how this is accomplished so that patient data is protected**. How this is accomplished is outside the scope of IHE.

C-EYECARE specifies basic requirements for DICOM integration such as DICOM Modality Worklist and DICOM Storage. The DICOM features are a subset of the features defined in the Basic and Advanced Eye Care Workflow Integration Profiles. The appointment scheduling messages are not included in A-EYECARE or B-EYECARE and provide additional features.

C-EYECARE focuses on HL7 V2 messages that are commonly used in an eye care clinic, such as HL7 SIU (appointment scheduling) messages and HL7 ADT (out-patient registration). These HL7 messages are used to coordinate patient and appointment scheduling information between systems such as a PMS and EHR.

C-EYECARE supports an optional feature to perform billing services between a Charge Processer (often part of a PMS system) and a Department Scheduling System/Order Filler (often part of an EHR system). It utilizes a transaction based upon a HL7 DFT (Detailed Financial Transaction) message.

How an order is generated in C-EYECARE is a subset of the features defined in the Advanced and Basic Eye Care Workflow Integration Profiles. It has much in common with the IHE Radiology Scheduled Workflow, but deals more explicitly with the essential eye care workflow and data requirements. See RAD TF-1: 3.4 for the integrated workflow data model adopted by the IHE Technical Framework for HL7 messages and DICOM information objects. This data model offers three major levels of control for workflow:

- **Order**: A request for a Departmental Service
- **Requested Procedure**: Unit of work resulting in one or more reports, with associated codified, billable acts.
- **Scheduled and Performed Procedure Step**: the smallest unit of work in the workflow that is scheduled (work to do) or performed (work done).

The order in C-EYECARE is internal to the DSS/OF Actor, therefore not conveyed with an HL7 ORM Message. However, the requested procedure and scheduled procedure step of the order is conveyed by the DSS/OF to the Acquisition Modality/AMI Actors via DICOM Modality Worklist. Therefore, a clear understanding of the workflow data model is essential to interpreting the Core Eye Care Workflow Integration Profile. Additional information may be found in Appendix A and B. C-EYECARE workflow addresses the Order, Requested Procedure and Scheduled Procedure Step. The Performed Procedure Step is not modeled in C-EYECARE but included in A-EYECARE.

Although the major cases for eye care workflow are described in the following subsections, it is beneficial to also see the corresponding workflows in IHE Radiology. RAD TF-1: 3.3 has a description of the “normal” scheduled workflow when all three levels of control in the data model are fully utilized for known patients.

11.1 Actors/Transactions

Figure 11.1-1 shows the actors directly involved in the C-EYECARE 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.

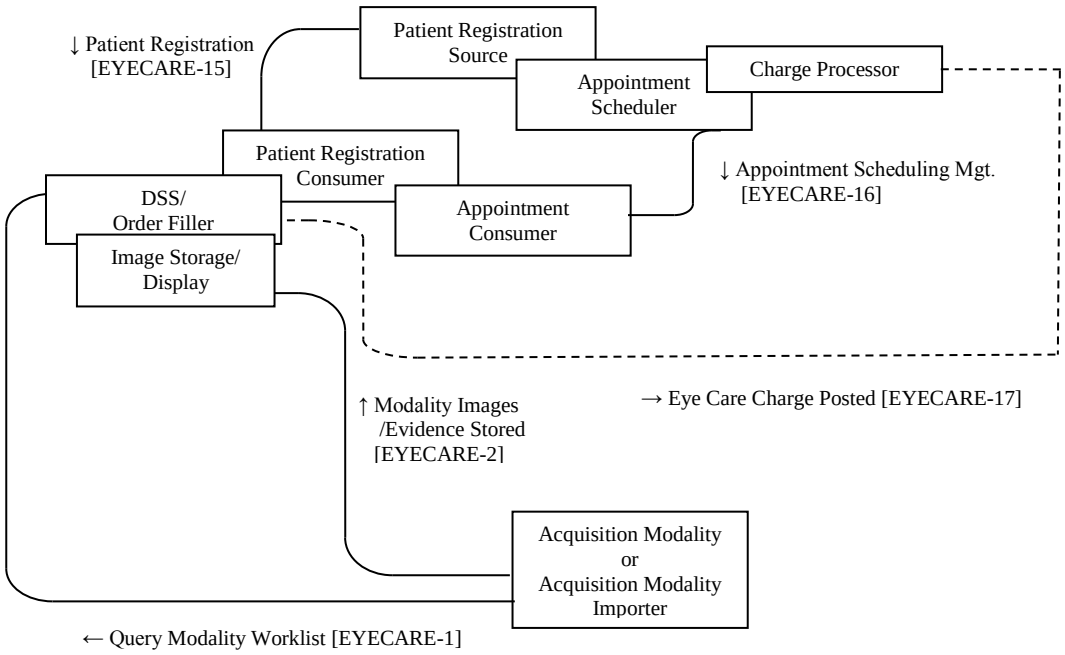

Figure 11.1-1: Core Eye Care Workflow Diagram

IHE Eye Care does not specify real world systems that implement IHE Actors. However, certain Actors (and/or combination of Actors) often make sense for specific products. For example, a Practice Management System (PMS) real world product may be the type of system that implements the Patient Registration Source and Appointment Scheduler Actors. An Electronic Heath Record (EHR) real world product may be the type of system that implements the Patient Registration Consumer, Appointment Consumer, Department System Schedule/Order Filler, and Image Storage/Display Actors. See Figure 11.1-2.

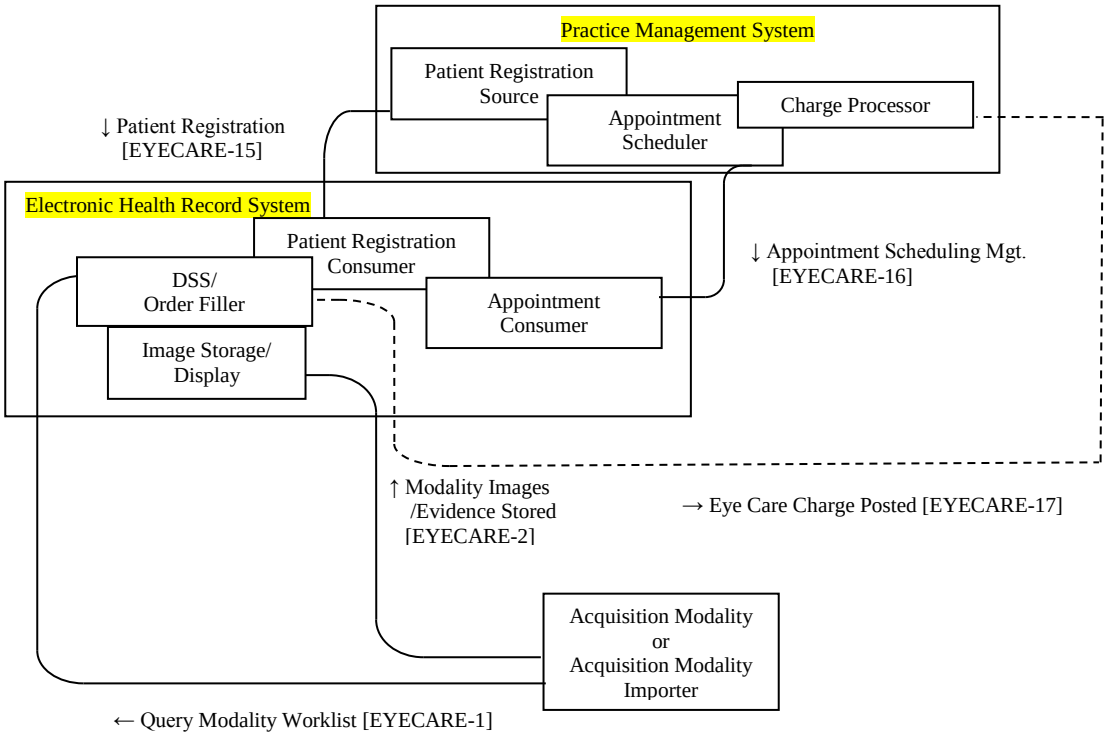

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Figure 11.1-2: (Informative) Actors Mapping to Real World Systems

Table 11.1-1 lists the transactions for each actor directly involved in the C-EYECARE Profile. To claim compliance with this Profile, an actor shall support all required transactions (labeled "R") and may support the optional transactions (labeled "O").

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Table 11.1-1: Core Eye Care Workflow - Actors and Transactions

Actors	Transactions	Optionality	Section
Patient Registration Source	Patient Registration [EYECARE-15]	R	EYECARE TF-2: 15
Appointment Scheduler	Appointment Scheduling Management [EYECARE-16]	R	EYECARE TF-2: 16
Charge Processor	Eye Care Charge Posted [EYECARE-17]	R	EYECARE TF-2: 4.17
Patient Registration Consumer	Patient Registration [EYECARE-15]	R	EYECARE TF-2: 4.15

Actors	Transactions	Optionality	Section
Appointment Consumer	Appointment Scheduling Management [EYECARE-16]	R	EYECARE TF-2: 16
Department System Scheduler/ Order Filler	Query Modality Worklist [EYECARE-1]	R	EYECARE TF-2: 4.1
	Eye Care Charge Posted [EYECARE-17]	O	EYECARE TF-2: 4.17
Image Storage/Display	Modality Images/Evidence Stored [EYECARE-2]	R	EYECARE TF-2: 4.2
Acquisition Modality	Query Modality Worklist [EYECARE-1]	R	EYECARE TF-2: 4.1
	Modality Images/Evidence Stored [EYECARE-2]	R	EYECARE TF-2: 4.2
Acquisition Modality Importer	Query Modality Worklist [EYECARE-1]	R	EYECARE TF-2: 4.1
	Modality Images/Evidence Stored [EYECARE-2]	R	EYECARE TF-2: 4.2

Note1: An EHR real world product may be the type of system that implements the Patient Registration Consumer, Appointment Consumer, Department System Schedule/Order Filler, and Image Storage/Display Actors.

Note2: A PMS real world product may be the type of system that implements the Patient Registration Source, Appointment Scheduler and Charge Processor Actors.

11.1.1 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.

11.1.1.1 Acquisition Modality Actor Requirements

The C-EYECARE Integration Profile does not define an Image Archive Actor or an Image Display Actor (i.e., no PACS systems); therefore, these additional requirements are specified for the Acquisition Modality Actor:

1. The Acquisition Modality Actor SHALL provide a mechanism for the safe keeping of the images and/or measurements created upon its system. How this is accomplished is outside the scope of IHE. Centralized long-term storage is not part of this profile and may be handled by the Image Manager/ Image Archive Actor which is implemented in the Basic and Advanced Eye Care Workflow profiles.
2. The mechanisms to ensure safe-keeping of the images and/or measurements SHALL be documented by the Acquisition Modality Actor product's IHE Integration Statement. Examples include increased disk space, disaster recovery, the ability to generate media (CD-R, DVD, and external hard disk), etc.
3. The Acquisition Modality SHALL offer the ability to send individual DICOM SOP Instances within an imaging study. These DICOM SOP Instances to be sent SHALL be user selectable.

Note: It is expected the user will select "key images" to be viewed by the physicians. Such as when performing a IVFA imaging study many of the images are not in focus or not relevant, the user is expected to perform a QA process to choose the key images.

4. The Acquisition Modality Actor SHALL have the ability to view all DICOM SOP Instances for which it provides a mechanism for safekeeping. This does not include DICOM SOP Instances based upon the Raw Data Storage SOP Classes.

11.1.1.2 Acquisition Modality Importer Actor Requirements

The C-EYECARE Integration Profile does not define an Image Archive Actor or an Image Display Actor (i.e., no PACS systems); therefore, these additional requirements are specified for the Acquisition Modality Importer Actor:

1. The Acquisition Modality Importer Actor SHALL offer the ability to send individual DICOM SOP Instances within an imaging study. These DICOM SOP Instances to be sent SHALL be user selectable.

Note: An Acquisition Modality Importer connecting to a non-DICOM ophthalmic device should also be able to provide a mechanism for safe keeping of the images and/or measurements it generates.

