Integrating the Healthcare Enterprise

IHE Eye Care
Technical Framework Supplement

Key Measurements in
DICOM® Encapsulated PDF

Revision 1.1 – Trial Implementation

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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 Technical Framework V4.0. 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 April 29, 2019 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 www.ihe.net.

Information about the IHE Eye Care domain can be found at 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.

CONTENTS

Introduction to this Supplement

Eye care devices commonly generate PDF reports (i.e., OCT optic disc, OCT RNFL, Visual Field, etc.) that clinicians store in a patient's medical record, for example within an EMR and/or PACS. The DICOM®[1] Encapsulated Document IOD provides the specification for eye care implementers to transmit these displayable PDF reports.

When generating the PDF reports, eye care devices also have the ability to output a broad range of numeric measurements (i.e., key measurements). Certain of these measurements are critical for the long-term care of patients, clinical quality management and other use cases. The original release of DICOM Encapsulated Document IOD did not provide the ability to include discreet data therefore this important information was not available for import into receiving systems.

DICOM has enhanced the Encapsulated Document IOD with an optional feature to provide discreet structured data by leveraging the DICOM structured reporting encoding format. The IHE Key Measurements in Encapsulated PDF Option utilizes this new DICOM feature to encode structured data. It is required for a well-defined list of eye care reports.

The initial scope of this option targets eye care clinical workflow automations to reduce and/or eliminate manual entry burden for long-term care of patients and for existing clinical quality measures programs. IHE Eye Care expects this list to expand based upon additional use cases. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

This supplement is written as changes to the documents listed below. The reader should have already read and understood these documents:

1. IHE Eye Care Technical Framework Volume 1, Integration Profiles
2. IHE Eye Care Technical Framework Volume 2, Transactions

This supplement also references other documents. The reader should have already read and understood these documents:

1. Radiology Technical Framework Volume 1, Integration Profiles
2. Radiology Technical Framework Volume 2, Transactions

History of Document Changes

This section provides a brief summary of changes and additions to this document.

Date	Document Revision	Change Summary
2019-01-22	1.0	Initial public comment release

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

Date	Document Revision	Change Summary
2019-04-29	1.1	Initial trial implementation release

General Introduction and Shared Appendices

The IHE Technical Framework General Introduction and Shared Appendices are components shared by all of the IHE domain technical frameworks. Each technical framework volume contains links to these documents where appropriate.

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

Appendix A – Actor Summary Definitions

Add the following actors to the IHE Technical Frameworks General Introduction Appendix A:

No new actors.

Appendix B – Transaction Summary Definitions

Add the following transactions to the IHE Technical Frameworks General Introduction Appendix B:

No new transactions.

Appendix D – Glossary

*Add the following **new** glossary terms to the IHE Technical Frameworks General Introduction Appendix D.*

No new glossary terms.

Volume 1 – Profiles

Copyright Licenses

NA

Domain-specific additions

NA

Add the following updates to Section 9.2

9 Unified Eye Care Workflow (U-EYECARE)

…

Update Actor Options for Key Measurements Option

9.2 U-EYECARE Actor Options

Options that may be selected for each actor in this profile, if any, are listed in the Table 9.2-1. Dependencies between options, when applicable, are specified in notes. IHE does not place any restrictions on which options are supported for any of the Real World Models or Refractive Measurement Models; however, some options do not make sense. For example, in Real World Model III the DSS/Order Filler does not support DICOM; therefore, the optional transactions related to DICOM are not relevant.

Table 9.2-1: Unified Eye Care Workflow - Actors and Options

Actor	Option Name	Reference
Patient Registration Source	Patient Record Merging Option	EYECARE TF-1: 9.2.2
Appointment Scheduler	*No options defined*	--
Charge Processor	*No options defined*	--
Patient Registration Consumer	Patient Record Merging Option	EYECARE TF-1: 9.2.2
Appointment Consumer	*No options defined*	--
Department System Scheduler/Order Filler	Patient Record Merging Option	EYECARE TF-1: 9.2.2
	Imaging Procedure Instructions Option	EYECARE TF-1: 9.2.3
	Imaging Procedure Status Update (DICOM) Option	EYECARE TF-1: 9.2.4
	Imaging Procedure Status Update (HL7®[2]) Option	EYECARE TF-1: 9.2.5
	Charge Posting Option	EYECARE TF-1: 9.2.7

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

Actor	Option Name	Reference
Refractive Measurement Consumer	Device Patient List Option	EYECARE TF-1: 9.2.9
Image Manager/ Image Archive	Patient Record Merging Option	EYECARE TF-1: 9.2.2
	Eye Care Image Option	EYECARE TF-1: 9.2.1.1
	Encapsulated PDF Option for Evidence Documents	EYECARE TF-1: 9.2.1.2
	Key Measurements in Encapsulated PDF Option	**EYECARE TF-1: 9.2.1.7**
	Eye Care Measurements Option	EYECARE TF-1: 9.2.1.3
	Imaging Procedure Status Update (DICOM) Option	EYECARE TF-1: 9.2.3
	Imaging Procedure Status Update (HL7) Option	EYECARE TF-1: 9.2.5
	Storage Commitment Option	EYECARE TF-1: 9.2.6
	PACS Key Images Sent Option	EYECARE TF-1: 9.2.8
	Stereo Relationship Option	EYECARE TF-1: 39.2.1.5
	Imaging Procedure Instructions Option	EYECARE TF-1: 9.2.3
Image Display	Eye Care Image Option	EYECARE TF-1: 9.2.1.1
	Encapsulated PDF Option for Evidence Documents	EYECARE TF-1: 9.2.1.2
	Key Measurements in Encapsulated PDF Option	**EYECARE TF-1: 9.2.1.7**
	Relative Image Position Coding Option	EYECARE TF-1: 3.2.2 EYECARE TF-2: 4.3.6
	Stereo Relationship Option	EYECARE TF-1: 9.2.1.5
Image Storage/Display *(an optional actor in Model I and III)*	Eye Care Image Option	EYECARE TF-1: 9.2.1.1
	Encapsulated PDF Option for Evidence Documents	EYECARE TF-1: 9.2.1.2
	Key Measurements in Encapsulated PDF Option	**EYECARE TF-1: 9.2.1.7**
	PACS Key Images Sent Option	EYECARE TF-1: 9.2.8
	Eye Care Measurements Option	EYECARE TF-1: 9.2.1.3
Evidence Creator	Storage Commitment Option	EYECARE TF-1: 9.2.6
Acquisition Modality	Patient Based Worklist Query Option (see Note 1)	EYECARE TF-2: 4.1
	Broad Worklist Query Option (see Note 1)	EYECARE TF-2: 4.1
	Eye Care Image Option (see Note 2)	EYECARE TF-1: 9.2.1.1
	Encapsulated PDF Option for Evidence Documents (see Note 2)	EYECARE TF-1: 9.2.1.2

Actor	Option Name	Reference
	Key Measurements in Encapsulated PDF Option	**EYECARE TF-1: 9.2.1.7**
	Eye Care Measurement Option	EYECARE TF-1: 9.2.1.3
	Imaging Procedure Status Update (DICOM) Option	EYECARE TF-1: 9.2.4
	Storage Commitment Option	EYECARE TF-1: 9.2.6
	Relative Image Position Coding Option	EYECARE TF-1: 3.2.2
	Stereo Relationship Option	EYECARE TF-1: 9.2.1.5
	Imaging Procedure Instructions Option	EYECARE TF-1: 9.2.3
Acquisition Modality Importer	Patient Based Worklist Query Option (see Note 1)	EYECARE TF-2: 4.1
	Broad Worklist Query Option (see Note 1)	EYECARE TF-2: 4.1
	Eye Care Measurement Option	EYECARE TF-1: 9.2.1.3
	Eye Care Image Option (see Note 2)	EYECARE TF-1: 9.2.1.1
	Encapsulated PDF Option for Evidence Documents (see Note 2)	EYECARE TF-1: 9.2.1.2
	Key Measurements in Encapsulated PDF Option	**EYECARE TF-1: 9.2.1.7**
	Imaging Procedure Status Update (DICOM) Option	EYECARE TF-1: 9.2.4
	Storage Commitment Option	EYECARE TF-1: 9.2.6
	Relative Image Position Coding Option	EYECARE TF-1: 3.2.2
	Stereo Relationship Option	EYECARE TF-1: 9.2.1.5
	Imaging Procedure Instructions Option	EYECARE TF-1: 9.2.3 EYECARE TF-2: 4.1.6
Refractive Measurement Source	Device Patient List Option	EYECARE TF-1: 9.2.9
Refractive Measurement Source Importer	Device Patient List Option	EYECARE TF-1: 9.2.9
Performed Procedure Step Manager	*No options defined*	--

Note 1: The Radiology TF requires that the Acquisition Modality support at least one of the Worklist Query Options (i.e., Patient-Based or Broad). Eye Care requires Acquisition Modality and Acquisition Modality Importer Actors to support BOTH the Patient-Based and Broad Worklist Query Options.

Note 2: The Acquisition Modality and Acquisition Modality Importer Actors SHALL support either the Eye Care Image Option or the Encapsulated PDF Option for Evidence Documents.

Add new Acquisition Modalities Storage Option for Key Measurements Option

9.2.1 Acquisition Modalities Storage Options

The Acquisition Modality, Acquisition Modality Importer and Image Storage/Display Actors will likely support a variety of DICOM SOP Classes. ……..

