DICOM Correction Proposal

STATUS	Letter Ballot
Date of Last Update	2024/11/11
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Submission Date	2024/05/06

Correction Number CP-2416
Log Summary: Add support for FLIO Ophthalmic Photography
Name of Standard PS3.3, PS3.16
Rationale for Correction: An emerging sub-modality for Ophthalmic Photography is Fluorescence Lifetime Imaging Ophthalmoscopy (FLIO) (see https://www.ncbi.nlm.nih.gov/books/NBK554053/), an evolution of Fluorescence Lifetime Imaging Microscopy (FLIM). The OP IODs are updated to support the technical parameters of FLIO, including pulsed laser illuination and long (>560 nm) or short (<560 nm) wavelength fluorescent images, time-binned. FLIO will typically use 16-bit OP multi-frame cine objects. Note that this is a “classic” format, and does not use the enhanced multi-frame paradigm. The Type 1C requirement for Image Path Filter Pass Band (0022,0004) for specification of image wavelength forces separate monochrome images for each channel. The ability to record two channels in the red and green channels of a single RGB image, as used in some OP techniques, is not considered apprpriate for FLIO as the two channels are not combined for display.
Correction Wording:

Update PS3.3

C.8.17.3 Ophthalmic Photographic Parameters Module

This Module describes equipment used to create original images.

Table C.8.17.3-1. Ophthalmic Photographic Parameters Module Attributes

Attribute Name	Tag	Type	Attribute Description
Acquisition Device Type Code Sequence	(0022,0015)	1	Describes the type of acquisition device Only a single Item shall be included in this Sequence.
>Include Table 8.8-1 “Code Sequence Macro Attributes”			*BCID 4202 “Ophthalmic Photography Acquisition Device”.*
Illumination Type Code Sequence	(0022,0016)	2	Coded value for illumination Zero or one Item shall be included in this Sequence.
>Include Table 8.8-1 “Code Sequence Macro Attributes”			*BCID 4203 “Ophthalmic Photography Illumination”.*
Light Path Filter Type Stack Code Sequence	(0022,0017)	2	Filters used in the light source path Zero or more Items shall be included in this Sequence.
>Include Table 8.8-1 “Code Sequence Macro Attributes”			*BCID 4204 “Ophthalmic Filter”.*

Light Path Filter Pass-Through Wavelength	(0022,0001)	~~3~~ **1C**	Nominal pass-through wavelength of light path filter in nm**, or wavelength of a monochromatic (e.g., laser) light source** **Required if Acquisition Device Type Code Sequence (0022,0015) is (xxxx1, DCM, "FLIO"). May be present otherwise.**
Light Path Filter Pass Band	(0022,0002)	3	Pass band of light path filter in nm. This Attribute has two Values. The first is the shorter and the second the longer wavelength relative to the peak. The values are for the - 3dB nominal (1/2 of peak) pass through intensity One of the two Values may be zero length, in which case it is a cutoff filter.
Image Path Filter Type Stack Code Sequence	(0022,0018)	2	Describes stack of filters used in image path Zero or more Items shall be included in this Sequence.
>Include Table 8.8-1 "Code Sequence Macro Attributes"			*BCID 4204 "Ophthalmic Filter".*
Image Path Filter Pass-Through Wavelength	(0022,0003)	3	Nominal pass-through wavelength of image path filter in nm
Image Path Filter Pass Band	(0022,0004)	~~3~~ **1C**	Pass band of image path filter in nm. This Attribute has two Values. The first is the shorter and the second the longer wavelength relative to the peak. The values are for the - 3dB nominal (1/2 of peak) pass through intensity One of the two Values may be zero length, in which case it is a cutoff filter **Required if Acquisition Device Type Code Sequence (0022,0015) is (xxxx1, DCM, "FLIO"). May be present otherwise.**
Lenses Code Sequence	(0022,0019)	2	Lenses that were used during the image acquisition Zero or more Items shall be included in this Sequence.
>Include Table 8.8-1 "Code Sequence Macro Attributes"			*BCID 4205 "Ophthalmic Lens".*
Detector Type	(0018,7004)	2	Type of detector used for creating this image. Defined Terms: CCD Charge Coupled Devices CMOS Complementary Metal Oxide Semiconductor

Channel Description Code Sequence	(0022,001A)	1C	Describes the light color used for each channel to generate the image. Required if this differs from the natural interpretation. ***Note*** *Interpretation and representation of RGB images rely on the assumption that the red channel really contains the red wavelength range of illumination light, the blue channel the blue wavelength range, etc. Some modalities use the RGB Photometric Interpretation as a container representing 3 channels of any illumination wavelength.* Shall have the same number of Items as the Value of Samples per Pixel Used (0028,0003) if present, or otherwise the value of Samples per Pixel (0028,0002). The channels shall be described in the order in which the channels are encoded.
>Include Table 8.8-1 "Code Sequence Macro Attributes"			*BCID 4206 "Ophthalmic Channel Description".*
Camera Angle of View	(0022,001E)	3	The aperture angle of the camera, in degrees

Update PS3.16

CID 4202 Ophthalmic Photography Acquisition Device

Type: Extensible
Version: ~~**20100607**~~ **2025mmdd**
UID: 1.2.840.10008.6.1.318

Table CID 4202. Ophthalmic Photography Acquisition Device

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
SCT	409898007	Fundus Camera	R-1021A	C0179536
SCT	397247004	Slit Lamp Biomicroscope	A-2B201	C0183355
SCT	409903006	External Camera	R-1021B	C1444146
SCT	409899004	Specular Microscope	R-1021C	C1444145
SCT	102321001	Operating Microscope	A-2B210	C0181849
SCT	392001008	Scanning Laser Ophthalmoscope	A-00E8A	C0392288
SCT	409901008	Indirect Ophthalmoscope	R-1021D	C0182048
SCT	409900009	Direct Ophthalmoscope	R-1021E	C0182047
SCT	409902001	Ophthalmic Endoscope	R-1021F	C0493036
SCT	397522002	Keratoscope	A-00FCA	C0181448
SCT	420827006	Pupillograph	A-00FF4	C0182567
DCM	**xxxx1**	**FLIO**		

CID 4203 Ophthalmic Photography Illumination

Type: Extensible
Version: ~~**20100607**~~ **2025mmdd**
UID: 1.2.840.10008.6.1.319

Table CID 4203. Ophthalmic Photography Illumination

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
SCT	410461001	Dual diffuse direct illumination	R-1020E	C1444589
SCT	410462008	Fine slit beam direct illumination	R-1020F	C1444590
SCT	410463003	Broad tangential direct illumination	R-10211	C1444591
SCT	410464009	Indirect sclerotic scatter illumination	R-10213	C1444592
SCT	410465005	Indirect retroillumination from the iris	R-10215	C1444593
SCT	410466006	Indirect retroillumination from the retina	R-10217	C1444594
SCT	410467002	Indirect iris transillumination	R-10218	C1444595
DCM	111625	Diffuse direct illumination		
DCM	111627	Scotopic light		
DCM	111628	Mesopic light		
DCM	111629	Photopic light		
DCM	111630	Dynamic light		
SCT	**118340008**	**Pulsed laser beam**		

Table D-1. DICOM Controlled Terminology Definitions (Coding Scheme Designator "DCM" Coding Scheme Version "01")

Code Value	Code Meaning	Definition	Notes
xxxx1	**FLIO**	**Fluorescence Lifetime Imaging Ophthalmoscopy device**	