11.1.1.3 Image Storage/Display Actor Requirements

The C-EYECARE Integration Profile does not define an Image Archive Actor or an Image Display Actor (i.e., no PACS systems); therefore, these additional requirements are specified for the Image Storage/Display Actor:

1. The Image Storage/Display Actor SHALL have the ability to access and display all DICOM SOP Instances that it is able to locally store and receive. This does not include DICOM SOP Instances based upon the Raw Data Storage SOP Classes.

11.2 C-EYECARE 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 11.2-1: Core Eye Care Workflow - Actors and Options

Actor	Option Name	Optionality	Reference
Patient Registration Source	Eye Care Charge Posted [EYECARE-17]	-	Section 11.2.3
Appointment Scheduler	*No options defined*	-	
Charge Processor	*No options defined*	-	
Patient Registration Consumer	*No options defined*	-	
Appointment Consumer	*No options defined*	-	
Department System Scheduler/Order Filler	Eye Care Charge Posted [EYECARE-17]	-	Section 11.2.3
Image Storage/Display	*No options defined*	-	-

Actor	Option Name	Optionality	Reference
Acquisition Modality	Patient Based Worklist Query (see Note 2)	R	EYECARE TF- 2: 4.1
	Broad Worklist Query (see Note 2)	R	EYECARE TF- 2: 4.1
	Eye Care Image Option	C See Section 11.2.1	EYECARE TF- 2: 4.2
	Encapsulated PDF Option for Evidence Documents	C See Section 11.2.1	EYECARE TF- 2: 4.2
	Eye Care Measurement Option	C See Section 11.2.1	EYECARE TF- 2: 4.2
Acquisition Modality Importer	Patient Based Worklist Query (see Note 2)	R	EYECARE TF- 2: 4.1
	Acquisition Modality Importer Storage	R	EYECARE TF- 2: 4.2
	Broad Worklist Query (see Note 2)	R	EYECARE TF- 2: 4.1

Note 1: The options in the table are defined in the transactions referenced in the Volume & Section column. For example, the Patient Based Worklist Query is referenced to section EYECARE TF-2: 4:1. If you look at Table 11.1-1, you can see that this transaction belongs to Query Modality Worklist.

Note 2: The Radiology TF requires that the Acquisition Modality support at least one of the Worklist Query choices (i.e., Patient and Broad). Eye Care requires support for both options for the Acquisition Modality and Acquisition Modality Importer.

The Acquisition Modality, Acquisition Modality Importer and Image Storage/Display will likely support a variety of DICOM SOP Classes. It is expected that this level of optionality will be documented by a reference in the IHE Integration Statement (see Appendix C).

11.2.1 Acquisition Modalities Storage Options

The DICOM Standard defines certain Image Storage SOP Classes that are applicable to EYECARE Acquisition Modalities, such as Ophthalmic 8 bit Photography Image Storage, Ophthalmic Tomography Image Storage, etc., see EYECARE TF-2: 4.2.5 for the complete list of SOP Classes. Acquisition Modalities for whom a DICOM Image SOP Class is defined are recommended to support the Eye Care Image Option. The Acquisition Modality/AMI Actors may support the associated Storage SOP Classes or support the DICOM Secondary Capture and/or DICOM Encapsulated PDF SOP Classes.

Image SOP Classes for certain Acquisition Modalities are yet to be defined in DICOM. For these Acquisition Modalities, the support of the Encapsulated PDF Option for Evidence Documents does comply with the Core Eye Care Workflow Profile. However, once the applicable SOP classes are defined by DICOM, then it is recommended by the Core Eye Care Workflow Profile that the Acquisition Modalities support the Eye Care Image Option with the appropriate DICOM SOP Class. The Encapsulated PDF Option may be supported as an addition to the appropriate DICOM SOP Class.

Note 1: For example, in IHE Year 1 there was not a DICOM SOP class defined for Ophthalmic Tomography, therefore, these types of Acquisition Modalities only had the capability to support the Encapsulated PDF Option for Evidence Documents. But in IHE Year 2 DICOM has defined such a SOP Class, therefore, they are recommended to support the approved DICOM SOP Class and additionally they may also support the Encapsulated PDF Option.

Note 2: The DICOM standard does not define use of a specific version of PDF when encapsulated PDF is used. This may result in incorrect display of reports when using a different PDF version of software from that which was used to create the files. Other issues arise when using only PDF with pixel data as the files are large and there may be difficulties with display. IHE Eye Care Technical Framework defines specific versions required for support; see EYECARE TF-2: 4.2.

The DICOM Standard defines certain Measurement Storage SOP Classes that are applicable to EYECARE Acquisition Modalities, such as Lensometry Measurement Storage, Subjective Refraction Measurement Storage, etc., see EYECARE TF-2:4.2.8 for the complete list of SOP Classes.

Acquisition Modalities for whom a DICOM Measurement SOP Class is defined are recommended to support the Eye Care Measurement Option in order to comply with the Core Eye Care Workflow Profile.

11.2.2 Acquisition Modality Importer Storage

The DICOM Standard defines certain Image and Measurement Storage SOP Classes that are applicable to eye care instruments such as ophthalmic photography, ultrasound, ophthalmic tomography images, refractive measurements, etc., see EYECARE TF-2:4.2.5 for the complete list of SOP Classes.

Acquisition Modality Actors for which a DICOM Storage SOP Class is defined are recommended to support the associated DICOM SOP Class. However, the Acquisition Modality Importer Actor may support the associated Storage SOP Classes or support the DICOM Secondary Capture and/or DICOM Encapsulated PDF SOP Classes. See EYECARE TF-2:4.2.11 for the complete specification.

11.2.3 Eye Care Charge Posted Option

Charge posting facilitates the transfer of billing charge information from the Department System Scheduler/Order Filler to the Charge Processing System. It uses the [EYECARE-17] transaction to convey the charge posting information. This transaction supports technical billing (e.g., procedures performed on an eye care instrument) and professional billing performed by an eye care health professional (e.g., examination, surgery, etc.).

A Patient Registration Source that supports the Eye Care Charge Posted Option shall be grouped with a Charge Processor Actor. The Charge Processor supports the [EYECARE-17] transaction. See EYECARE TF-2:4.17.

A DSS/Order Filler that supports the Eye Care Charge Posted Option shall support the [EYECARE-17] transaction. See EYECARE TF-2:4.17.

11.3 C-EYECARE Actor Groupings

11.3.1 C-EYECARE 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).

If this is a content profile, and actors from this profile are grouped with actors from a workflow or transport profile, the Content Bindings reference column references any specifications for mapping data from the content module into data elements from the workflow or transport transactions.

In some cases, required groupings are defined as at least one of an enumerated set of possible actors; this is designated by merging column one into a single cell spanning multiple potential grouped actors. Notes are used to highlight this situation.

Note: Requirements for grouping of actors are enumerated in the table below. Implementations must support all of the grouped actors if they support the C-EYECARE Actor listed in column 1. For example, implementations supporting a Patient Registration Consumer (row 3), must support the grouped actors Appointment Consumer, Department System Scheduler/Order Filler and Image/Storage Display.

Table 11.3-1: C-EYECARE - Required Actor Groupings

C-EYECARE Actor	Actor to be grouped with	Reference	Content Bindings Reference
Patient Registration Source (Note 1)	Appointment Scheduler	11.1	--
Appointment Scheduler	Patient Registration Source	11.1	--
Charge Processor	Patient Registration Source	11.1	--
	Appointment Scheduler	11.1	--
Patient Registration Consumer	Appointment Consumer	11.1	--
	Department System Scheduler/Order Filler	11.1	--
	Image Storage/Display	11.1	--
Appointment Consumer	Department System Scheduler/Order Filler	11.1	--
	Patient Registration Consumer	11.1	--
	Image Storage/Display	11.1	--
Department System Scheduler/Order Filler	Patient Registration Consumer	11.1	--
	Appointment Consumer	11.1	--
	Image Storage/Display	11.1	--
Image Storage/Display	Department System Scheduler/Order Filler	11.1	--
	Patient Registration Consumer	11.1	--
	Appointment Consumer	11.1	--
Acquisition Modality	None	--	--

C-EYECARE Actor	Actor to be grouped with	Reference	Content Bindings Reference
Acquisition Modality Importer	None	--	--

Note 1: There are optional groupings specified to support Charge Posting. See Table 11.2-1 and Section 11.2.3

11.4 Core Eye Care Workflow Process Flow

The Eye Care administrative process flow is shown in Figure 11.6-1. For comparison with Radiology, see RAD TF-1:3.3. The functionality of those data flows is specified within the specific transactions invoked by the EYECARE TF.

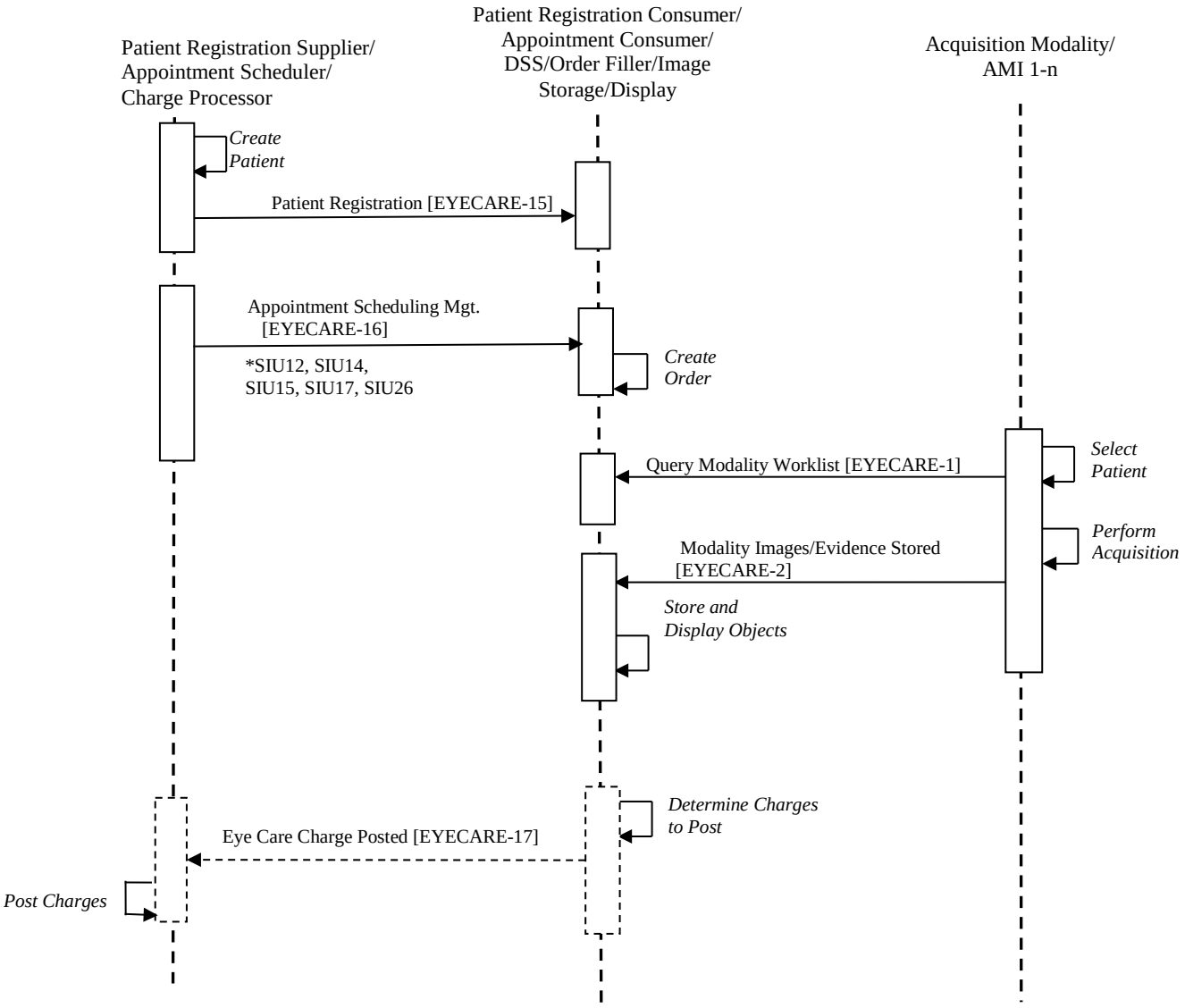


Figure 11.6-1: Workflow - Administrative Process Flow

The following should be noted in relation to the Administrative process flow:

- *Patient Registration*: New patient demographics and updates are sent to consuming systems.
- *Appointment Scheduling*: The patient's appointment is created/managed and sent to consuming systems. This includes new appointments, updates such as confirmed, arrived, checked in, complete. It also supports cancel/delete appointments and patient no shows.
- *Create Order*: The DSS/OF creates patient orders internal to its system.