9.2.1.1 ……..

9.2.1.7 Key Measurements in Encapsulated PDF Option

Eye care devices commonly generate PDF reports (i.e., OCT optic disc, OCT RNFL, Visual Field, etc.) that clinicians store in a patient's medical record, such as within an EMR and/or PACS. The DICOM Encapsulated Document IOD provides the specification for eye care implementers to transmit these displayable PDF reports.

When generating the PDF reports, eye care devices also have the ability to output a broad range of numeric measurements (i.e., key measurements). Certain of these measurements are critical for the long-term care of patients, clinical quality management and other use cases. The original release of DICOM Encapsulated Document IOD did not provide the ability to include discreet data therefore this important information was not available for import into receiving systems.

DICOM has enhanced the Encapsulated Document IOD with an optional feature to provide discreet structured data by leveraging the DICOM structured reporting encoding format. The IHE Key Measurements in Encapsulated PDF Option utilizes this new DICOM feature to encode structured data. It is required for a well-defined list of eye care reports.

The initial scope of this option targets eye care clinical workflow automations to reduce and/or eliminate manual entry burden for long-term care of patients and for existing clinical quality measures programs. IHE Eye Care expects this list to expand based upon additional use cases.

Eye care reports currently defined are:

1. Visual Field Key Measurement Report
2. OCT Optic Disc Key Measurement Report
3. OCT RNFL Key Measurement Report
4. OCT Macula Thickness Key Measurement Report
5. OCT GCL Key Measurement Report
6. Corneal Topography Key Measurement Report
7. Endothelial Cell Count Key Measurement Report

Note: This option is titled "Key Measurements" because this is the main use case. In actuality, the design of the DICOM Option allows the capture of all types of measurements and structured data (i.e., beyond the scope of the initial targeted "key measurements"). Defining options for clinical research and other use cases is a long-term goal.

Acquisition Modality or Acquisition Modality Importer Actors that support this option SHALL be able to generate DICOM Encapsulated PDF SOP Instances as defined in EYECARE TF-2: 4.2.12 and all sub sections.

Image Storage/Display Actors that support this option SHALL comply with the requirements in EYECARE TF-2: 4.2.12.5.

An Image Display or Image Storage/Display Actor that supports this option SHALL be able to receive DICOM Encapsulated PDF SOP Instances and incorporate eye care key measurements as
225 defined in EYECARE TF-2: 4.2.12.5.

An Image Manager/Image Archive that stores the DICOM Encapsulated PDF SOP Instances SHALL support DICOM Level 2 (full fidelity) storage.

Appendices

None

Volume 2 – Transactions

Add new Section 4.2.12

4.2.12 Key Measurements in Encapsulated PDF Option

Eye care devices commonly generate PDF reports (i.e., OCT optic disc, OCT RNFL, Visual Field, etc.) that clinicians store in a patient's medical record, such as within an EMR and/or PACS. The DICOM Encapsulated Document IOD provides the specification for eye care implementers to transmit these displayable PDF reports.

When generating the PDF reports, eye care devices also have the ability to output a broad range of numeric measurements (i.e., key measurements). Certain of these measurements are critical for the long-term care of patients, clinical quality management and other use cases. The original release of DICOM Encapsulated Document IOD did not provide the ability to include discreet data therefore this important information was not available for import into receiving systems.

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Note: This option is titled "key measurements" because this is the main use case. In actuality, the design of the DICOM Option allows the capture of all types of measurements and structured data (i.e., beyond the scope of the initial targeted "key measurements"). Defining options for clinical research and other use cases is a long-term goal.

4.2.12.1 Generic Requirements for Generating Eye Care Measurements in PDF

DICOM SCU systems that generate eye care measurements using the Key Measurements in Encapsulated PDF Option SHALL comply with the following list:

1. Comparing and/or tracking measurement (such as longitudinal tracking) between varying acquisition devices may not be clinically reliable and could cause patient safety issues. IHE therefore mandates the requirement for DICOM SCUs to include equipment manufacturer data for all key measurement reports.

   Attributes Manufacturer (0008,0070), Manufacturer's Model Name (0008,1090), Device Serial Number (0018,1000) and Software Versions (0018,1020) SHALL be Type 1. This supports the features of the Enhanced Equipment Module.

   Note: It is highly recommended that all DICOM SCP systems consider the equipment manufacturer information and use this when comparing/tracking measurements (i.e., do not compare measurements from different vendor's equipment unless clinically proven to be reliable). Determining reliability is beyond the scope of IHE and the responsibility of the implementation. Acquisition devices and their underlying algorithms may provide measurements that appear common based upon their categorical representation, but might not be physically or physiologically fungible.

2. The first occurrence of the Concept Name Code Sequence (0040,A043) resides in the DICOM Encapsulated Document Module and is encoded before the Content Sequence (0040,A730) and provides a coded title of the report. The first occurrence of Concept Name Code Sequence (0040,A043) SHALL be Type 1.

   Note: DICOM defines the use of Baseline CID 7020 "Document Titles" to provide this value. It is a long list of any type of medical report. IHE Eye Care has specialized this value for the Key Measurements Option.

   Codes are specified in Table 4.2.12.1-1. Table 4.2.12.1-1 is non-extensible.

Table 4.2.12.1-1: Concept Name Code Sequence Codes

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
99IHEEYECARE	400000	Eye Care Measurement Report

The following table defines the definitions of codes defined by IHE Eye Care. For definitions of DICOM codes (DCM), see the DICOM Standard.

Table 4.2.12.1-2: Concept Name Code Sequence Definitions

Code Value (0008,0100)	Code Meaning (0008,0104)	Definition
400000	Eye Care Measurement Report	Eye care measurement report

3. The Document Class Code Sequence (0040,E008) resides in the DICOM Encapsulated Document Module and is encoded before the Content Sequence (0040,A730) and SHALL be Type 1. Codes are specified in Table 4.2.12.1-3. Table 4.2.12.1-3 is extensible.

   Note: An "extensible" table provides the ability for specific implementations to provide codes beyond those specified in IHE.

Table 4.2.12.1-3: Eye Care Key Measurement Document Class Code Sequence Codes

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
99IHEEYECARE	400100	Visual Field Key Measurement Report
99IHEEYECARE	400101	OCT Optic Disc Key Measurement Report
99IHEEYECARE	400102	OCT RNFL Key Measurement Report
99IHEEYECARE	400103	OCT Macula Thickness Key Measurement Report
99IHEEYECARE	400104	OCT GCL Key Measurement Report
99IHEEYECARE	400105	Corneal Topography Key Measurement Report
99IHEEYECARE	400106	Endothelial Cell Count Key Measurement Report
Additional IHE Eye Care reports to be considered in the future		

The following table defines the definitions of codes defined by IHE Eye Care. For definitions of DICOM codes (DCM), see the DICOM Standard.

Table 4.2.12.1-4: Document Class Code Sequence Definitions

Code Value (0008,0100)	Code Meaning (0008,0104)	Definition
400100	Visual Field Key Measurement Report	Visual field key measurement report
400101	OCT Optic Disc Key Measurement Report	Optical coherence tomography (OCT) optic disc key measurement report
400102	OCT RNFL Key Measurement Report	Optical coherence tomography (OCT) retinal nerve fiber layer key measurement report
400103	OCT Macula Thickness Key Measurement Report	Optical coherence tomography (OCT) macula thickness key measurement report
400104	OCT GCL Key Measurement Report	Optical coherence tomography (OCT) ganglion cell layer (GCL) key measurement report
400105	Corneal Topography Key Measurement Report	Corneal topography key measurement report
400106	Endothelial Cell Count Key Measurement Report	Endothelial Cell Count key measurement report

4. The DICOM attribute Content Sequence (0040,A730) is the mechanism to encode structured data (i.e., capture discreet measurements) within an encapsulated DICOM document (i.e., PDF). The attribute Content Sequence (0040,A730) SHALL be Type 1.

   Note: The Content Sequence is the main mechanism to encode structured data with a DICOM Structured Report (SR) SOP Instance. DICOM Encapsulated Document is not a DICOM SR, so DICOM SR requirements do not apply. For example, the rendering/display of the report is performed by using the encapsulated document (i.e., PDF)

not the content of the Content Sequence. The data encoded in the Content Sequence can be easily incorporated into a DICOM SCP's database.

5. Implementations have the ability to encode multiple PDF reports in one SOP Instance. This can be accomplished by encoding two or more titles in the attribute Document Class Code Sequence (0040,E008) and correspondingly encoding two or more measurement groups (TID 1501 Measurement Group).

   The number of items in the Document Class Code Sequence (0040,E008) SHALL be the same as the number of TID 1501 Measurement Group instances. The first item within the Document Class Code Sequence (0040,E008) SHALL correspond to the first instance of TID 1501 Measurement Group. The second item SHALL correspond to the second instance and so on.

   For example, if a device generates a Visual Field report and an OCT RNFL report the Document Class Code Sequence would contain two items. The first item being (400100, 99IHEEYECARE, "Visual Field Key Measurement Report") and the second being (400102, 99IHEEYECARE, "OCT RNFL Key Measurement Report"). The first instance of 1501 TID Measurement Group corresponds to the visual field report and the second instance to the OCT RNFL report.

   It also is possible to generated two reports with the same title, for example creating two OCT RNFL reports using different diameters. The Document Class Code Sequence would contain two items with the same title code (400102, 99IHEEYECARE, "OCT RNFL Key Measurement Report). It would also encode two TID 1501 Measurement Group instances.