- *Query Modality Worklist*: The Modality Worklist (MWL) query may be broad (get a list of scheduled procedures from which one will be selected), or patient-specific (provided with sufficient query keys to get back the scheduled procedure for a single patient). Eye Care procedures may be performed on multiple Acquisition Modalities or Acquisition Modality Importers, therefore, multiple devices may perform the queries.
- *Select Patient*: In the event of a single SPS in the MWL response, a modality may optimize the Select Patient function to select that SPS without further explicit user action.
- *Perform Acquisition*: Each Modality may produce a variety of images and other evidence (visual fields, refractive and biometry information, etc.). The key DICOM SOP instances are stored to the Image Storage/Display. The Image Storage/Display is highly recommended to support all the object types as specified by the Eye Care Image Option, the Eye Care Measurement Option and the Encapsulated PDF Option (see EYECARE TF-2: 4.2).
- *Store and Display Objects*: The Image Storage/Display Actor stores the DICOM SOP Instances and is able to display them to the user of the system.
- *Charge Posted*: The DSS/Order Filler provides charging information to the Charge Processor and the Charge Processor post the charges.

11.4.1 Extension to Query Modality Worklist for Eye Care [EYECARE-1]

11.4.1.1 Issuer of Patient ID

The Patient Registration Supplier Actor transmits information regarding the assigning authority (issuer) of the Patient ID to the Patient Registration Consumer/DSS/OF Actor. However, [RAD-5] (see RAD TF-2: 4.5), does not require the DICOM attribute “Issuer of Patient ID” be filled in by the DSS/OF Actor if asked by the Acquisition Modality or Acquisition Modality Importer (AMI) during a Modality Worklist query. This extension requires support for this attribute; see IHE EYECARE TF- 2: 4.1.5 for complete specifications.

A key feature in Eye Care is that patient identity is a critical issue for the Acquisition Modality itself, because of longitudinal data requirements. For example, visual field analyzers persistently store longitudinal data in order to perform glaucoma progression analysis. Ensuring that all the data comes from one patient, and that all data from that patient is used to calculate the progression, is essential.

Traditionally, many instruments have used the patient name and date of birth to determine the identity of patient records, because patient ID’s were not available from an electronic health record and were unreliable. As electronic health record systems become available to manage patient ID’s systematically, these are typically used as the unique key for the identity of the patient record. However, this is within the context of their own “namespace” of ID’s. In order for an acquisition modality to confidently determine the identity of its patient records based on the Patient ID, it also must know this context. This can be provided by the “Issuer of Patient ID” attribute.

Note: When an Issuer of ID is provided to the acquisition modality, it should determine patient identity based on the (Issuer of Patient ID, Patient ID) combination, rather than patient name and date of birth. The acquisition modality should still provide patient reconciliation logic for legacy records.

11.5 Core Eye Care Workflow Use Cases

This section describes the specific use cases and process flows defined for the Core Eye Care Workflow Profile.

Clinical Context: C-EYECARE typically addresses workflow scenarios for a small standalone clinic.

We are addressing scenarios expecting the patients to be registered, an appointment scheduled (and updated), eye care procedure(s) are ordered and diagnostic imaging/measurements are generated. The following two examples show two typical scheduled workflows that may occur. They are very similar in the IHE transactions performed; however, the difference is whether a manual or automatic order was created for a procedure.

Note: For the purposes of this Technical Framework, the term "order" is to be construed in the most generic sense. The extent to which an order is treated as a healthcare provider's order is to be a function of legal jurisdiction. When the procedure involved is deemed not to require a healthcare provider's order, the "order" may be viewed simply as a requirement to preserve data integrity in the workflow.

11.5.1 Workflow Example with Manual Procedure Order

The patient has been created in a Patient Registration Supplier Actor, a healthcare provider has written a procedure order manually, and a procedure step has been scheduled in the DSS/OF. The technician uses the Acquisition Modality or Acquisition Modality Importer to query for a worklist. This may be either a patient query (using parameters to identify the patient uniquely), or a broad query (for all procedure steps scheduled for the modality). The modalities use the DICOM modality worklist service to query the DSS/OF, which responds with a worklist. This is displayed on the modality. The modality may then use the DICOM query/retrieve service to retrieve longitudinal data to display to the technician prior to the acquisition, or to display to the healthcare provider after the acquisition (for implicit post-processing involving longitudinal data).The technician selects the appropriate worklist item The technician performs the acquisition based upon the scheduled protocol code identified in the worklist, or the technician may determine that the requested protocol code was insufficiently specific, and select a different code for acquiring the information. For example, a visual field may have been ordered and the code to convey the procedure and protocol is Visual Field. This code is not specific enough to choose the algorithm needed. Management of the performed procedure step is not specified in C-EYECARE; see EYECARE-1:3.4.1 for explanation.

11.5.2 Workflow Where the Procedure Ordered is an Automatic Eye Care Order

There are often a number of procedures performed on patients when they arrive in the clinic, without need for healthcare provider orders. For example, an eye care order may be created automatically when a patient is scheduled for an eye exam, placing the patient’s name and order information on the modality worklist of several different instruments in the eye care clinic. Examples may include a lensometer and an autorefractor, etc. In this scenario, not all of the

orders are performed. For example, if the patient does not have glasses, no lensometry measurement is required.

The patient has been created in a Patient Registration Supplier Actor, and a number of automatic orders are generated by the DSS/OF (i.e., an automatic eye care order is placed). The technician uses the Acquisition Modality or Acquisition Modality Importer Actor to query the DSS/OF for a worklist. This may be either a patient query (using parameters to uniquely identify the patient), or a broad query (for all procedure steps scheduled for the modality). This is displayed on the Acquisition Modality or Acquisition Modality Importer. At this time, the technician recognizes the automatic eye care order and therefore determines that he/she needs to select the appropriate protocol code and perform the acquisition. The technician performs an acquisition for the patient. When the technician selects to save the acquisition, the modality uses the DICOM storage service to store the acquisition data to the storage server. Additional acquisitions may occur as part of the performed procedure step, each resulting in a DICOM storage command. Management of the performed procedure step is not specified in C-EYECARE; see EYECARE-1:3.4.2 for explanation.

Not all of the automatically generated orders will be performed. The DSS/OF is responsible to remove all unused worklist items that have not been performed on this patient. The triggering mechanism for removing these automatic orders from the device specific Acquisition Modality Worklist will be defined by the DSS/OF and configured for the specific needs of the clinic. This is outside the scope of IHE.

The above workflow may occur on many different modalities for which automatic orders were created in the clinic.

This scenario is more completely documented in Appendix A.3 Workflow Examples using Automatic Orders.

11.6 Workflow Concepts in Practice

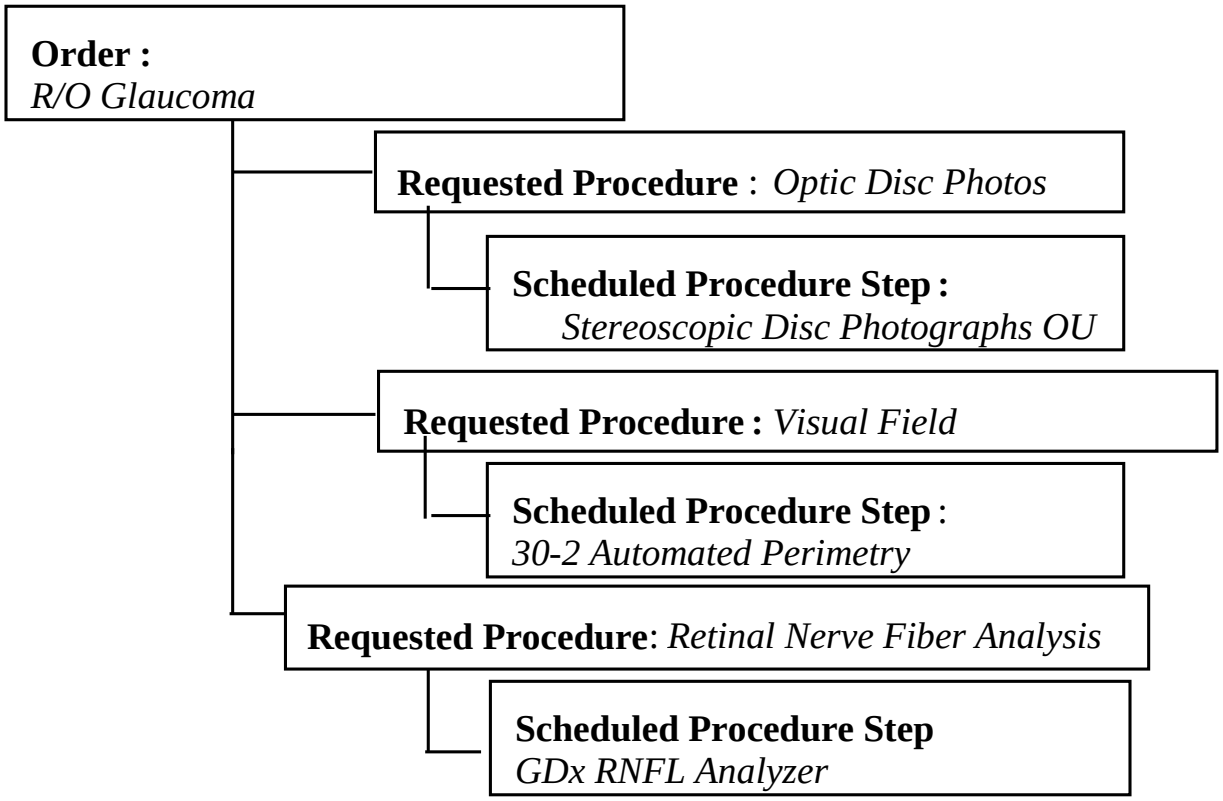
The IHE “Real World” model for Workflow described above offers three major levels of control that can be used to customize a broad range of specific workflow situations:

- **Order**: A request for an Imaging Service
- **Requested Procedure**: Unit of work resulting in one report with associated codified, billable acts.
- **Scheduled and Performed Procedure Step**: the smallest unit of work in the workflow that is scheduled (work to do) and/or performed (work done).

The DSS/OF uses the Universal Service ID in each order that it receives to determine what specific Requested Procedures are needed, and for each Requested Procedure, what Procedure Steps need to be scheduled.

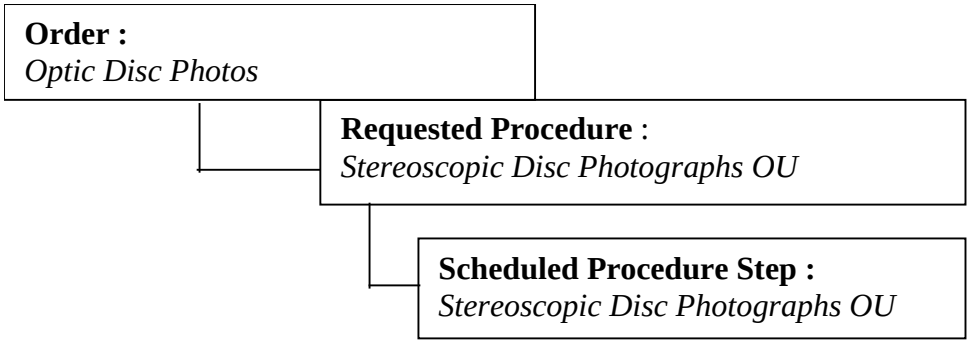
A departmental Procedure Plan may be used in the DSS/OF Actor to predefine Orders that may be requested from the eye care department. Definitions will specify both the procedure code and the Scheduled Procedure Steps for each Requested Procedure.

The figure below defines an example of the breakdown of a “rule out glaucoma” Order.



In this Procedure Plan, for this specific Order, three Requested Procedures are defined. Each Requested Procedure has been scheduled as a separate Scheduled Procedure Step, because the patient may have each one performed at a different time. In addition, more than one ophthalmologist may be involved in the interpretation of the Requested Procedures. This is the way this institution has decided to handle this Order. Another Institution may choose to require the same ophthalmologist to read some or all of the procedures. In that case, its Procedure Plan would define same Order to have a single Requested Procedure with two or three Scheduled Procedure Steps.

Many Orders processed in an Eye Care Department would have a simpler breakdown such as this Optic Disc Photos example.



It should be noted that the three level Order breakdown has been defined in the IHE Scheduled Workflow so that any type of Order, from the simple case to the more complex case may be handled by the same workflow concepts, thus providing a general approach that can be easily customized by each department in the definition of its Procedure Plan.

In the IHE Scheduled Workflow, the **Accession Number identifies the Order**. The **Requested Procedure ID** distinguishes among Requested Procedures when an Order requires multiple Procedures. IHE sets a common meaning for these two terms to provide healthcare providers with a consistent and non-ambiguous access across different vendor products (RIS, PACS and Modalities).

Management of the performed procedure step is not specified in C-EYECARE; see A-EYECARE 3.5 for explanation.

11.7 Patient Reconciliation Use Case

Clinical Context: Jane Smith is a patient within an eye care clinic. She gets married and her name has been changed to Jane Brown. Her medical records, images, measurements, etc. need updating to reflect her new patient demographics and/or patient ID. Products typically affected include Practice Management Systems (PMS) and Electronic Medical Record systems. The PMS is manually reconciled and the other systems are automatically synchronized with the patient name/demographics changes.

Note: As part of the reconciliation of the two patient records, the Patient ID needs to also be merged. Both A-EYCARE and B-EYECARE require support of HL7 ADT-40 (Merge Patient ID) to accomplish the merge. This is an advanced feature that is not easy to accomplish, therefore, it has been omitted from the C-EYECARE Profile. It is expected that systems will manually merge the patients internally in each system. How this is accomplished is outside the scope of IHE.

IHE Context: This use case includes the Patient Registration transaction (HL7 A08); this transaction synchronizes patient demographics of the Patient Registration Supplier and Patient Registration Consumer.

The figure below provides an example workflow for the reconciliation and assumes Jane Smith has already been registered; such as in Figure 11.9-1.

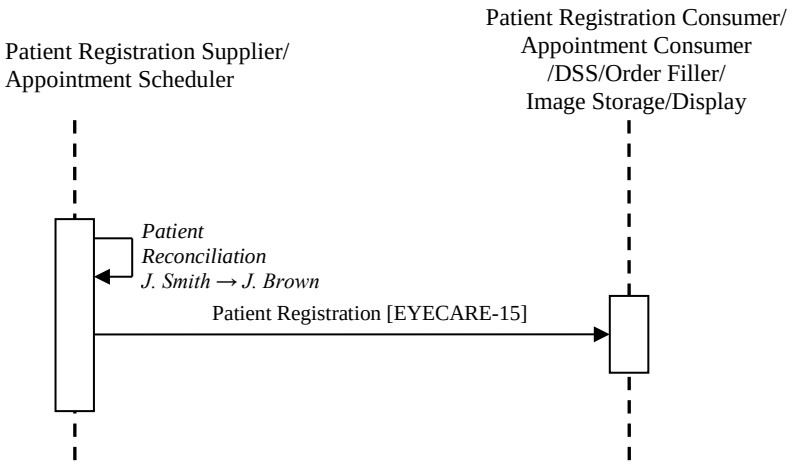


Figure 11.9-1: Patient Reconciliation

The above example illustrates how the HL7 A08 message is used to reconcile patient demographics. It is also used to convey additional information or changes to patient information, such as address changes, phone number changes, insurance updates, etc.

11.8 Core Eye Care Workflow Security Considerations

No security considerations are required.

11.9 EYECARE Cross-Profile Considerations

Implementations that support C-EYECARE may also support transactions and/or options defined in A-EYECARE and/or B-EYECARE such as the Stereo Relationship Option, etc. See Tables 3.1-1 and 3.2-1 for the complete list of transactions possible for implementation.

Glossary

No terms added to glossary.

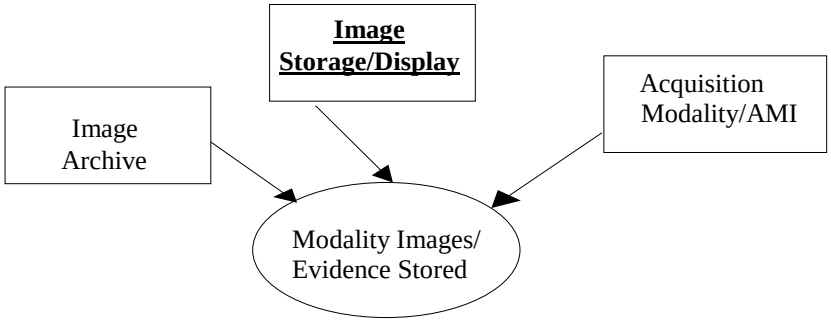
Volume 2 - Transactions

Modified Section 4.2.1, through 4.2.8

4.2.1 Scope

In the Modality Images/Evidence Stored transaction, the Acquisition Modality or Acquisition Modality Importer sends the acquired images/evidence documents to the Image Archive **or the Image Storage/Display.** The information provided from the Modality Worklist transaction (see RAD-TF 2: 4.5) SHALL be included in the headers of the generated images.

4.2.2 Use Case Roles



Actor: Acquisition Modality or Acquisition Modality Importer

Role: Transmit acquired image/evidence documents data to Image Archive **and/or Image Storage/Display.**

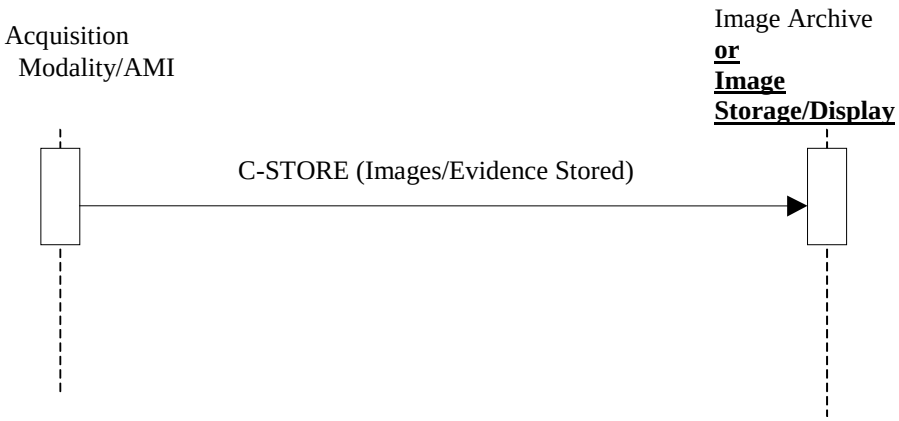
Actor: Image Archive **or Image Storage/Display**

Role: Accept and store images/evidence documents from Acquisition Modalities and Acquisition Modality Importers.

4.2.3 Referenced Standards

DICOM 20~~07~~**11** PS 3.4: Storage Service Class.

4.2.4 Interaction Diagram



4.2.4.1 Images/Evidence Stored

4.2.4.1.1Trigger Events

The Acquisition Modality or Acquisition Modality Importer can transfer images/evidence documents to the Image Archive **and/or Image Storage/Display** sequentially within one or more DICOM associations, as the images/evidence documents become available or collectively.

4.2.4.1.2 Message Semantics

The Acquisition Modality and Acquisition Modality Importers use the DICOM C-STORE message to transfer the images/evidence documents. The Acquisition Modality or Acquisition Modality Importer is the DICOM Storage SCU and the Image Archive **and/or Image Storage/Display** is the DICOM Storage SCP.

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4.2.5 EYE CARE Image Option

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Image Archive **and Image Storage/Display Actors that** support the EYE CARE Image Option shall support all of the SOP classes listed in Table 4.2.5-1.

Table 4.2.5-1: EYE CARE Storage SOP Classes

SOP Class UID	SOP Class Name
1.2.840.10008.5.1.4.1.1.6.1	Ultrasound Image Storage
1.2.840.10008.5.1.4.1.1.3.1	Ultrasound Multi-frame Image Storage
1.2.840.10008.5.1.4.1.1.77.1.5.1	Ophthalmic 8 bit Photography Image Storage
1.2.840.10008.5.1.4.1.1.77.1.5.2	Ophthalmic 16 bit Photography Image Storage

SOP Class UID	SOP Class Name
1.2.840.10008.5.1.4.1.1.88.33	Stereometric Relationship Storage
1.2.840.10008.5.1.4.1.1.77.1.5.4	Ophthalmic Tomography Image Storage

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Note: Future version of Eye Care may include specifications for video solutions.

Image Archives **and Image Storage/Display** Actors shall be able to negotiate, offer and accept
755 any of the transfer syntaxes listed in Table 4.2.5-3.

Acquisition Modalities, Image Archives **and Image Storage/Display Actors** may support transfer syntaxes beyond what is specified in Table 4.2.5-3.

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760 ### 4.2.5.1 Radiological Studies of the Eye

Eye care healthcare providers frequently order radiological studies of the eye and surrounding anatomy. In many instances the interpretation of the study by a radiologist is all that is required. However, in certain instances such as suspected disease or trauma of the orbit (eye socket) or sinuses the ophthalmologist considers both a radiologist report and personal evaluation of the
765 imaging study. One common example would be an orbital CT scan looking for fracture of the orbital floor, which may require surgical repair. Another example is the use of an orbital MRI looking for suspected tumor. Plain x-ray films of the facial bones may be obtained when there is trauma near the eye. In all these instances the ophthalmologist gains specific diagnostic value by his or her own evaluation of the images and may also use this function in the OR to guide
770 surgical intervention.

Image Display **Image** Archive **and Image Storage/Display Actors** are recommended to support the radiological SOP Classes defined in Table 4.2.5.1-1.

Table 4.2.5.1-1: Radiological Studies SOP Classes

SOP Class UID	SOP Class Name
1.2.840.10008.5.1.4.1.1.1	Computed Radiography Image Storage
1.2.840.10008.5.1.4.1.1.1.1	Digital X-Ray Image Storage – For Presentation
1.2.840.10008.5.1.4.1.1.2	CT Image Storage
1.2.840.10008.5.1.4.1.1.4	MR Image Storage
1.2.840.10008.5.1.4.1.1.12.1	X-Ray Angiographic Image Storage
1.2.840.10008.5.1.4.1.1.7	Secondary Capture Image Storage

4.2.6 Encapsulated PDF Option for Evidence Documents

There are many Acquisition Modalities that create evidence documents in addition to or instead of standalone images such as derived images, combined data, measurements, plots, graphs and other diagnostic information.

Acquisition Modalities that support the Encapsulated PDF Option shall support the SOP Class defined by Table 4.2.6-1.

DICOM SOP Classes have been defined for many devices that create measurements, such as lensometers, auto-refractors, keratometers, and subjective refraction devices. Therefore, they are required to support the Eye Care Measurements Option defined in Section 4.2.7.

Image Archives **and Image Storage/Display Actors** that support the Encapsulated PDF Option shall support the SOP Class defined by Table 4.2.6-1.

Table 4.2.6-1: Eye Care SOP Classes for Evidence Documents

SOP Class UID	SOP Class Name
1.2.840.10008.5.1.4.1.1.104.1	Encapsulated PDF Storage

4.2.7 Eye Care Measurements Option

There are many Acquisition Modalities in eye care that create measurement information, such as lensometers, auto-refractors, keratometers, and subjective refraction devices. This option allows support for such devices.

Acquisition Modalities that support the EYE CARE Measurements Option shall support at least one of the SOP Classes defined by Table 4.2.7-1.

Image Archives **and Image Storage/Display Actors** that support the EYE Care Measurements Option are required to support all the SOP Classes defined in Table 4.2.7-1.