   The two reports can be distinguished using rows 2 and 3 in TID 1501 Measurement Group. These rows are mandatory for all key measurement reports.

   Row 2 "Tracking Identifier" is defined by DICOM as: "Text label used for tracking a finding or feature, potentially across multiple reporting objects, over time. This label shall be unique within the domain in which it is used. Corresponds to Tracking ID (0062,0020)". This is a unique value referred to (and used) by humans, not just computers.

   Row 3 "Tracking Unique Identifier" is defined by DICOM as: "Unique identifier used for tracking a finding or feature, potentially across multiple reporting objects, over time. Corresponds to Tracking UID (0062,0021)".

   Example:
   The first measurement group identifies the first OCT RNFL report.

TID 1501 Row 2 (112039, DCM, "Tracking Identifier") – “VendorDevice01-38” (a valid unique text value within the domain of the eye clinic(s) and device).

TID 1501 Row 3 (112040, DCM, "Tracking Unique Identifier") – 1.2.3.4.5.6.7.300 (i.e., contains a valid vendor UID)

The second measurement group identifies the second OCT RNFL report.

TID 1501 Row 2 (112039, DCM, "Tracking Identifier") – “VendorDevice013259-39”

TID 1501 Row 3 (112040, DCM, "Tracking Unique Identifier") – 3.7.6.8.9.0.11

The reports can now be tracked as two different measurement groups.

4.2.12.2 Eye Care Key Measurement Reports in PDF

This section specifies the list of IHE Eye Care key measurement reports defined for this option.

4.2.12.2.1 Visual Field Key Measurement Report Content Sequence

Table 4.2.12.2-1 and the following sections define the requirements for visual field key measurement reports. Table 4.2.12.2-1 is extensible.

Table 4.2.12.2.1-1: Visual Field Key Measurements Content Sequence

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Mandatory Value Set Constraint
1	Coded PDF document title plus modifiers are conveyed in Attributes Concept Name Code Sequence (0040,A043) and Document Class Code Sequence (0040,E008) residing in the Encapsulated Document Module							Concept Name Code Sequence (0040,A043) = (400000, 99IHEEYECARE, "Eye Care Measurement Report ") Document Class Code Sequence (0040,E008) = (400100, 99IHEEYECARE, “Visual Field Key Measurement Report”)
Content Sequence (0040,A730) attribute within Encapsulated Document Module								
2	>	CONTAINS	INCLUDE	DTID 1501 “Measurement Group”	1-n	M		$Measurement = Table 4.2.12.2.1.1-1 Visual Field Concept Name Code Sequence Codes $Units = Table 4.2.12.1.1-1 Visual Field Concept Name Code Sequence Codes $Method = DICOM CID 4250 Visual Field Static Perimetry Test Patterns $TargetSite = (81745001, SCT, “Eye”) $Laterality = DICOM CID 244 “Laterality”

3	>	CONTAINS	CODE	EV (111855, DCM, "Glaucoma Hemifield Test Analysis ")	1	MC	SHALL BE INCLUDED IF KNOWN	DICOM CID 4254
4	>	CONTAINS	TEXT	EV (400204, 99IHEEYECARE, “Fixation losses ratio”)	1	MC	SHALL BE INCLUDED IF KNOWN	Text string in the form of “number of fixation loss responses/number of trials”
5	>	CONTAINS	TEXT	EV (400205, 99IHEEYECARE, “False positive ratio”)	1	MC	SHALL BE INCLUDED IF KNOWN	Text string in the form of “number of false positive responses/number of trials”
6	>	CONTAINS	TEXT	EV (400206, 99IHEEYECARE, “False negative ratio”)	1	MC	SHALL BE INCLUDED IF KNOWN	Text string in the form of “number of false negative responses/number of trials”
7	>	HAS OBS CONTEXT	CODE	EV (111001, DCM, "Algorithm Name")	1	MC	SHALL BE INCLUDED IF KNOWN	
8	>	HAS OBS CONTEXT	TEXT	EV (111003, DCM, "Algorithm Version")	1	MC	SHALL BE INCLUDED IF KNOWN	
9	>	HAS OBS CONTEXT	TEXT	EV (111002, DCM, "Algorithm Parameters")	1-n	U		

4.2.12.2.1.1 Visual Field Document Content Macro Attributes

TID 1501 Measurement Group specifies TID 300 Measurement to capture the individual key measurements. The attributes within the Document Content Marco provides the name/value pair for the key measurements. The Concept Name Code Sequence (0040,A043) used in this macro defines the name of the measurement.

Codes defined in Table 4.2.12.2.1.1-1 SHALL BE INCLUDED IF KNOWN.

Table 4.2.12.2.1.1-1 is extensible.

Table 4.2.12.2.1.1-1: Visual Field Concept Name Code Sequence Codes

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	Units of Measure
99IHEEYECARE	400200	Mean Deviation	$Units = EV (dB, UCUM, "dB")
99IHEEYECARE	400201	Pattern Standard Deviation	$Units = EV (dB, UCUM, "dB")
DCM	111852	Visual Field Index	$Units = EV (%, UCUM, "%")
99IHEEYECARE	400202	False positive percent	$Units = EV (%, UCUM, "%")

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	Units of Measure
99IHEEYECARE	400203	False negative percent	$Units = EV (%, UCUM, "%")
99IHEEYECARE	400204	Fixation losses ratio	Text string in the form of "number of fixation loss responses/number of trials", such as "3/15"
99IHEEYECARE	400205	False positive ratio	Text string in the form of "number of false positive responses/number of trials", such as "3/7"
99IHEEYECARE	400206	False negative ratio	Text string in the form of "number of false negative responses/number of trials", such as "7/7"

Note: TID 300 Measurement defines an optional feature to specify properties of a measurement via TID 310 Measurement Properties. TID 310 supports properties such as normality, statistical properties, normal ranges, level of significance and more. Normality flags are highly useful and commonly provided by implementations. At a minimum, IHE highly recommends implementers provide normality flags to the extent that is technically feasible. Other properties are also encouraged to improve clinical usefulness. Implementations may include these properties for any eye care measurement. See Section 4.2.12.9 for examples.

The following table defines the definitions of codes defined by IHE Eye Care. For definitions of DICOM codes (DCM), see the DICOM Standard.

Table 4.2.12.2.1.1-2: Visual Field Measurement Code Definitions

Code Value (0008,0100)	Code Meaning (0008,0104)	Definition
400200	Mean Deviation	Weighted average deviation from the age corrected normal field, as decibel.
400201	Pattern Standard Deviation	Weighted square root of loss variance, as decibel.
400202	False positive percent	Estimated percentage of all patient responses that occurred at a time when no visual stimulus was present (false positive responses), as percent. Note: Commonly used when performing Swedish Interactive Threshold Algorithm (SITA) based measurements.
400203	False negative percent	Estimated percentage of all stimuli that were not seen by the patient but were previously seen at a lower luminance earlier in the visual field test (false negative responses), as percent. Note: Commonly used when performing Swedish Interactive Threshold Algorithm (SITA) based measurements.
400204	Fixation losses ratio	The ratio between the number of times a patient loses visual fixation while maintaining a visual gaze on a single location and the number of trials presented. Conveyed as a text string in the form of fixation loss responses over number of trials such as "3/15".

Code Value (0008,0100)	Code Meaning (0008,0104)	Definition
400205	False positive ratio	The ratio between the number of times patient responses that occurred at a time when no visual stimulus was present (false positive responses) and the number of trials presented. Conveyed as a text string in the form of false positive responses over the number of trials such as “3/7”. Note: Commonly used when NOT performing Swedish Interactive Threshold Algorithm (SITA) based measurements.
400206	False negative ratio	The ratio between the number of times stimuli that were not seen by the patient but were previously seen at a lower luminance earlier in the visual field test (false negative responses) and the number of trials presented. Conveyed as a text string in the form of false negative responses over the number of trials such as “3/7”. Note: Commonly used when NOT performing Swedish Interactive Threshold Algorithm (SITA) based measurements.

4.2.12.2.2 OCT Optic Disc Key Measurement Report Content Sequence

Table 4.2.12.2.2-1 and the following sections define the requirements for OCT optic disc key measurement Report. Table 4.2.12.2.2-1 is extensible.

390 **Table 4.2.12.2.2-1: OCT Optic Disc Key Measurements Content Sequence**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Mandatory Value Set Constraint
1	Coded PDF document title plus modifiers are conveyed in Attributes Concept Name Code Sequence (0040,A043) and Document Class Code Sequence (0040,E008) residing in the Encapsulated Document Module							Concept Name Code Sequence (0040,A043) = (400000, 99IHEEYECARE, "Eye Care Measurement Report ") Document Class Code Sequence (0040,E008) = (400101, 99IHEEYECARE, “OCT Optic Disc Key Measurement Report”)
Content Sequence (0040,A730) attribute within Encapsulated Document Module								
2	>	CONTAINS	INCLUDE	DTID 1501 “Measurement Group”	1-n	M		$Measurement = Table 4.2.12.2.2.1-1 OCT Optic Disc Concept Name Code Sequence Codes $Units = Table 4.2.12.2.2.1-1 OCT Optic Disc Concept Name Code Sequence Codes $TargetSite = (81745001, SCT, “Eye”) $Laterality = DICOM CID 244 “Laterality”
3	>	CONTAINS	NUM	EV (111029, DCM, “Image Quality Rating”	1-n	MC	SHALL BE INCLUDED IF KNOWN	$Value = 0 – 100 $Units = EV([0:100}, UCUM, “range:0:100)

4	>	HAS OBS CONTEXT	CODE	EV (111001, DCM, "Algorithm Name")	1	MC	SHALL BE INCLUDED IF KNOWN	
5	>	HAS OBS CONTEXT	TEXT	EV (111003, DCM, "Algorithm Version")	1	MC	SHALL BE INCLUDED IF KNOWN	
6	>	HAS OBS CONTEXT	TEXT	EV (111002, DCM, "Algorithm Parameters")	1-n	U		

4.2.12.2.2.1 OCT Optic Disc Document Content Macro Attributes

TID 1501 Measurement Group specifies TID 300 Measurement to capture the individual key measurements. The attributes within the Document Content Marco provides the name/value pair for the key measurements. The Concept Name Code Sequence (0040,A043) used in this macro defines the name of the measurement.