Table 4.2.7-1: EYE CARE Measurement Storage SOP Classes

SOP Class UID	SOP Class Name
1.2.840.10008.5.1.4.1.1.78.1	Lensometry Measurements
1.2.840.10008.5.1.4.1.1.78.2	Autorefraction Measurements
1.2.840.10008.5.1.4.1.1.78.3	Keratometry Measurements
1.2.840.10008.5.1.4.1.1.78.4	Subjective Refraction Measurements
1.2.840.10008.5.1.4.1.1.78.5	Visual Acuity Measurements
1.2.840.10008.5.1.4.1.1.78.6	Spectacle Prescription Report

4.2.8 Stereo Relationship Option

Stereo photography such as for the optic disk requires determination of the stereo relationships between two OP images. The DICOM standard provides a mechanism for storing separate stereo relationship objects referencing the left and right images.

Acquisition Modality, Image Archive, Image Display **and Image Storage/Display A**ctors supporting the Stereo Relationship Option shall support the DICOM SOP Class defined in Table 4.2.8-1.

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Table 4.2.8-1: Stereo Relationship SOP Class

SOP Class UID	SOP Class Name
1.2.840.10008.5.1.4.1.1.77.1.5.3	Stereometric Relationship Storage

Add new Section 4.15

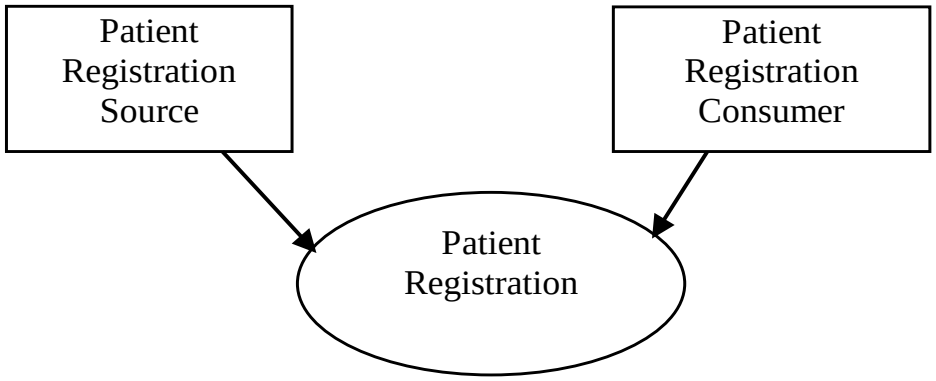
4.15 Eye Care Patient Registration [EYECARE-15]

This section corresponds to the IHE EYE CARE Patient Registration [EYECARE-15] transaction. It defines a basic set of HL7 ADT transactions tailored towards an eye care outpatient registration scenario.

4.15.1 Scope

This transaction enables systems to register and update patient information within an ambulatory (i.e., outpatient) setting (such as a small eye care clinic).

4.15.2 Use Case Roles



Actor: Patient Registration Source

Role: Registers and updates of patient

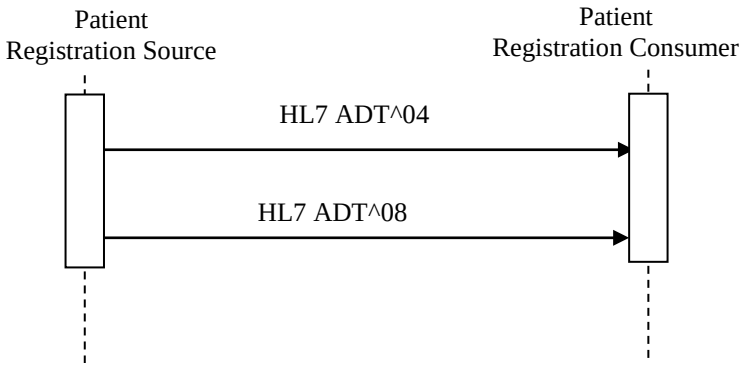
Actor: Patient Registration Consumer

Role: Receives patient registration and update messages, and takes the appropriate actions.

4.15.3 Referenced Standards

HL7 v2.5.1 Chapters 2, 3, 15

4.15.4 Interaction Diagram



4.15.4.1 Patient Registration – Register Patient

4.15.4.1.1 Trigger Events

The following event triggers the ADT message to register the patient.

- A04: Register a Patient – registration of an outpatient for a visit to the facility

4.15.4.1.2 Message Semantics

The Patient Registration – Register Patient message is performed by the HL7 ADT message. The Patient Registration Source Actor SHALL generate the message to register a patient. This message SHALL be used for an event that a new patient will be seen as an outpatient at some time in the future (such as a patient phoning into the clinic to schedule an appointment) or if the patient arrives without being previously registered.

Required segments are defined below. Other segments are optional.

Table 4.15.4.1.2-1: ADT A04 Required Segments

ADT	Patient Registration Message	REQ	Chapter in HL7 2.5.1
MSH	Message Header	R	2
EVN	Event Type	R	3
PID	Patient Identification	R	3
PV1	Patient Visit	R	3
[{ROL}]	Role	R2	15
{IN1}	Insurance	R2	7

R – Required, R2 – Required if known

Adapted from the HL7 Standard, version 2.5.1

4.15.4.1.2.1 MSH Segment

The MSH segment SHALL be constructed as defined in ITI TF-2b:3.30.5.1 MSH – Header Segment.

Field *MSH-9-Message Type* SHALL have three components. The first component SHALL have a value of ADT; the second component SHALL have values of A04. The third component SHALL have a value of ADT_A01.

4.15.4.1.2.2 EVN Segment

The EVN segment SHALL be constructed as defined in ITI TF-2b:3.30.5.2 EVN – Event Type Segment. With the following exceptions:

Field *EVN-1 Event Type Code* is B for backward compatibility.

Fields *EVN-3-Date/Time Planned Event, EVN-6 Event Occurred and EVN-7 Event Facility* are optional.

4.15.4.1.2.3 PID - Patient Identification segment

The PID segment is used by all applications as the primary means of communicating patient identification information. This segment contains permanent patient identifying and demographic information that, for the most part, is not likely to change frequently. Fields not listed are optional.

Table 4.15.4.1.2.3-1: PID – Patient Identification segment

SEQ	LEN	DT	Usage	RP/#	TBL#	ITEM#	Element name
2	20	CX	X			00105	Patient ID
3	250	CX	R	Y		00106	Patient Identifier List
4	20	CX	B			00107	Alternate Patient ID - PID
5	250	XPN	R	Y		00108	Patient Name
7	26	TS	R2			00110	Date/Time of Birth
8	1	IS	R2		0001	00111	Administrative Sex
9	250	XPN	X			00112	Patient Alias
10	250	CE	O		0005	00113	Race
11	250	XAD	R2	Y		00114	Patient Address
12	4	IS	X		0289	00115	County Code
13	250	XTN	R2	Y		00116	Phone Number - Home
18	250	CX	C			00121	Patient Account Number
19	16	ST	B			00122	SSN Number - Patient

SEQ	LEN	DT	Usage	RP/#	TBL#	ITEM#	Element name
20	25	DLN	B			00123	Driver's License Number - Patient
22	250	CE	O		0189	00125	Ethnic Group
28	250	CE	B		0212	00739	Nationality

Adapted from the HL7 Standard, version 2.5.1

Note: In accord with the HL7 Version 2.5 usage of this segment, fields PID-2 (Patient ID), PID-4 (Alternate Patient ID), PID-19 (SSN patient number) and PID-20 (Driver's license number) are superseded by field PID-3. PID-2 Patient ID is not allowed to be present in the message.

Note: PID-4 Alternate Patient ID is allowed for backward compatibility only. One example of usage for backward compatibility is the scenario where actors have legacy paper charts and it is desired to convey the "chart number" of the paper. IHE highly recommends to not use this field except for the expectation noted.

PID-3 – Patient Identifier List contains a list of identifiers (one or more) used by the healthcare facility to uniquely identify a patient.

This field may be populated with various identifiers assigned to the patient by various assigning authorities.

Component-1 "ID number" and Component-4 "Assigning authority" are required for each identifier. When conveying more than one identifier Component-5 "Identifier Type Code" is required.

The values for subfield Component-5 "Identifier Type Code" are given in HL7 Table 0203 (HL7 Version 2.5, Chapter 2A - Section 2A.14.5).

Values commonly used for Identifier Type Code in the context of PID-3 are as follows:

- BC Bank card number. Assigning authority is the bank.
- BR Birth Certificate number. Assigning authority is the birth state or national government that issues the Birth Certificate.
- DL Driver's license number. Assigning authority is the state.
- NH National Health Plan Identifier. Assigning authority at the national level.
- PE Living Subject Enterprise Number. Assigning authority is the enterprise.
- PI Patient Internal Identifier assigned by the healthcare organization.
- PPN Passport number.
- PRC Permanent Resident Card Number
- SS Social Security Number

For example:

Patient Smith's medical record number is 99887766. This number is assigned by the clinic named "Best Eye Center". Best Eye Center incorporates the Namespace ID 99BEC for the medical record numbers it assigns.

The ADT system sends the medical record number at registration, in an occurrence of PID-3-Patient Identifier List that looks like this:

999099497^^^99BEC

If more than one ID is provided, then it may be **999099497^^^99BEC^PI** (i.e., includes the required 5th component to identify the type of ID when multiple IDs are use)

Patient Smith's Social Security number is **999-99-4452**. This number is assigned by the U.S. Social Security Administration.

The Patient Registration Source system sends the Social Security number at registration, in an occurrence of *PID-3-Patient Identifier List* that looks like this:

999-99-4452^^^USSSA^SS

PID-5 – Patient Name contains one or more names for the patient. At least one name SHALL be provided, with at least Component 1 "Family Name" valued. Components 2 (Given Name) and 3 Middle Name are R2 (required if known).

PID-8 – Administrative Sex:

The values are taken from HL7 User-defined Table 0001.

PID-10 – Race may be further constrained in national extensions. For instance, in the US it is recommended to be required if known using the CDC Concept Code for Race 2.16.840.1.114222.4.11.3405 value set. A France extension may not allow the use of the field (usage code X).

PID-13 – Home Phone Number (XTN):

Component 1 – Telephone Number is B for backward compatible only

Component 2 – Telephone Use Code is R2 using the HL7 User-defined Table 0201

Component 3 – Telephone Equipment Type is R2 using the HL7 User-defined Table 0202

Component 4 – E-mail Address is R2

Components 5 (Country Code), 6 (Area/City Code) and 7 (Local Number) are R2

PID-18 – Patient Account Number contains the patient account number assigned by accounting to which all charges, payments, etc., are recorded. It is used to identify the patient's account.

Relationship to encounter: A patient account can span more than one enterprise encounter. At least one of the fields PID-18 "Patient Account Number" or PV1-19 "Visit Number" SHALL be valued. Additional requirements for the presence of value in these fields may be documented in national extensions of this transaction.

PID-22 – Ethnicity may be further constrained in national extensions. For instance, in the US it is recommended to be required if known using the CDC Concept Code for Ethnicity 2.16.840.1.114222.4.11.877 value set.

4.15.4.1.2.4 PV1 - Patient Identification segment

The PV1 segment is used by applications to communicate information on an account or visit-specific basis. Fields not listed are optional.

Table 4.15.4.1.2.4-1: PV1 - Patient Visit segment

SEQ	LEN	DT	Usage	RP/#	TBL#	ITEM#	ELEMENT NAME
2	1	IS	R		0004	00132	Patient Class
8	250	XCN	R2	Y	0010	00138	Referring Doctor
19	250	CX	C			00149	Visit Number

Adapted from the HL7 Standard, version 2.5.1

PV1-2 – Patient Class is used by systems to categorize patients by site. The values are taken from HL7 User-defined Table 0004.

PV1-19 – Visit Number contains the unique identifier assigned to the encounter. At least one of the fields PID-18 "Patient Account Number" or PV1-19 "Visit Number" SHALL be valued.

Note: *PV1-19 – Referring Doctor* is a repeating field, so multiple doctors may be conveyed.

4.15.4.1.2.5 ROL - Role segment

The ROL segment communicates information about providers related to the patient.

Table 4.15.4.1.2.5-1: ROL Segment

SEQ	LEN	DT	Usage	Rep/#	TBL#	ITEM#	ELEMENT NAME
1	60	EI	C			01206	Role Instance ID
2	2	ID	R		0287	00816	Action Code
3	250	CE	R		0443	01197	Role-ROL
4	250	XCN	R	Y		01198	Role Person

Adapted from the HL7 Standard, version 2.5.1

ROL-1 – Role Instance ID is optional in the context of ADT messages.