Codes defined in Table 4.2.12.2.2.1-1 SHALL BE INCLUDED IF KNOWN.

Table 4.2.12.2.2.1-1 is extensible.

Table 4.2.12.2.2.1-1: OCT Optic Disc Concept Name Code Sequence Codes

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	Units of Measure
99IHEEYECARE	400300	Cup to disc area ratio	$UNITS = EV (1, UCUM, "no units")
99IHEEYECARE	400301	Cup to disc ratio vertical	$UNITS = EV (1, UCUM, "no units")
99IHEEYECARE	400302	Cup to disc ratio horizontal	$UNITS = EV (1, UCUM, "no units")
99IHEEYECARE	400303	Optic disc rim area	$Units = EV ($mm^2$, UCUM, "$mm^2$")
99IHEEYECARE	400304	Optic disc cup area	$Units = EV ($mm^2$, UCUM, "$mm^2$")
99IHEEYECARE	400305	Optic disc area	$Units = EV ($mm^2$, UCUM, "$mm^2$")
99IHEEYECARE	400306	Bruch's Membrane Opening area	$Units = EV ($mm^2$, UCUM, "$mm^2$")
99IHEEYECARE	400307	Bruch's Membrane Opening global sector average total thickness	$Units = EV (um, UCUM, "um")

Note: TID 300 Measurement defines an optional feature to specify properties of a measurement via TID 310 Measurement Properties. TID 310 supports properties such as normality, statistical properties, normal ranges, level of significance

and more. Normality flags are highly useful and commonly provided by implementations. At a minimum, IHE highly recommends implementers provide normality flags to the extent that is technically feasible. Other properties are also encouraged to improve clinical usefulness. Implementations may include these properties for any eye care measurement. See Section 4.2.12.9 for examples.

The following table defines the definitions of codes defined by IHE Eye Care. For definitions of DICOM codes (DCM), see the DICOM Standard.

Table 4.2.12.2.2.1-2: OCT Optic Disc Measurement Code Definitions

Code Value (0008,0100)	Code Meaning (0008,0104)	Definition
400300	Cup to disc area ratio	Ratio of the cup area to the disc area
400301	Cup to disc ratio vertical	Ratio of the vertical diameter of the physiological cup to that of the vertical diameter of the optic disc
400302	Cup to disc ratio horizontal	Ratio of the horizontal diameter of the physiological cup to that of the vertical diameter of the optic disc
400303	Optic disc rim area	Area of the "rim" portion of the optic disc, as mm^2
400304	Optic disc cup area	Area of the "cup" portion of the optic disc, as mm^2
400305	Optic disc area	Area of the optic disc, as mm^2
400306	Bruch's Membrane Opening area	Area of the Bruch's Membrane Opening (BMO) projected into a single linear plane, as mm^2 Note: Some BMO points may occur above, others below the plane.
400307	Bruch's Membrane Opening global sector average total thickness	Bruch's Membrane Opening (BMO) mean total thickness averaged over the global sector, as microns. The global sector combines the individual known sectors that are included in the BMO classifications. Note: Sectors are vendor specific such as include Temporal (T), Temporal-Superior (TS), Temporal-Inferior (TI), Nasal (N), Nasal-Inferior (NI), Nasal-Superior (NS).

4.2.12.2.3 OCT RNFL Key Measurement Report Content Sequence

Table 4.2.12.2.3-1 and the following sections define the requirements for OCT RNFL (retinal nerve fiber layer) key measurement Report. Table 4.2.12.2.3-1 is extensible.

Table 4.2.12.2.3-1: OCT RNFL Key Measurements Content Sequence

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Mandatory Value Set Constraint
1	Coded PDF document title plus modifiers are conveyed in Attributes Concept Name Code Sequence (0040,A043) and Document Class Code Sequence (0040,E008) residing in the Encapsulated Document Module							Concept Name Code Sequence (0040,A043) = (400000, 99IHEEYECARE, "Eye Care Measurement Report ")

								Document Class Code Sequence (0040,E008) = (400102, 99IHEEYECARE, “OCT RNFL Key Measurement Report”)
Content Sequence (0040,A730) attribute within Encapsulated Document Module								
2	>	CONTAINS	INCLUDE	DTID 1501 “Measurement Group”	1-n	M		$Measurement = Table 4.2.12.2.3.1-1 OCT RNFL Concept Name Code Sequence Codes $Units = Table 4.2.12.2.3.1-1 OCT RNFL Concept Name Code Sequence Codes $TargetSite = (81745001, SCT, “Eye”) $Laterality = DICOM CID 244 “Laterality”
3	>	CONTAINS	NUM	EV (111029, DCM, “Image Quality Rating”	1-n	MC	SHALL BE INCLUDED IF KNOWN	$Value = 0 – 100 $Units = EV([0:100}, UCUM, “range:0:100)
4	>	HAS OBS CONTEXT	CODE	EV (111001, DCM, "Algorithm Name")	1	MC	SHALL BE INCLUDED IF KNOWN	
5	>	HAS OBS CONTEXT	TEXT	EV (111003, DCM, "Algorithm Version")	1	MC	SHALL BE INCLUDED IF KNOWN	
6	>	HAS OBS CONTEXT	TEXT	EV (111002, DCM, "Algorithm Parameters")	1-n	U		

4.2.12.2.3.1 OCT RNFL Document Content Macro Attributes

TID 1501 Measurement Group specifies TID 300 Measurement to capture the individual key measurements. The attributes within the Document Content Marco provides the name/value pair for the key measurements. The Concept Name Code Sequence (0040,A043) used in this macro defines the name of the measurement.

Codes defined in Table 4.2.12.2.3.1-1 SHALL BE INCLUDED IF KNOWN.

Table 4.2.12.2.3.1-1 is extensible.

Table 4.2.12.2.3.1-1: OCT RNFL Concept Name Code Sequence Codes

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	Units of Measure
99IHEEYECARE	400400	Retinal nerve fiber layer average thickness	$Units = EV (um, UCUM, "um")
99IHEEYECARE	400401	Retinal nerve fiber layer inferior thickness	$Units = EV (um, UCUM, "um")

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	Units of Measure
99IHEEYECARE	400402	Retinal nerve fiber layer superior thickness	$Units = EV (um, UCUM, "um")
99IHEEYECARE	400403	Retinal nerve fiber layer temporal thickness	$Units = EV (um, UCUM, "um")
99IHEEYECARE	400404	Retinal nerve fiber layer nasal thickness	$Units = EV (um, UCUM, "um")
99IHEEYECARE	400405	Retinal nerve fiber layer symmetry	$Units = EV (%, UCUM, "%")
DCM	111926	Ganglion cell complex thickness	$Units = EV (um, UCUM, "um")

Note: TID 300 Measurement defines an optional feature to specify properties of a measurement via TID 310 Measurement Properties. TID 310 supports properties such as normality, statistical properties, normal ranges, level of significance and more. Normality flags are highly useful and commonly provided by implementations. At a minimum, IHE highly recommends implementers provide normality flags to the extent that is technically feasible. Other properties are also encouraged to improve clinical usefulness. Implementations may include these properties for any eye care measurement. See Section 4.2.12.9 for examples.

The following table defines the definitions of codes defined by IHE Eye Care. For definitions of DICOM codes (DCM), see the DICOM Standard.

Table 4.2.12.2.3.1-2: OCT RNFL Measurement Code Definitions

Code Value (0008,0100)	Code Meaning (0008,0104)	Definition
400400	Retinal nerve fiber layer average thickness	Average measurement approximating the distance related to the structure between the internal limiting membrane (ILM) and the outer border of the retinal nerve fiber layer (RNFL) in all regions, as microns.
400401	Retinal nerve fiber layer inferior thickness	Average measurement approximating the distance related to the structure between the internal limiting membrane (ILM) and the outer border of the retinal nerve fiber layer (RNFL) in the inferior region, as microns.
400402	Retinal nerve fiber layer superior thickness	Average measurement approximating the distance related to the structure between the internal limiting membrane (ILM) and the outer border of the retinal nerve fiber layer (RNFL) in the superior region, as microns.
400403	Retinal nerve fiber layer temporal thickness	Average measurement approximating the distance related to the structure between the internal limiting membrane (ILM) and the outer border of the retinal nerve fiber layer (RNFL) in the temporal region, as microns.
400404	Retinal nerve fiber layer nasal thickness	Average measurement approximating the distance related to the structure between the internal limiting membrane (ILM) and the outer border of the retinal nerve fiber layer (RNFL) in the nasal region, as microns.
400405	Retinal nerve fiber layer symmetry	Percent symmetry of the retinal nerve fiber layer (RNFL) thickness between the two eyes, as percent.