ROL-3 – Role-ROL defines the functional involvement of the person. HL7 Table 0443 SHALL be used and has been extended by IHE to support the additional provider role codes listed below. **The extensions are shown in bold.**

User-defined Table 0443: Provider role

Value	Description	Used with
AD	Admitting	PV1-17 Admitting doctor
AT	Attending	PV1-7 Attending doctor
CP	Consulting Provider	
FHCP	Family Health Care Professional	
PP	Primary Care Provider	
PECP	**Primary Eye Care Provider**	
RP	Referring Provider	PV1-8 Referring doctor
RT	Referred to Provider	

Adapted from the HL7 Standard, version 2.5.1

ROL-4 – Role Person provides identification of the person playing the role. IHE highly recommends not only conveying the provider's name but also the provider's ID. This could be a national provider identifier (NPI) or a local ID.

4.15.4.1.2.6 IN1 - Insurance segment

The IN1 segment is used by applications to communicate insurance information on an account or visit-specific basis. Fields not listed are optional.

Table 4.15.4.1.2.6-1 IN1 - Insurance segment

SEQ	LEN	DT	Usage	RP/#	TBL#	ITEM#	ELEMENT NAME
1	4	ISI	R			00426	Set ID – IN1
2	250	CE	R		00072	00368	Insurance Plan ID
3	250	CX	R	Y		00428	Insurance Company ID
4	250	XON	R2	Y		00429	Insurance Company Name
8	12	ST	R2			00433	Group Number
36	15	ST	R2			00461	Policy Number

Adapted from the HL7 Standard, version 2.5.1

The HL7 Standard does not identify if an insurance plan is primary or secondary, therefore, the field *IN1-1 – Set ID – INI* is used to convey this information. The primary insurance plan SHALL be identified with *IN1-1 Set ID – INI* set to the value 1. Other secondary insurance plans SHALL be identified with incrementing *IN1-1 Set ID- IN1* values, 2, 3, 4….

IHE highly recommends only insurances that are active be sent.

4.15.4.1.2.7 Expected Action

After receiving patient registration HL7 ADT A04 message, the Patient Registration Consumer SHALL create a new patient record for the patient identified if there is no current record for the Patient ID (defined by the field *PID-3*).

4.15.4.2 Patient Registration – Update Patient

4.15.4.2.1 Trigger Events

The following event triggers the ADT message to register the patient.

- A08: Register a Patient – registration of an outpatient for a visit to the facility

4.15.4.2.2 Message Semantics

The Patient Registration – Update Patient message is performed by the HL7 ADT message. The Patient Registration Source Actor SHALL generate the message whenever an error is resolved or a change occurs in patient demographics.

A Patient Registration Source SHALL send all of the required (R and R2) information for a patient record in an A08 message.

An A08 message is the only method a Patient Registration Source may use to update patient demographic and visit information. However a Patient Registration Source shall not use an A08 message to update Patient ID.

Note: As part of the reconciliation of two patient records, the Patient ID needs to also be merged. This is accomplished by supporting the HL7 ADT-40 (Merge Patient ID) message. This is an advanced feature that is not easy to accomplish, therefore, it has been omitted from this transition. Other transactions in IHE EYE CARE do require the HL7 ADT-40 message.

Required segments are defined below. Other segments are optional.

Table 4.15.4.2.2-1: ADT A08 Required Segments

ADT	Patient Registration Message	REQ	Chapter in HL7 2.5.1
MSH	Message Header	R	2
EVN	Event Type	R	3
PID	Patient Identification	R	3
PV1	Patient Visit	R	3
{IN1}	Insurance	R2	7

R – Required, R2 – Required if known

Adapted from the HL7 Standard, version 2.5.1

4.15.4.2.2.1 MSH Segment

The MSH segment SHALL be constructed as defined in ITI TF-2b:3.30.5.1 MSH – Header Segment.

Field *MSH-9-Message Type* SHALL have three components. The first component SHALL have a value of ADT; the second component SHALL have values of A08. The third component SHALL have a value of ADT_A01.

4.15.4.2.2.2 EVN Segment

See Section 4.15.4.1.2.2.

4.15.4.2.2.3 PID - Patient Identification segment

The PID segment is used by all applications as the primary means of communicating patient identification information. This segment contains permanent patient identifying and demographic information that, for the most part, is not likely to change frequently.

See Section 4.15.4.1.2.3 for field requirements.

At least one of the fields *PID-18-Patient Account Number* or *PV1-19-Visit Number* SHALL be valued.

4.15.4.2.2.4 PV1 - Patient Identification segment

The PV1 segment is used by applications to communicate information on an account or visit-specific basis.

See Section 4.15.4.1.2.4 for field requirements.

At least one of the fields *PID-18-Patient Account Number* or *PV1-19-Visit Number* SHALL be valued.

4.15.4.2.2.5 ROL Role Segment

The ROL segment is used by applications to communicate information about providers related to the patient.

See Section 4.15.4.1.2.5 for field requirements.

4.15.4.2.2.6 IN1 - Insurance segment

The IN1 segment is used by applications to communicate insurance information on an account or visit-specific basis.

See Section 4.15.4.1.2.6 for field requirements.

4.15.4.2.2.7 Expected Action

The Patient Registration Consumer SHALL update its local patient demographic, visit and/or insurance information based on the values received in the ADT A08 message.

See section 4.15.4.2.2 for the Message Semantics of the A08 message.

If an attribute received has a NULL value (i.e., is transmitted as two double quote marks "“) in the A08 message SHALL be removed from the Patient Registration Consumer’s database for that patient record.

If an attribute received has no value (i.e., is omitted) in the A08 message, the old value should remain unchanged in the receiving system's database for that patient record.

4.15.5 Common HL7 Message Implementation Requirements

The IHE Infrastructure Technical Framework has defined general HL7 implementation notes for HL7 V2 messages, for example:

- Using the Minimal Lower Layer Protocol (MLLP) over TCP/IP to transmit messages
- Using HL7 Original Acknowledgement Mode versus the Enhanced Acknowledgment Mode
- Rules for the MSA Segment, ERR Segment
- Empty Field convention
- Other

IHE Actors performing this transaction SHALL comply with requirements defined in IHE ITI TF-2x:C.2 HL7 Implementation Notes (Appendix C).

For HL7 Messages, the term “B” means backwards compatible.

Note: IHE recognizes that certain deployments may require the use of Network Share Files as the transport mechanism. Although this is considered to be outside the scope of this profile, we do advise to not include MLLP framing characters in Network Share File implementations.

Note: Receiving TCP Socket Based Implementations that allow senders to remain connected and leave the socket open should ensure that their system properly handles a forcibly disconnected TCP session. TCP sessions can be forcibly disconnected by firewalls, routers, or switches because of congestion, inactivity, or firewall policy violations. Systems should reset the socket and be ready to establish a new session when these situations are encountered.

4.15.6 Security Considerations

No additional security considerations for the Patient Registration transaction, beyond those described in Appendix E of EYECARE TF:1 were deemed necessary.

4.15.6.1 Security Audit Considerations

There are no specific ATNA security audit events associated with the Patient Registration transaction nor requirements on the encoding of that audit event.

4.16 Appointment Scheduling Management [EYECARE-16]

This transaction facilitates the management of a patient's appointment. It includes scheduling the appointment and status updates, such as modifying the date, cancel or deleting an appointment, patient no show, etc. It is based upon HL7 Appointment Notification messages.

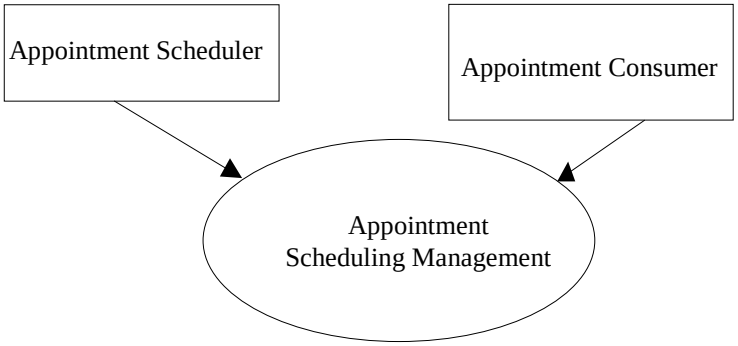
- S12 - Notification of New Appointment Booking
- S14 - Notification of Appointment Modification
- S15 - Notification of Appointment Cancellation
- S17 - Notification of Appointment Deletion
- S26 - Notification That Patient Did Not Show Up for Scheduled Appointment

4.16.1 Scope

In the Appointment Scheduling Management Transaction, the Appointment Scheduler conveys appointment notifications to the Appointment Consumer Actor for new appointment bookings and updates to the notifications. These notifications contain the date(s) and time(s) of resource scheduling information.

Note: Many systems in the network may wish this type of information so IHE advises that an Appointment Scheduler is able to communicate these notifications to multiple systems.

4.16.2 Use Case Roles



Actor: Appointment Scheduler

Role: Sends appointment notifications to Appointment Consumer

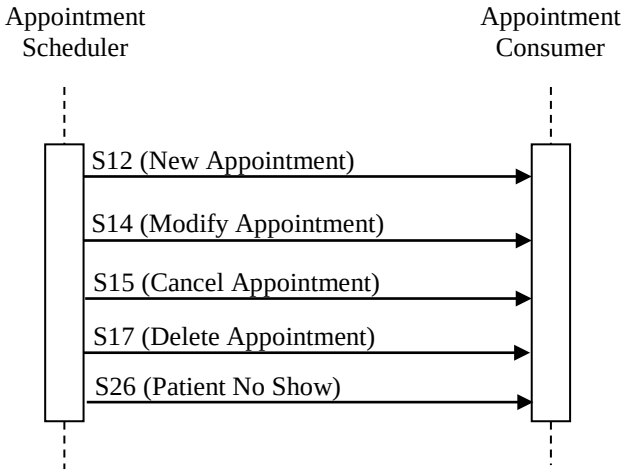
Actor: Appointment Consumer

Role: Receives appointment notifications from Appointment Scheduler

4.16.3 Standards Referenced

HL7 Version 2.5.1 Chapters 2, 3, 4 and 10

4.16.4 Interaction Diagram



4.16.4.1 Appointment Scheduling Management – New Appointment

4.16.4.1.1 Trigger Events

The Appointment Scheduler creates a new appointment booking. The Appointment Scheduler broadcasts an SIU^S12 message to subscribed Appointment Consumers.

4.16.4.1.2 Message Semantics

The New Appointment message is performed by the HL7 SIU message. The Appointment Scheduled Actor SHALL generate the message to book a new appointment. The message semantics follow the SIU^S12 message as specified in HL7 v2.5.1 Chapter 10. Refer to HL7 Standard for general message semantics.

Required segments are defined below. Other segments are optional.

Table 4.16.4.1.2-1 HL7 SIU^S12 Message

SIU^S12	Schedule information new booking	REQ	Chapter in HL7 2.5.1
MSH	Message Header	R	2
SCH	Schedule Activity Information	R	10
{TQ1}	Timing and Quality	R	4
[{NTE}]	Note and comments for the SCH	R2	2
PID	Patient Identification	R	3
{RGS	Resource Group	R	10
[{AIG}]	Appointment Information – General	O	10

SIU^S12	Schedule information new booking	REQ	Chapter in HL7 2.5.1
{AIL}	Appointment Information – Location	R	10
[{AIP}]}	Appointment Information – Personnel Resource	R2	10

Adapted from the HL7 Standard, version 2.5.1

Note: The AIG segment is optional but IHE recommends using this segment if the system manages general resources.

4.16.4.1.2.1 MSH Segment

The MSH segment SHALL be constructed as defined in ITI TF-2b:3.30.5.1 MSH – Header Segment.

Field *MSH-9-Message Type* SHALL have three components. The first component SHALL have a value of SIU; the second component SHALL have a value of S12. The third component SHALL have a value of SIU_S12.

4.16.4.1.2.2 SCH Segment

The SCH segment is used by applications is to communicate general information about the scheduled appointment. Fields not listed are optional.

Table 4.16.4.1.2.2-1 SCH Segment

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME
1	75	EI	C			00860	Placer Appointment ID
2	75	EI	R			00861	Filler Appointment ID
3	5	NM	C			00862	Occurrence Number
6	250	CE	R			00883	Event Reason
9	20	NM	B			00868	Appointment Duration
10	250	CE	B			00869	Appointment Duration Units
11	200	TQ	B	Y		00884	Appointment Timing Quantity
16	250	XCN	R	Y		00885	Filler Contact Person
20	250	XCN	R	Y		00878	Entered by Person
24	75	EI	C			00882	Parent Filler Appointment ID
25	250	CE	R		0278	00889	Filler Status Code
26	22	EI	C	Y		00216	Placer Order Number
27	22	EI	C	Y		00217	Filler Order Number

Adapted from the HL7 Standard, version 2.5.1

Note: The term “Placer” in the HL7 Table is used to represent a system that may have requested the appointment. If no system requested the appointment then it is not sent. The term “Filler” in the HL7 Table is used to represent the IHE Actor Appointment Scheduler.

Field *SCH-1 Placer Appointment ID* is used when a system "requests" the appointment such as an HL7 Appointment Request (SRM) message. This may occur but is outside the scope of this transaction; therefore, this transaction does not place any requirements on this field beyond those specified by HL7.

Field *SCH-2 Filler Appointment ID* is required sent by the Appointment Scheduler. This field SHALL contain the Appointment Scheduler's unique ID related to this specific appointment.

Fields *SCH-6 Event Reason* is required for HL7 backwards compatibility. IHE recommends inserting a NULL value if backwards compatibility is not required for a given implementation.

Fields *SCH-11 Appointment Timing Quantity* has been deprecated. The TQ1 segment is better suited to convey appointment timing and quality related to the specified appointment. It is maintained here for backwards compatibility.

Fields *SCH-25 Filler Status Codes* is required to convey the current status of the appointment. HL7 Table 0278 SHALL be used and has been extended by IHE to support the additional appointment status codes listed below. **The extensions are shown in bold.**

Table 4.16.4.1.2.2-2 HL7 Table 0278 and IHE Extension to Filler Status Codes

Value	Description
Pending	Appointment has not yet been confirmed
Waitlist	Appointment has been placed on a waiting list for a particular slot, or set of slots
Booked	The indicated appointment is booked
Confirmed	**The patient was contacted (i.e., called, SMS) and the appointment was confirmed.**
Arrived	**The patient has arrived at the facility.**
Checked In	**The patient has completed checked in documents and is ready to be seen by clinical staff.**
Started	The indicated appointment has begun and is currently in progress
Complete	The indicated appointment has completed normally (was not discontinued, canceled, or deleted)
Cancelled	The indicated appointment was stopped from occurring (canceled prior to starting)
Dc	The indicated appointment was discontinued (DC'ed while in progress, discontinued parent appointment, or discontinued child appointment)
Deleted	The indicated appointment was deleted from the filler application
Blocked	The indicated time slot(s) is(are) blocked
Overbook	The appointment has been confirmed; however it is confirmed in an overbooked state
No Show	The patient did not show up for the appointment

4.16.4.1.2.3 TQ1 Segment

Table 4.16.6.1.1.3-1 TQ1 Segment

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME
7	26	TS	R			01633	Start date/time
8	26	TS	R2			01634	End date/time
12	10	ID	C		0472	01638	Conjunction

Adapted from the HL7 Standard, version 2.5.1

Field *TQ1-7 – Start date/time* SHALL contain the scheduled start date and time of the appointment.

4.16.4.1.2.4 RGS Segment

Table 4.16.4.1.2.4-1 RGS Segment

SEQ	LEN	DT	OPT	RP/#	TBL #	ITEM#	ELEMENT NAME
1	4	SI	R			01203	Set ID - RGS
2	3	ID	R		0206	00763	Segment Action Code

Adapted from the HL7 Standard, version 2.5.1

Field *RGS-2 – Segment Action Code* SHALL contain the action code and use values from HL7 Table 0206.

4.16.4.1.2.5 AIL Segments

The AIL segment is used by applications is to communicate information about location resources that can be scheduled. IHE does not place any additional requirements and the segment fields beyond the HL7 Standard.

4.16.4.1.2.6 AIP Segments

The AIP segment is used by applications is to communicate information about personal types that can be scheduled. IHE does not place any additional requirements and the segment fields beyond the HL7 Standard.

4.16.4.1.2.7 Expected Action

The Appointment Consumer Actor SHALL create a new patient appointment in its system after receiving the new appointment HL7 SIU^12 message.

4.16.4.2 Appointment Scheduling Management – Modify Appointment

4.16.4.2.1 Trigger Events

The appointment for a patient is modified (updated) and Appointment Scheduler broadcasts an SIU^S14 message to subscribed Appointment Consumers.

4.16.4.2.2 Message Semantics

The Modification Appointment message is performed by the HL7 SIU message. The Appointment Scheduled Actor SHALL generate update messages when changes to the appointment have been made. Typically changes would be in the statuses, such as booked, confirmed, arrived, checked in, etc. It also may include appointment date/time changes, etc. *This message is NOT used for Cancel, Delete or No Show, as these updates are performed using other SIU messages*. The message semantics follow the SIU^S14 message as specified in HL7 v2.5.1 Chapter 10. Refer to HL7 Standard for general message semantics.

Required segments are defined below. Other segments are optional.

Table 4.16.4.2.2-1 HL7 SIU^S14 Message

SIU^S14	Schedule information new booking	REQ	Chapter in HL7 2.5.1
MSH	Message Header	R	2
SCH	Schedule Activity Information	R	10
{TQ1}	Timing and Quality	R	4
[{NTE}]	Note and comments for the SCH	R2	2
PID	Patient Identification	R	3
{RGS	Resource Group	R	10
[{AIG}]	Appointment Information – General	O	10
{AIL}	Appointment Information – Location	R	10
[{AIP}]}	Appointment Information – Personnel Resource	R2	10

Adapted from the HL7 Standard, version 2.5.1

4.16.4.2.2.1 MSH Segment

The MSH segment SHALL be constructed as defined in ITI TF-2b:3.30.5.1 MSH – Header Segment.

Field *MSH-9-Message Type* SHALL have three components. The first component SHALL have a value of SIU; the second component SHALL have a value of S14. The third component SHALL have a value of SIU_S12.

4.16.4.2.2.2 SCH Segment

See Section 4.16.4.1.2.2 for the requirements for the SCH segment.

4.16.4.2.2.3 TQ1 Segment

See Section 4.16.4.1.2.3 for the requirements for the TQ1 segment.

4.16.4.2.2.4 RGS Segment

See Section 4.16.4.1.2.4 for the requirements for the RGS segment.

4.16.4.2.2.5 AIL Segment

See Section 4.16.4.1.2.5 for the requirements for the AIL segment.

4.16.4.2.2.6 AIP Segment

See Section 4.16.4.1.2.6 for the requirements for the AIP segment.

4.16.4.2.2.7 Expected Action

After receiving a modify appointment HL7 SIU^14 message, the Appointment Consumer Actor SHALL update the patient's appointment in its system.

4.16.4.3 Appointment Scheduling Management – Cancel Appointment

4.16.4.3.1 Trigger Events

The appointment for a patient is cancelled and the Appointment Scheduler broadcasts an SIU^S15 message to subscribed Appointment Consumers.

4.16.4.3.2 Message Semantics

The Cancel Appointment message is performed by the HL7 SIU message. The Appointment Scheduled Actor SHALL generate the message when the patient's appointment has been cancelled. The message semantics follow the SIU^S15 message as specified in HL7 v2.5.1 Chapter 10. Refer to HL7 Standard for general message semantics.

Required segments are defined below. Other segments are optional.

Table 4.16.4.3.2-1 HL7 SIU^S15 Message

SIU^S15	Schedule information new booking	REQ	Chapter in HL7 2.5.1
MSH	Message Header	R	2
SCH	Schedule Activity Information	R	10
{TQ1}	Timing and Quality	R	4
[{NTE}]	Note and comments for the SCH	R2	2
PID	Patient Identification	R	3
{RGS	Resource Group	R	10

SIU^S15	Schedule information new booking	REQ	Chapter in HL7 2.5.1
[{AIG}]	Appointment Information – General	O	10
{AIL}	Appointment Information – Location	R	10
[{AIP}]}	Appointment Information – Personnel Resource	R2	10

Adapted from the HL7 Standard, version 2.5.1

4.16.4.3.2.1 MSH Segment

The MSH segment SHALL be constructed as defined in ITI TF-2b:3.30.5.1 MSH – Header Segment.

Field *MSH-9-Message Type* shall have three components. The first component SHALL have a value of SIU; the second component SHALL have a value of S15. The third component SHALL have a value of SIU_S12.

4.16.4.3.2.2 SCH Segment

See Section 4.16.4.1.2.2 for the requirements for the SCH segment.

Fields *SCH-25 Filler Status Codes* is required to convey the current status of the appointment. The value SHALL be set to “Cancelled” as defined by HL7 Table 0278.

4.16.4.3.2.3 TQ1 Segment

See Section 4.16.4.1.2.3 for the requirements for the TQ1 segment.

4.16.4.3.2.4 RGS Segment

See Section 4.16.4.1.2.4 for the requirements for the RGS segment.

4.16.4.3.2.5 AIL Segment

See Section 4.16.4.1.2.5 for the requirements for the AIL segment.

4.16.4.3.2.6 AIP Segment

See Section 4.16.4.1.2.6 for the requirements for the AIP segment.

4.16.4.3.2.7 Expected Action

After receiving an HL7 SIU^15 message, the Appointment Consumer Actor SHALL cancel the patient’s appointment in its system.

4.16.4.4 Appointment Scheduling Management – Delete Appointment

4.16.4.4.1 Trigger Events

The appointment for a patient is deleted and the Appointment Scheduler broadcasts an SIU^S17 message to subscribed Appointment Consumers.

4.16.4.4.2 Message Semantics

The Delete Appointment message is performed by the HL7 SIU message. The Appointment Scheduled Actor SHALL generate the message when the patient's appointment has been deleted. The message semantics follow the SIU^S17 message as specified in HL7 v2.5.1 Chapter 10. Refer to HL7 Standard for general message semantics.

Required segments are defined below. Other segments are optional.

Table 4.16.4.4.2-1 HL7 SIU^S17 Message

SIU^S17	Schedule information new booking	REQ	Chapter in HL7 2.5.1
MSH	Message Header	R	2
SCH	Schedule Activity Information	R	10
{TQ1}	Timing and Quality	R	4
[{NTE}]	Note and comments for the SCH	R2	2
PID	Patient Identification	R	3
{RGS	Resource Group	R	10
[{AIG}]	Appointment Information – General	O	10
{AIL}	Appointment Information – Location	R	10
[{AIP}]}	Appointment Information – Personnel Resource	R2	10

Adapted from the HL7 Standard, version 2.5.1

4.16.4.4.2.1 MSH Segment

The MSH segment SHALL be constructed as defined in ITI TF-2b:3.30.5.1 MSH – Header Segment.

Field *MSH-9-Message Type* SHALL have three components. The first component SHALL have a value of SIU; the second component SHALL have a value of S17. The third component SHALL have a value of SIU_S12.

4.16.4.4.2.2 SCH Segment

See Section 4.16.4.1.2.2 for the requirements for the SCH segment.

Fields *SCH-25 Filler Status Codes* is required to convey the current status of the appointment. The value SHALL be set to "Deleted" as defined by HL7 Table 0278.

4.16.4.4.2.3 TQ1 Segment

See Section 4.16.4.1.2.3 for the requirements for the TQ1 segment.

4.16.4.4.2.4 RGS Segment

See Section 4.16.4.1.2.4 for the requirements for the RGS segment.

4.16.4.4.2.5 AIL Segment

See Section 4.16.4.1.2.5 for the requirements for the AIL segment.

4.16.4.4.2.6 AIP Segment

See Section 4.16.4.1.2.6 for the requirements for the AIP segment.

4.16.4.4.2.7 Expected Action

After receiving an HL7 SIU^17 message, the Appointment Consumer Actor SHALL delete the patient's appointment in its system.

4.16.4.5 Appointment Scheduling Management – Patient No Show

4.16.4.5.1 Trigger Events

The patient did not show up for the appointment and the Appointment Scheduler broadcasts an SIU^S26 message to subscribed Appointment Consumers.