4.2.12.2.4 OCT Macula Thickness Measurement Report Content Sequence

Table 4.2.12.2.4-1 and the following sections define the requirements for OCT macula thickness key measurement Report. Table 4.2.12.2.4-1 is extensible.

Table 4.2.12.2.4-1: OCT Macula Thickness Key Measurements Content Sequence

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Mandatory Value Set Constraint
1	Coded PDF document title plus modifiers are conveyed in Attributes Concept Name Code Sequence (0040,A043) and Document Class Code Sequence (0040,E008) residing in the Encapsulated Document Module							Concept Name Code Sequence (0040,A043) = (400000, 99IHEEYECARE, "Eye Care Measurement Report ") Document Class Code Sequence (0040,E008) = (400103, 99IHEEYECARE, "OCT Macula Thickness Key Measurement Report")
	Content Sequence (0040,A730) attribute within Encapsulated Document Module							
2	>	CONTAINS	INCLUDE	DTID 1501 "Measurement Group"	1-n	M		$Measurement = Table 4.2.12.2.4.1-1 OCT Macula Thickness Concept Name Code Sequence Codes $Units = Table 4.2.12.2.4.1-1 OCT Macula Thickness Concept Name Code Sequence Codes $TargetSite = (81745001, SCT, "Eye") $Laterality = DICOM CID 244 "Laterality"
3	>	CONTAINS	NUM	EV (111029, DCM, "Image Quality Rating)	1-n	MC	SHALL BE INCLUDED IF KNOWN	$Value = 0 – 100 $Units = EV([0:100}, UCUM, "range:0:100)
4	>	HAS OBS CONTEXT	CODE	EV (111001, DCM, "Algorithm Name")	1	MC	SHALL BE INCLUDED IF KNOWN	
5	>	HAS OBS CONTEXT	TEXT	EV (111003, DCM, "Algorithm Version")	1	MC	SHALL BE INCLUDED IF KNOWN	
6	>	HAS OBS CONTEXT	TEXT	EV (111002, DCM, "Algorithm Parameters")	1-n	U		

4.2.12.2.4.1 OCT Macula Thickness Document Content Macro Attributes

TID 1501 Measurement Group specifies TID 300 Measurement to capture the individual key measurements. The attributes within the Document Content Marco provides the name/value pair

for the key measurements. The Concept Name Code Sequence (0040,A043) used in this macro defines the name of the measurement.

Codes defined in Table 4.2.12.2.4.1-1 SHALL BE INCLUDED IF KNOWN.

Table 4.2.12.2.4.1-1 is extensible.

Table 4.2.12.2.4.1-1: OCT Macula Thickness Concept Name Code Sequence Codes

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	Units of Measure
LN	57109-1	Macular grid. center subfield thickness	$Units = EV (um, UCUM, "um")
LN	57118-2	Macular grid. total volume	$Units = EV ($mm^3$, UCUM, "$mm^3$")

Note: TID 300 Measurement defines an optional feature to specify properties of a measurement via TID 310 Measurement Properties. TID 310 supports properties such as normality, statistical properties, normal ranges, level of significance and more. Normality flags are highly useful and commonly provided by implementations. At a minimum, IHE highly recommends implementers provide normality flags to the extent that is technically feasible. Other properties are also encouraged to improve clinical usefulness. Implementations may include these properties for any eye care measurement. See Section 4.2.12.9 for examples.

The following table defines the definitions of codes defined by IHE Eye Care. For definitions of DICOM codes (DCM), see the DICOM Standard.

Table 4.2.12.2.4.1-2: OCT Macula Thickness Measurement Code Definitions

Code Value (0008,0100)	Code Meaning (0008,0104)	Definition
57109-1	Macular grid. center subfield thickness	As defined by LOINC, this is based on the ETDRS and defines a 1-mm diameter (.5-mm radius). See LOINC for the complete definition.

4.2.12.2.5 OCT GCL Measurement Report Content Sequence

Table 4.2.12.2.5-1 and the following sections define the requirements for OCT GCL (ganglion cell layer) key measurement Report. Table 4.2.12.2.5-1 is extensible.

Table 4.2.12.2.5-1: OCT GCL Key Measurements Content Sequence

	NL	GCL	VT	Concept Name	VM	Req Type	Condition	Mandatory Value Set Constraint
1	Coded PDF document title plus modifiers are conveyed in Attributes Concept Name Code Sequence (0040,A043) and Document Class Code Sequence (0040,E008) residing in the Encapsulated Document Module							Concept Name Code Sequence (0040,A043) = (400000, 99IHEEYECARE, "Eye Care Measurement Report ")

								Document Class Code Sequence (0040,E008) = (400104, 99IHEEYECARE, “OCT GCL Key Measurement Report”)
Content Sequence (0040,A730) attribute within Encapsulated Document Module								
2	>	CONTAINS	INCLUDE	DTID 1501 “Measurement Group”	1-n	M		$Measurement = Table 4.2.12.2.5.1-1 OCT GCL Concept Name Code Sequence Codes $Units = Table 4.2.12.2.5.1-1 OCT GCL Concept Name Code Sequence Codes $TargetSite = (81745001, SCT, “Eye”) $Laterality = DICOM CID 244 “Laterality”
3	>	CONTAINS	NUM	EV (111029, DCM, “Image Quality Rating?	1-n	MC	SHALL BE INCLUDED IF KNOWN	$Value = 0 – 100 $Units = EV([0:100}, UCUM, “range:0:100)
4	>	HAS OBS CONTEXT	CODE	EV (111001, DCM, "Algorithm Name")	1	MC	SHALL BE INCLUDED IF KNOWN	
5	>	HAS OBS CONTEXT	TEXT	EV (111003, DCM, "Algorithm Version")	1	MC	SHALL BE INCLUDED IF KNOWN	
6	>	HAS OBS CONTEXT	TEXT	EV (111002, DCM, "Algorithm Parameters")	1-n	U		

4.2.12.2.5.1 OCT GCL Document Content Macro Attributes

465 TID 1501 Measurement Group specifies TID 300 Measurement to capture the individual key measurements. The attributes within the Document Content Marco provides the name/value pair for the key measurements. The Concept Name Code Sequence (0040,A043) used in this macro defines the name of the measurement.

Codes defined in Table 4.2.12.2.5.1-1 SHALL BE INCLUDED IF KNOWN.

470 Table 4.2.12.2.5.1-1 is extensible.

Table 4.2.12.2.5.1-1: OCT GCL Concept Name Code Sequence Codes

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	Units of Measure
99IHEEYECARE	400500	Average GCL-IPL thickness	$Units = EV (um, UCUM, "um")

Note: TID 300 Measurement defines an optional feature to specify properties of a measurement via TID 310 Measurement Properties. TID 310 supports properties such as normality, statistical properties, normal ranges, level of significance and more. Normality flags are highly useful and commonly provided by implementations. At a minimum, IHE highly recommends implementers provide normality flags to the extent that is technically feasible. Other properties are also encouraged to improve clinical usefulness. Implementations may include these properties for any eye care measurement. See Section 4.2.12.9 for examples.

The following table defines the definitions of codes defined by IHE Eye Care. For definitions of DICOM codes (DCM), see the DICOM Standard.

Table 4.2.12.2.5.1-2: OCT GCL Measurement Code Definitions

Code Value (0008,0100)	Code Meaning (0008,0104)	Definition
400500	Average GCL-IPL thickness	Average thickness between ganglion cell layer (GCL) and inner plexiform layer (IPL), as microns.

4.2.12.2.6 Corneal Topography Key Measurement Report Content Sequence

Table 4.2.12.2.6-1 and the following sections define the requirements for corneal topography key measurement reports. Table 4.2.12.2.6-1 is extensible.

Table 4.2.12.2.6-1: Corneal Topography Content Sequence

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Mandatory Value Set Constraint
1	Coded PDF document title plus modifiers are conveyed in Attributes Concept Name Code Sequence (0040,A043) and Document Class Code Sequence (0040,E008) residing in the Encapsulated Document Module							Concept Name Code Sequence (0040,A043) = (400000, 99IHEEYECARE, "Eye Care Measurement Report ") Document Class Code Sequence (0040,E008) = (400105, 99IHEEYECARE, "Corneal Topography Key Measurement Report ")
Content Sequence (0040,A730) attribute within Encapsulated Document Module								
2	>	CONTAINS	INCLUDE	DTID 1501 "Measurement Group"	1-n	M		$Measurement = Table 4.2.12.2.6.1-1 Corneal Topography Concept Name Code Sequence Codes $Units = Table 4.2.12.2.6.1-1 Corneal Topography Concept Name Code Sequence Codes $TargetSite = (81745001, SCT, "Eye") $Laterality = DICOM CID 244 "Laterality"
3	>	HAS OBS CONTEXT	CODE	EV (111001, DCM, "Algorithm Name")	1	MC	SHALL BE INCLUDED IF KNOWN	

4	>	HAS OBS CONTEXT	TEXT	EV (111003, DCM, "Algorithm Version")	1	MC	SHALL BE INCLUDED IF KNOWN	
5	>	HAS OBS CONTEXT	TEXT	EV (111002, DCM, "Algorithm Parameters")	1-n	U		

4.2.12.2.6.1 Corneal Topography Document Content Macro Attributes

TID 1501 Measurement Group specifies TID 300 Measurement to capture the individual key measurements. The attributes within the Document Content Marco provides the name/value pair for the key measurements. The Concept Name Code Sequence (0040,A043) used in this macro defines the name of the measurement.