4.16.4.5.2 Message Semantics

The Patient No Show message is performed by the HL7 SIU message. The Appointment Scheduled Actor SHALL generate the message when the patient's appointment has been deleted. The message semantics follow the SIU^S26 message as specified in HL7 v2.5.1 Chapter 10. Refer to HL7 Standard for general message semantics.

Required segments are defined below. Other segments are optional.

Table 4.16.4.5.2-1 HL7 SIU^S26 Message

SIU^S26	Schedule information new booking	REQ	Chapter in HL7 2.5.1
MSH	Message Header	R	2
SCH	Schedule Activity Information	R	10
{TQ1}	Timing and Quality	R	4
[{NTE}]	Note and comments for the SCH	R2	2
PID	Patient Identification	R	3
{RGS	Resource Group	R	10
[{AIG}]	Appointment Information – General	O	10
{AIL}	Appointment Information – Location	R	10
[{AIP}]}	Appointment Information – Personnel Resource	R2	10

Adapted from the HL7 Standard, version 2.5.1

4.16.4.5.2.1 MSH Segment

The MSH segment SHALL be constructed as defined in ITI TF-2b:3.30.5.1 MSH – Header Segment.

Field *MSH-9-Message Type* SHALL have three components. The first component SHALL have a value of SIU; the second component SHALL have a value of S26. The third component SHALL have a value of SIU_S12.

4.16.4.5.2.2 SCH Segment

See Section 4.16.4.1.2.2 for the requirements for the SCH segment.

Fields *SCH-25 Filler Status Codes* is required to convey the current status of the appointment. The value SHALL be set to "No Show" as defined by HL7 Table 0278.

4.16.4.5.2.3 TQ1 Segment

See Section 4.16.4.1.2.3 for the requirements for the TQ1 segment.

4.16.4.5.2.4 RGS Segment

See Section 4.16.4.1.2.4 for the requirements for the RGS segment.

4.16.4.5.2.5 AIL Segment

See Section 4.16.4.1.2.5 for the requirements for the AIL segment.

4.16.4.5.2.6 AIP Segment

See Section 4.16.4.1.2.6 for the requirements for the AIP segment.

4.16.4.5.2.7 Expected Action

After receiving an HL7 SIU^26 message, the Appointment Consumer Actor SHALL set the status of the patient's appointment to no show.

4.16.5 Common HL7 Message Implementation Requirements

The IHE Infrastructure Technical Framework has defined general HL7 implementation notes for HL7 V2 messages, for example:

- Using the Minimal Lower Layer Protocol (MLLP) over TCP/IP to transmit messages
- Using HL7 Original Acknowledgement Mode versus the Enchanted Acknowledgment Mode
- Rules for the MSA Segment, ERR Segment
- Empty Field convention
- Other

IHE actors performing this transaction SHALL comply with requirements defined in IHE ITI TF-2x:C.2 HL7 Implementation Notes (Appendix C).

Note: IHE recognizes that certain deployments may require the use of Network Share Files as the transport mechanism. Although this is considered to be outside the scope of this profile, we do advise to not include MLLP framing characters in Network Share File implementations.

Note: Receiving TCP Socket Based Implementations that allow senders to remain connected and leave the socket open should ensure that their system properly handles a forcibly disconnected TCP session. TCP sessions can be forcibly disconnected by firewalls, routers, or switches because of congestion, inactivity, or firewall policy violations. Systems should reset the socket and be ready to establish a new session when these situations are encountered.

4.16.6 Security Considerations

No additional security considerations for the Appointment Scheduling Management transaction, beyond those described in Appendix E of EYECARE TF:1, were deemed necessary.

4.16.6.1 Security Audit Considerations

There are no specific ATNA security audit events associated with the Appointment Scheduling Management transaction nor requirements on the encoding of that audit event.

4.17 Eye Care Charge Posted [EYECARE-17]

This section addresses the IHE EYE CARE Charge Posted [EYECARE-17] transaction. Transaction EYECARE-17 is used by the Department System Scheduler/Order Filler and Charge Processor actors.

4.17.1 Scope

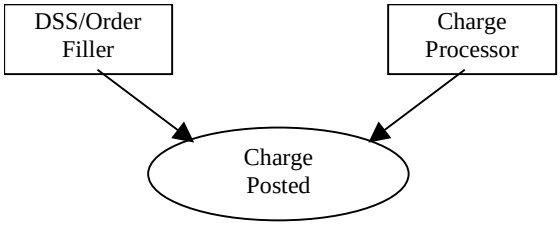
The Eye Care Charge Posted Transaction specifies a message from the Department System Scheduler/Order Filler to the Charge Processor. This HL7 Detailed Financial Transaction message contains procedure data typically needed to generate a claim.

The Department System Scheduler/Order Filler provides the procedure and other billing charges data that is used by the Charge Processor. The Charge Processor may or may not expect the actual transaction fees associated with the procedures included in the transaction. In some situations, the Department System Scheduler/Order Filler is best able to match the procedure details to the appropriate fees. In other situations, the Charge Processor performs this function. In either case, the Charge Processor can override the fees provided by the Department System Scheduler/Order Filler.

The ways and means of ensuring the required data is complete is the responsibility of the Charge Processor and is outside the scope of IHE.

Note: Although IHE specifies real-time charge posted transactions, batch processing can be accommodated as per the batch specifications defined in HL7 Chapter 2, sec. 2.23.2.

4.17.2 Use Case Roles



Actor: Department System Scheduler/Order Filler

Role: Collects information relevant to the posting of charges and submits it to the Charge Processor.

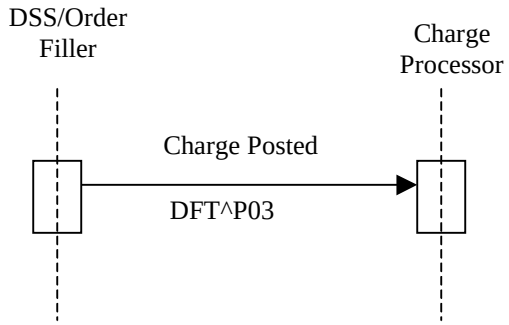
Actor: Charge Processor

Role: Receives the information from the Department System Scheduler/Order Filler. Processes and combines charges in order to issue an insurance claim or patient's billing statement.

4.17.3 Referenced Standards

Health Level Seven, Version 2.5.1: Chapter 6 - Financial Management

4.17.4 Interaction Diagram



4.17.4.1 Financial Transaction Message

The Detailed Financial Transaction (DFT) message is used to describe a financial transaction transmitted between the Department System Scheduler/Order Filler and the Charge Processor.

Note that sometimes the DFT does not actually result in a financial transaction.

4.17.4.1.1 Trigger Events

The Department System Scheduler/Order Filler determines when the charge posted transactions are to be sent to the Charge Processor. There are two types of financial billing transactions – Technical and Professional. Each can be triggered at a separate time or both can be sent at the same time - depending on the site configuration.

- Technical Billing

- Charge posting of the Technical Billing for a procedure is typically triggered when the procedure is completed. How the Department System Scheduler/Order Filler is aware that the procedure has been complete is outside the scope of this transaction. Examples include support for the DICOM Modality Performed Procedure Step SOP class, or manual or automated entry on the Department System Scheduler/Order Filler.
- Professional Billing
- Charge posting of the Professional Billing is triggered when an examination or other healthcare services are completed/verified by the eye care physician. When the Department System Scheduler/Order Filler is aware that the service is completed it sends the professional charge information to the Charge Processor.

4.17.4.1.2 Message Semantics

The Department System Scheduler/Order Filler uses the DFT message to convey necessary charge posting information to the Charge Processor. The Charge Processor is expected to know about Patient Demographic information either from internal means or consuming HL7 ADT Patient Registration messages.

The Eye Care Charge Posted Transaction will transmit Detailed Financial Transactions (DFT) messages using the P03 event.

Required segments are defined below. Other segments are optional

DFT Segment	Detailed Financial Transaction Message	Chapter in HL7 2.5.1
MSH	Message Header	2
EVN	Event Type	3
PID	Patient Identification	3
[PV1]	Patient Visit	3 (see note)
{FT1}	Financial Transaction	6

Note: PV1 is required if use of PV1-19 Visit Number is required per the applicable regional or national appendices to the IHE Technical framework (See RAD TF-4)

4.17.4.1.2.1 MSH Segment

The MSH segment SHALL be constructed as defined in ITI TF-2b:3.30.5.1 MSH – Header Segment.

Field *MSH-9 Message Type* shall have at least two components. The first component shall have a value of "DFT"; the second component shall have a value of P03. The third component SHALL have a value of DFT_P03.

4.17.4.1.2.2 EVN Segment

See Section 4.15.4.1.2.2.

4.17.4.1.2.3 PID Segment

The PID segment is used by all applications as the primary means of communicating patient identification information. This segment contains permanent patient identifying and demographic information that, for the most part, is not likely to change frequently.

See Section 4.15.4.1.2.3 for field requirements.

At least one of the fields *PID-18-Patient Account Number* or *PV1-19-Visit Number* SHALL be valued.

4.17.4.1.2.4 PV1 Segment

The PV1 segment is used by applications to communicate information on an account or visit-specific basis.

See Section 4.15.4.1.2.4 for field requirements.

At least one of the fields *PID-18-Patient Account Number* or *PV1-19-Visit Number* SHALL be valued.

4.17.4.1.2.5 FT1 Segment

The FT1 segment is used to post charges, credits, payments, and adjustments to patient accounting records.

Table 4.17-1: IHE Profile - FT1 Segment

SEQ	LEN	DT	OPT	TBL#	ITEM#	ELEMENT NAME
1	4	SI	O		00355	Set ID - FT1
2	12	ST	O		00356	Transaction ID
3	10	ST	O		00357	Transaction Batch ID
4	53	DR	R		00358	Transaction Date
5	26	TS	R2		00359	Transaction Posting Date
6	8	IS	R	0017	00360	Transaction Type
7	250	CE	R	0132	00361	Transaction Code
8	40	ST	O		00362	Transaction Description
9	40	ST	O		00363	Transaction Description - Alt
10	6	NM	O		00364	Transaction Quantity
11	12	CP	O		00365	Transaction Amount - Extended
12	12	CP	O		00366	Transaction Amount - Unit
13	250	CE	O	0049	00367	Department Code
14	250	CE	O	0072	00368	Insurance Plan ID
15	12	CP	O		00369	Insurance Amount
16	80	PL	O		00133	Assigned Patient Location
17	1	IS	O	0024	00370	Fee Schedule
18	2	IS	O	0018	00148	Patient Type
19	250	CE	O	0051	00371	Diagnosis Code - FT1

SEQ	LEN	DT	OPT	TBL#	ITEM#	ELEMENT NAME
20	250	XCN	R	0084	00372	Performed By Code
21	250	XCN	R		00373	Order By Code
22	12	CP	O		00374	Unit Cost
23	427	EI	R		00217	Filler Order Number
24	250	XCN	O		00765	Entered By Code
25	250	CE	R	0088	00393	Procedure Code
26	250	CE	O	0340	01316	Procedure Code Modifier
27	250	CE	O	0339	01310	Advanced Beneficiary Notice Code
28	250	CWE	O	0476	01646	Medically Dependent Duplicate Procedure Reason
29	250	CNE	O	0549	01845	NDC Code
30	250	CX	O		01846	Payment Reference ID
31	4	SI	O		01847	Transaction Reference Key

Adapted from the HL7 standard, version 2.5.1

Note: The ability to send both ICD9 and ICD10 codes is becoming increasingly important in certain organizations. Sending dual codes can be accomplished by using the code and alternative code components from field FT1-19 Diagnosis Code. Following is an example providing both ICD9 (main code) and ICD10 (alternative code) for the same diagnosis:

"361.32^Retina Defect-Horseshoe Tear^I9^H33.312^Retina Defect-Horseshoe Tear^I10".

4.17.4.1.2.6 Expected Actions

It is expected that the Department System Scheduler/Order Filler will be sending the Charge Posted Transaction to the Charge Processor when one of the trigger events has occurred. This can be either the technical billing or the professional billing financial transaction. The Charge Processor determines the appropriate time to post the charges.