Codes defined in Table 4.2.12.2.6.1-1 SHALL BE INCLUDED IF KNOWN.

Table 4.2.12.2.6.1-1 is extensible.

Table 4.2.12.2.6.1-1: Corneal Topography Concept Name Code Sequence Codes

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	Units of Measure
99IHEEYECARE	400600	Central keratometry minimum power	UNITS = EV ([diop], UCUM, "diopters")
99IHEEYECARE	400601	Central keratometry minimum radius of curvature	$Units = EV (mm, UCUM, "mm")
99IHEEYECARE	400602	Central keratometry minimum power axis	UNITS = EV (deg, UCUM, "degrees")
99IHEEYECARE	400603	Central keratometry maximum power	UNITS = EV ([diop], UCUM, "diopters")
99IHEEYECARE	400604	Central keratometry maximum radius of curvature	$Units = EV (mm, UCUM, "mm")
99IHEEYECARE	400605	Central keratometry maximum power axis	UNITS = EV (deg, UCUM, "degrees")
99IHEEYECARE	400606	Minimum corneal thickness	$Units = EV (um, UCUM, "um")

Note: TID 300 Measurement defines an optional feature to specify properties of a measurement via TID 310 Measurement Properties. TID 310 supports properties such as normality, statistical properties, normal ranges, level of significance and more. Normality flags are highly useful and commonly provided by implementations. At a minimum, IHE highly recommends implementers provide normality flags to the extent that is technically feasible. Other properties are also encouraged to improve clinical usefulness. Implementations may include these properties for any eye care measurement. See Section 4.2.12.9 for examples.

The following table defines the definitions of codes defined by IHE Eye Care. For definitions of DICOM codes (DCM), see the DICOM Standard.

Table 4.2.12.2.6.1-2: Corneal Topography Measurement Code Definitions

Code Value (0008,0100)	Code Meaning (0008,0104)	Definition
400600	Central keratometry minimum power	The lowest refractive power in the central zone, as diopters (for example central 3mm) Note: This code is related to DICOM attribute Keratometric Power (0046,0076) within the attribute Flat Keratometric Axis Sequence (0046,0080).
400601	Central keratometry minimum radius of curvature	The longest radius of curvature of the two most extreme orthogonal keratometry measurements in the central zone, as mm (for example central 3mm) Note: This code is related to DICOM attribute Radius of Curvature (0046,0075) within the attribute Flat Keratometric Axis Sequence (0046,0080).
400602	Central keratometry minimum power axis	The meridian of the lowest power radius of the two most extreme orthogonal keratometry measurements in the central zone, as degrees (for example central 3mm) Note: This code is related to DICOM attribute Keratometric Axis (0046,0077) within the attribute Flat Keratometric Axis Sequence (0046,0080).
400603	Central keratometry maximum power	The highest refractive power in the central zone, as diopters (for example central 3mm) Note: This code is related to DICOM attribute Keratometric Power (0046,0076) within the attribute Steep Keratometric Axis Sequence (0046,0074).
400604	Central keratometry maximum radius of curvature	The shortest radius of curvature of the two most extreme orthogonal keratometry measurements in the central zone, as mm (for example central 3mm) Note: This code is related to DICOM attribute Radius of Curvature (0046,0075) within the attribute Steep Keratometric Axis Sequence (0046,0074).
400605	Central keratometry maximum power axis	The meridian of the highest power radius of the two most extreme orthogonal keratometry measurements in the central zone, as degrees (for example central 3mm) Note: This code is related to DICOM attribute Keratometric Axis (0046,0077) within the attribute Steep Keratometric Axis Sequence (0046,0074).
400606	Minimum corneal thickness	The thickness of the cornea at that location representing the minimum measurable thickness, as microns

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4.2.12.2.7 Endothelial Cell Count Key Measurement Report Content Sequence

Table 4.2.12.2.7-1 and the following sections define the requirements for endothelial cell count key measurement reports. Table 4.2.12.2.7-1 is extensible.

Table 4.2.12.2.7-1: Endothelial Cell Count Content Sequence

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Mandatory Value Set Constraint
1	Coded PDF document title plus modifiers are conveyed in Attributes Concept Name Code Sequence (0040,A043) and Document Class Code Sequence (0040,E008) residing in the Encapsulated Document Module							Concept Name Code Sequence (0040,A043) = (400000, 99IHEEYECARE, "Eye Care Measurement Report ") Document Class Code Sequence (0040,E008) = (400106, 99IHEEYECARE, "Endothelial Cell Count Key Measurement Report ")
	Content Sequence (0040,A730) attribute within Encapsulated Document Module							
2	>	CONTAINS	INCLUDE	DTID 1501 "Measurement Group"	1-n	M		$Measurement = Table 4.2.12.2.7.1-1 Endothelial Cell Count Concept Name Code Sequence Codes $Units = Table 4.2.12.2.7.1-1 Endothelial Cell Count Concept Name Code Sequence Codes $TargetSite = (81745001, SCT, "Eye") $Laterality = DICOM CID 244 "Laterality"
3	>	HAS OBS CONTEXT	CODE	EV (111001, DCM, "Algorithm Name")	1	MC	SHALL BE INCLUDED IF KNOWN	
4	>	HAS OBS CONTEXT	TEXT	EV (111003, DCM, "Algorithm Version")	1	MC	SHALL BE INCLUDED IF KNOWN	
5	>	HAS OBS CONTEXT	TEXT	EV (111002, DCM, "Algorithm Parameters")	1-n	U		

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4.2.12.2.7.1 Endothelial Cell Count Document Content Macro Attributes

TID 1501 Measurement Group specifies TID 300 Measurement to capture the individual key measurements. The attributes within the Document Content Marco provides the name/value pair for the key measurements. The Concept Name Code Sequence (0040,A043) used in this macro
515 defines the name of the measurement.

Codes defined in Table 4.2.12.2.7.1-1 SHALL BE INCLUDED IF KNOWN.

Table 4.2.12.2.7.1-1 is extensible.

Table 4.2.12.2.7.1-1: Endothelial Cell Count Concept Name Code Sequence Codes

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	Units of Measure
99IHEEYECARE	400700	Endothelial cell density	$Units = EV ($mm^2$, UCUM, "$mm^2$")

Note: TID 300 Measurement defines an optional feature to specify properties of a measurement via TID 310 Measurement Properties. TID 310 supports properties such as normality, statistical properties, normal ranges, level of significance and more. Normality flags are highly useful and commonly provided by implementations. At a minimum, IHE highly recommends implementers provide normality flags to the extent that is technically feasible. Other properties are also encouraged to improve clinical usefulness. Implementations may include these properties for any eye care measurement. See Section 4.2.12.9 for examples.

The following table defines the definitions of codes defined by IHE Eye Care. For definitions of DICOM codes (DCM), see the DICOM Standard.

Table 4.2.12.2.7.1-2: Endothelial Cell Count Measurement Code Definitions

Code Value (0008,0100)	Code Meaning (0008,0104)	Definition
400700	Endothelial cell density	The density of endothelial cells present on the innermost surface of the cornea as mm^2

4.2.12.3 TID 310 Measurement Properties

TID 300 Measurement defines an optional feature to specify properties of a measurement via TID 310 Measurement Properties. TID 310 supports properties such as normality, statistical properties, normal ranges, level of significance and more.

Normality flags are highly useful in interpretation of various device reports and commonly provided by implementations. At a minimum, IHE highly recommends implementers provide normality flags to the extent that is technically feasible. Other properties are also encouraged to improve clinical usefulness.

These properties exist for any eye care measurement, common examples include Mean Deviation, Patterned Standard Deviation, RNFL thickness, etc.

Below are examples using TIDs 300, 310 and 312.

Table 4.2.12.3-1: TID 300 Measurement

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			NUM	$Measurement	1	M		UNITS = $Units

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
2	>	HAS CONCEPT MOD	CODE	$ModType	1-n	U		$ModValue
3-7	>	…..	…..	…..	..	..	…..	…..
8	>	HAS PROPERTIES	INCLUDE	DTID 310 “Measurement Properties”	1	U		$RefAuthority = $RefAuthority $RangeAuthority = $RangeAuthority
9-n	>	…..	…..	…..	..	..	…..	…..

Table 4.2.12.3-2: TID 310 Measurement Properties

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CODE	EV (121402, DCM, "Normality")	1	U		DCID 222 “Normality Codes”
2			INCLUDE	DTID 311 “Measurement Statistical Properties”	1	U		$RefAuthority = $RefAuthority
3			INCLUDE	DTID 312 “Normal Range Properties”	1	U		$RangeAuthority = $RangeAuthority
4			CODE	EV (121403, DCM, "Level of Significance")	1	U		DCID 220 “Level of Significance”
5			NUM	DCID 225 “Measurement Uncertainty Concepts”	1-n	U		
6			CODE	EV (121404, DCM, "Selection Status")	1	U		DCID 224 “Selection Method”

Table 4.2.12.3-3: TID 312 Normal Range Properties

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			NUM	DCID 223 “Normal Range Values”	1-n	M		
2			TEXT	EV (121407, DCM, "Normal Range description")	1	U		
3			TEXT	EV (121408, DCM, "Normal Range Authority")	1	UC	XOR row 4	
4			CODE	EV (121408, DCM, "Normal Range Authority")	1	UC	XOR row 3	$RangeAuthority

1. **Visual Field example values showing Mean Deviation with properties of Normality**

From TID 300 row 1 - (99IHEEYECARE, 400200, “Mean Deviation”) = (-0.53, db).

From TID 300 use optional row 8 (TID 310 Measurement Properties) to convey Normality for Mean Deviation.

From TID 310 row 1 – (121402, DCM, "Normality") = (17621005, SCT, “Normal”)

2. **OCT example values showing RNFL thickness with properties of Normality and identifying implementation specific normals database**

From TID 300 row 1 - (99IHEEYECARE, 400400, “Retinal nerve fiber layer average thickness”) = (60, um)

From TID 300 use optional row 8 (TID 310 Measurement Properties) to convey Normality

From TID 310 row 1 – (121402, DCM, "Normality") = (371880002, SCT, “Abnormally Low”) From TID 310 use optional row 2 (DTID 312 “Normals Range Properties”)

From TID 312 use row 1 using DCID 223 “Normal Range Values” - (385524004, SCT, "Normal Range Lower Limit") = (75,um)

From TID 312 use row 1 using DCID 223 “Normal Range Values” - (371933006, SCT, "Normal Range Upper Limit") = (110, um)

From TID 312 row 2 - EV (121407, DCM, "Normal Range description") – "Reference population is 500 eyes from 500 subjects of ethnicity Chinese, Indian and Japanese

From TID 312 row 4 - EV (121408, DCM, "Normal Range Authority") – (12345, 99VENDORNAME, “Vendor Name ethnicity”)

Note: The coloring of values for display is not defined by DICOM and is vendor specific. The level of detailed information is vendor specific and IHE encourages vendors to provide all significant details in “Normal Range description”.

Note: Some devices offer more than one normative database (e.g., based on the ethnicity, age, etc.), varying the code for “Normal Range Authority” facilities the identification of different normative databases.

4.2.12.4 Extending Normality Value Codes

DICOM PS3.16 CID 222 Normality Codes specifies an extensible value set of normality codes. Below are an initial set of codes recommended by IHE EYECARE.

Table 4.2.12.4-1: CID 222 Normality Codes

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-RT Concept ID
SCT	17621005	Normal	G-A460
SCT	263654008	Abnormal	R-42037

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)	SNOMED-RT Concept ID
SCT	371879000	Abnormally High	R-002C4
SCT	371880002	Abnormally Low	R-002C5
SCT	82334004	Normality Undetermined	G-A385
Include DICOM CID 4254. Visual Field Static Perimetry Test Analysis Results			
SCT	394844007	Outside reference range	
SCT	281302008	Above reference range	
SCT	281300000	Below reference range	
SCT	281301001	Within reference range	
SCT	442777001	Borderline high	
SCT	442779003	Borderline low	
SCT	371917008	One standard deviation above mean	
SCT	371919006	One standard deviation below mean	
SCT	371920000	Two standard deviations above mean	
SCT	371918003	Two standard deviations below mean	3

4.2.12.5 DICOM SCP Expected Action

This section defines DICOM SCP expected actions:

1. SHALL be able to display the PDF as specified for the Image Display in Section 4.2.6.2
2. SHALL be able to incorporate into its database one or more discreet data fields for each report title supported
3. SHALL support DICOM Level 2 (full fidelity) storage if the DICOM SCP supports DICOM Query/Retrieve and/or DICOM Media Storage
4. It is highly recommended that all DICOM SCP systems consider the equipment manufacturer information and use this when comparing/tracking measurements (i.e., do not compare measurements from different vendor's equipment unless clinically proven to be reliable). Determining reliability is beyond the scope of IHE and the responsibility of the implementation. Acquisition devices and their underlying algorithms may provide measurements that appear common based upon their categorical representation, but might not be physically or physiologically fungible.

Appendix A: Key Measurement Report Examples

Appendix A provides examples of key measurements encapsulated reports.

A.1: OCT Macular Thickness Report Example

The table below describes an example of an OCT macular thickness report. It includes the "SHALL BE INCLUDED IF KNOWN" key measurements plus an example for including an optional "normality code" for one of the key measurements.

Table A.1-1: OCT Macular Thickness Report

SR Tree Depth	Nesting	Attribute	Tag	VR	Value	Comments
		Instance Creation Date	(0008,0012)	DA	…….	
		Instance Creation Time	(0008,0013)	TM	…….	
		SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.104.1	
		SOP Instance UID	(0008,0018)	UI	…….	
		Study Date	(0008,0020)	DA	…….	
		Series Date	(0008,0021)	DA	…….	
		Acquisition Date	(0008,0022)	DA	…….	
		Content Date	(0008,0023)	DA	…….	
		Acquisition Datetime	(0008,002A)	DT	…….	
		Study Time	(0008,0030)	TM	…….	
		Series Time	(0008,0031)	TM	…….	
		Content Time	(0008,0033)	TM	…….	
		Accession Number	(0008,0050)	SH	…….	
		Modality	(0008,0060)	CS	OPT	
		Conversion Type	(0008,0064)	CS	…….	
		Manufacturer	(0008,0070)	LO	ABCD Eye Care Vendor	IHE specializes this attribute to Type 1
		Referring Physicians Name	(0008,0090)	PN	…….	

SR Tree Depth	Nesting	Attribute	Tag	VR	Value	Comments
		Study Description	(0008,1030)	LO	…….	
		Series Description	(0008,103E)	LO	…….	
		Manufacturers Model Name	(0008,1090)	LO	ABCD OCT Model Name	IHE specializes this attribute to Type 1
		Patient's Name	(0010,0010)	PN	……	
		Patient ID	(0010,0020)	LO	…….	
		Patient's Birth Date	(0010,0030)	DA	…….	
		Patient's Sex	(0010,0040)	CS	…….	
		Device Serial Number	(0018,1000)	LO	56789	IHE specializes this attribute to Type 1
		Software Versions	(0018,1020)	LO	1.2	IHE specializes this attribute to Type 1
		Study Instance UID	(0020,000D)	UI	…….	
		Series Instance UID	(0020,000E)	UI	…….	
		Series Number	(0020,0011)	IS	…….	
		Instance Number	(0020,0013)	IS	…….	
		Image Laterality	(0020,0062)	CS	…….	
		Burned In Annotation	(0028,0301)	CS	…….	
1		Concept Name Code Sequence	(0040,A043)	SQ		The coded title that identifies the Encapsulated PDF SOP Instance as an Eye Care Measurement Report. Note that this title is conveyed with attributes as defined in the Encapsulated Document Module and NOT conveyed as a CONTAINER Content Sequence. This is why the title does not include the attributes Value Type (0040,A040) and Continuity of Content (0040,A050).
	%item					
	>	Code Value	(0008,0100)	SH	400000	
	>	Coding Scheme Designator	(0008,0102)	SH	99IHEEYECARE	

SR Tree Depth	Nesting	Attribute	Tag	VR	Value	Comments
	>	Code Meaning	(0008,0104)	LO	Eye Care Measurements Report	Required to convey the type of PDF measurement report
	%enditem					
	%endseq					
1		Content Sequence	(0040,A730)	SQ		
	%item					
1.1	>	Relationship Type	(0040,A010)	CS	CONTAINS	
1.1	>	Value Type	(0040,A040)	CS	CONTAINER	
1.1		Concept Name Code Sequence	(0040,A043)	SQ		
	%item					
1.1	>>	Code Value	(0008,0100)	SH	125007	
1.1	>>	Coding Scheme Designator	(0008,0102)	SH	DCM	
1.1	>>	Code Meaning	(0008,0104)	LO	Measurement Group	Required by IHE to convey measurements for all types of eye care pdf measurements
	%enditem					
	%endseq					
1.1	>	Continuity Of Content	(0040,A050)	CS	SEPARATE	
1.1		Content Template Sequence	(0040,A504)	SQ		
	%item					
1.1	>>	Mapping Resource	(0008,0105)	CS	DCMR	
	>>	Template Identifier	(0040,DB00)	CS	1501	
	%enditem					
	%endseq					
1.1	>	Content Sequence	(0040,A730)	SQ		
	%item					
1.1.1	>>	Relationship Type	(0040,A010)	CS	HAS OBS CONTEXT	
1.1.1	>>	Value Type	(0040,A040)	CS	TEXT	
1.1.1	>>	Concept Name Code Sequence	(0040,A043)	SQ		

SR Tree Depth	Nesting	Attribute	Tag	VR	Value	Comments
	%item					
1.1.1	>>>	Code Value	(0008,0100)	SH	112039	
1.1.1	>>>	Coding Scheme Designator	(0008,0102)	SH	DCM	
1.1.1	>>>	Code Meaning	(0008,0104)	LO	Tracking Identifier	The Measurements Group template requires a Tracking Identifier
	%enditem					
	%endseq					
1.1.1	>>	Text Value	(0040,A160)	UT	ABCD56789-20	This is a required human readable value that MUST BE UNIQUE within the clinic this device is being used. That is why this example shows the manufacture and the device serial number before the identifier number. It is different than other manufactures in the clinic plus other similar devices from the same manufacture (i.e., two OCTs in the clinic will not have the same identifier because the serial numbers will be different)
1.2.1	>>	Relationship Type	(0040,A010)	CS	HAS OBS CONTEXT	
1.2.1	>>	Value Type	(0040,A040)	CS	UIDREF	
1.2.1	>>	Concept Name Code Sequence	(0040,A043)	SQ		
	%item					
1.2.1	>>>	Code Value	(0008,0100)	SH	112040	
1.2.1	>>>	Coding Scheme Designator	(0008,0102)	SH	DCM	
1.2.1	>>>	Code Meaning	(0008,0104)	LO	Tracking Unique Identifier	The Measurements Group template requires a Tracking Unique Identifier
	%enditem					
	%endseq					
1.2.1	>>	UID	(0040,A124)	UI	1.2.3.4.5.6.7.8.9876	A global UID
1.3.1	>>	Relationship Type	(0040,A010)	CS	HAS CONCEPT MOD	
1.3.1	>>	Value Type	(0040,A040)	CS	CODE	

SR Tree Depth	Nesting	Attribute	Tag	VR	Value	Comments
1.3.1	>>	Concept Name Code Sequence	(0040,A043)	SQ		
	%item					
1.3.1	>>>	Code Value	(0008,0100)	SH	363698007	
1.3.1	>>>	Coding Scheme Designator	(0008,0102)	SH	SCT	
1.3.1	>>>	Code Meaning	(0008,0104)	LO	Finding Site	IHE requires the finding site
	%enditem					
	%endseq					
1.3.1	>>	Concept Code Sequence	(0040,A168)	SQ		
	%item					
1.3.1	>>>	Code Value	(0008,0100)	SH	81745001	
1.3.1	>>>	Coding Scheme Designator	(0008,0102)	SH	SCT	
1.3.1	>>>	Code Meaning	(0008,0104)	LO	Eye	
	%enditem					
	%endseq					
1.3.2	>>	Content Sequence	(0040,A730)	SQ		
	%item					
1.3.2	>>>	Relationship Type	(0040,A010)	CS	HAS CONCEPT MOD	
1.3.2	>>>	Value Type	(0040,A040)	CS	CODE	
1.3.2	>>>	Concept Name Code Sequence				
	%item					
1.3.2	>>>>	Code Value	(0008,0100)	SH	272741003	
1.3.2	>>>>	Coding Scheme Designator	(0008,0102)	SH	SCT	
1.3.2	>>>>	Code Meaning	(0008,0104)	LO	Laterality	IHE requires the laterality
	%enditem					
	%endseq					
1.3.2	>>>	Concept Code Sequence	(0040,A168)	SQ		
	%item					
1.3.2	>>>>	Code Value	(0008,0100)	SH	24028007	
1.3.2	>>>>	Coding Scheme Designator	(0008,0102)	SH	SCT	

SR Tree Depth	Nesting	Attribute	Tag	VR	Value	Comments
1.3.2	>>>>	Code Meaning	(0008,0104)	LO	Right	
	%enditem					
	%endseq					
	%enditem					
	%endseq					
	%enditem					
	%endseq					
	%item					
1.4.1	>	Relationship Type	(0040,A010)	CS	CONTAINS	
1.4.1		Value Type	(0040,A040)	CS	NUM	
1.4.1	>	Concept Name Code Sequence				
	%item					
1.4.1	>>	Code Value	(0008,0100)	SH	57109-1	
1.4.1	>>	Coding Scheme Designator	(0008,0102)	SH	LN	
1.4.1	>>	Code Meaning	(0008,0104)	LO	Macular grid. center subfield thickness	IHE requires this measurement to be sent if known
	%enditem					
	%endseq					
1.4.1	>	Measured Value Sequence	(0040,A300)	SQ		
	%item					
1.4.1	>>	Measurement Units Code Sequence	(0040,08EA)	SQ		
	%item					
1.4.1	>>>	Code Value	(0008,0100)	SH	um	
1.4.1	>>>	Coding Scheme Designator	(0008,0102)	SH	UCUM	
1.4.1	>>>	Code Meaning	(0008,0104)	LO	micrometer	
	%enditem					
	%endseq					
1.4.1	>	Numeric Value	(0040,A30A)	DS	295	
	%enditem					
	%endseq					
1.4.2	>	Relationship Type	(0040,A010)	CS	HAS PROPERTIES	This Optional feature is included to convey normality.

SR Tree Depth	Nesting	Attribute	Tag	VR	Value	Comments
						This feature is very desirable and useful to clinicians. Note that this example includes a "normality" comparison. Another option is to provide measurement statistics using DTID 311 "Measurement Statistical Properties" and codes from DICOM CID 226 Population Statistical Descriptors (i.e., percentile groups).
1.4.2	>	Value Type	(0040,A040)	CS	CODE	
1.4.2	>	Concept Name Code Sequence				
	%item					
1.4.2	>>	Code Value	(0008,0100)	SH	121402	
1.4.2	>>	Coding Scheme Designator	(0008,0102)	SH	DCM	
1.4.2	>>	Code Meaning	(0008,0104)	LO	Normality	
	%enditem					
	%endseq					
	>	Concept Code Sequence	(0040,A168)	SQ		
1.4.2	>>	Code Value	(0008,0100)	SH	281301001	
1.4.2	>>	Coding Scheme Designator	(0008,0102)	SH	SCT	
1.4.2	>>	Code Meaning	(0008,0104)	LO	Within reference range	
	%enditem					
	%endseq					
1.5.1	>	Relationship Type	(0040,A010)	CS	CONTAINS	
1.5.1		Value Type	(0040,A040)	CS	NUM	
1.5.1	>	Concept Name Code Sequence				
	%item					
1.5.1	>>	Code Value	(0008,0100)	SH	57118-2	
1.5.1	>>	Coding Scheme Designator	(0008,0102)	SH	LN	
1.5.1	>>	Code Meaning	(0008,0104)	LO	Macular grid. total volume	IHE requires this measurement to be sent if known

SR Tree Depth	Nesting	Attribute	Tag	VR	Value	Comments
	%enditem					
	%endseq					
1.5.1	>	Measured Value Sequence	(0040,A300)	SQ		
	%item					
1.5.1	>>	Measurement Units Code Sequence	(0040,08EA)	SQ		
	%item					
1.5.1	>>>	Code Value	(0008,0100)	SH	mm3	
1.5.1	>>>	Coding Scheme Designator	(0008,0102)	SH	UCUM	
1.5.1	>>>	Code Meaning	(0008,0104)	LO	mm3	
	%enditem					
	%endseq					
1.5.1	>	Numeric Value	(0040,A30A)	DS	7348	
	%enditem					
	%endseq					
1.6.1	>	Relationship Type	(0040,A010)	CS	HAS CONCEPT MOD	
1.6.1	>	Value Type	(0040,A040)	CS	CODE	
1.6.1	>	Concept Name Code Sequence				
	%item					
1.6.1	>>	Code Value	(0008,0100)	SH	111001	
1.6.1	>>	Coding Scheme Designator	(0008,0102)	SH	DCM	
1.6.1	>>	Code Meaning	(0008,0104)	LO	Algorithm Name	Shall be included if known, since this example supports a “normal database for macular thickness” the vendor is required to name the algorithm used. This is required so SCPs can compare values from multiple reports using the same algorithm. If two different algorithms are used, than the SCP would know if should not compare.
	%enditem					
	%endseq					

SR Tree Depth	Nesting	Attribute	Tag	VR	Value	Comments
1.6.1	>	Concept Code Sequence	(0040,A168)	SQ		
	%item					
1.6.1	>>	Code Value	(0008,0100)	SH	1234789	
1.6.1	>>	Coding Scheme Designator	(0008,0102)	SH	99ABCDOCT	
1.6.1	>>	Code Meaning	(0008,0104)	LO	ABCDMacular	
	%enditem					
	%endseq					
1.7.1	>	Relationship Type	(0040,A010)	CS	HAS OBS CONTEXT	
1.7.1	>	Value Type	(0040,A040)	CS	TEXT	
1.7.1	>	Concept Name Code Sequence	(0040,A043)	SQ		
	%item					
1.7.1	>>	Code Value	(0008,0100)	SH	111003	
1.7.1	>>	Coding Scheme Designator	(0008,0102)	SH	DCM	
1.7.1	>>	Code Meaning	(0008,0104)	LO	Algorithm Version	Shall be included if known, since this example supports a “normal database for macular thickness” the vendor is required to provide the algorithm version. This is required so SCPs can compare values from multiple reports using the same algorithm/version.
	%enditem					
	%endseq					
1.7.1	>	Text Value	(0040,A160)	UT	Version 2.0	
	%enditem					
	%endseq					
	%enditem					
	%endseq					
1		Document Class Code Sequence	(0040,E008)	SQ		
	%item					
	>	Code Value	(0008,0100)	SH	400103	
	>	Coding Scheme Designator	(0008,0102)	SH	99IHEEYECARE	

SR Tree Depth	Nesting	Attribute	Tag	VR	Value	Comments
	>	Code Meaning	(0008,0104)	LO	OCT Macula Thickness Key Measurement Report	The coded title that identifies the specific title of Eye Care Measurement Report for this Encapsulated PDF SOP Instance.
	%enditem					
	%endseq					
		Document Title	(0042,0010)	ST	OCT Macula Thickness Key Measurement Report	Text string that identifies the specific title of Eye Care Measurement Report for this Encapsulated PDF SOP Instance.
		Encapsulated Document	(0042,0011)	OB	…….	
		MIME Type of Encapsulated Document	(0042,0012)	LO	application/pdf	

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Volume 3 – Content Modules

Not applicable

Volume 4 – National Extensions

Add appropriate Country section

Not applicable

