Annotation Guildline

1. Context and Purpose

   MAC's annotation is designed for a primary care setting, where fundus photography is available but OCT is not. Therefore, all decisions must be made solely based on the provided fundus photograph, without relying on additional imaging modalities or clinical information. Also, each disease should be classified according to referability, reflecting a primary care situation.

2. Disease List

	Label	Remark	Reference
Glaucoma	Referable(1) / Non Referable(0) / Indeterminate(unable to determine) (0.5)		Gedde SJ, Bowden EC, Challa P, et al; *American Academy of Ophthalmology Preferred Practice Pattern Glaucoma Committee*. **Primary Open-Angle Glaucoma Preferred Practice Pattern®**. *Ophthalmology*. 2026 Feb 9:S0161-6420(25)00815-2. doi:10.1016/j.ophtha.2025.12.029. PMID:41665583.
RVO	Referable(1) / Non Referable(0) / Indeterminate(unable to determine) (0.5)	Including active and past history	Kovach JL, Bailey ST, Kim SJ, Lim JI, Vemulakonda GA, Ying GS, Flaxel CJ; *American Academy of Ophthalmology Preferred Practice Pattern Retina/Vitreous Committee*. **Retinal Vein Occlusions Preferred Practice Pattern®**. *Ophthalmology*. 2025 Apr;132(4):P303-P343. doi:10.1016/j.ophtha.2024.12.025. PMID:39918523.
RAO	Referable(1) / Non Referable(0) / Indeterminate(unable to determine) (0.5)	Including active and past history	Kovach JL, Bailey ST, Kim SJ, Lim JI, Vemulakonda GA, Ying GS, Flaxel CJ; *American Academy of Ophthalmology Preferred Practice Pattern Retina/Vitreous Committee*. **Retinal and Ophthalmic Artery Occlusions Preferred Practice Pattern®**. *Ophthalmology*. 2025 Apr;132(4):P270-P302. doi:10.1016/j.ophtha.2024.12.024. PMID:39918522.
AMD	Referable(1) / Non Referable(0) / Indeterminate(unable to determine) (0.5)		Vemulakonda GA, Bailey ST, Kim SJ, Kovach JL, Lim JI, Ying GS, Flaxel CJ; *American Academy of Ophthalmology Preferred Practice Pattern Retina/Vitreous Committee*. **Age-Related Macular Degeneration Preferred Practice Pattern®**. *Ophthalmology*. 2025 Feb 7:S0161-6420(24)00782-6. doi:10.1016/j.ophtha.2024.12.018. PMID:39918524.

MMD	Referable(1) / Non Referable(0) / Indeterminate(unable to determine) (0.5)		**Chen Y, Han X, Gordon I, et al.** *A systematic review of clinical practice guidelines for myopic macular degeneration.* J Glob Health. 2022;12:04026. doi:10.7189/jogh.12.04026. PMID:35356661. **International Myopia Institute (IMI) Pathologic Myopia Report 2021.** *Myopic maculopathy and pathologic myopia classification and management.* Invest Ophthalmol Vis Sci. 2021;62(5):Article 5.
DR	Referable(1) / Non Referable(0) / Indeterminate(unable to determine) (0.5)		Lim JI, Kim SJ, Bailey ST, et al; *American Academy of Ophthalmology Preferred Practice Pattern Retina/Vitreous Committee*. **Diabetic Retinopathy Preferred Practice Pattern®**. *Ophthalmology*. 2025 Feb 7:S0161-6420(24)00784-X. doi:10.1016/j.ophtha.2024.12.020. PMID:39918521.
ERM	Referable(1) / Non Referable(0) / Indeterminate(unable to determine) (0.5)		Bailey ST, Vemulakonda GA, Kim SJ, Kovach JL, Lim JI, Ying GS, Flaxel CJ; *American Academy of Ophthalmology Preferred Practice Pattern Retina/Vitreous Committee*. **Idiopathic Epiretinal Membrane and Vitreomacular Traction Preferred Practice Pattern®**. *Ophthalmology*. 2025 Apr;132(4):P197-P233. doi:10.1016/j.ophtha.2024.12.019. PMID:39918520.
Optic pallor	Referable(1) / Non Referable(0) / Indeterminate(unable to determine) (0.5)		**Debrun GM, et al.** *Optic Neuropathy and Pallor: Practical Neuro-ophthalmology Review.* Neurology. 2020;95(14):e1963-e1972. doi:10.1212/WNL.0000000000010550. **Johnson LN, et al.** *Practice patterns for the evaluation and management of non-arteritic anterior ischemic optic neuropathy (NAION) and optic atrophy.* Ophthalmology. 2017;124(9):1288-1295. doi:10.1016/j.ophtha.2017.04.016.

3. Disease Definition

	Referable 1	Non Referable 0
Glaucoma	Fundus photo shows definite	Optic disc within normal

	glaucomatous optic nerve head: (1) vertical cup to disc ratio ≥ 0.7 (2) Inter-eye vertical cup to disc ratio asymmetry ≥ 0.2 (3) Localized neuro-retinal rim thinning/notching violating ISNT rule (4) disc hemorrhage or focal RNFL defect visible on color fundus photography	range for disc size Vertical cup to disc ratio <0.7 Inter-eye asymmetry <0.2 No focal rim thinning No obvious RNFL defect No disc hemorrhage Physiologic large cup without other suspicious features
RVO	Any acute or chronic branch/hemi/central RVO on fundus: Sectoral or diffuse flame/dot/blot hemorrhages along arcades Dilated, tortuous veins, venous beading Collateral vessels, sheathing, sclerosed veins Residual macular exudates or edema pattern compatible with prior RVO “past history” of RVO with visible sequelae like sclerosed vessels, collateral vessels, laser scars, or NV	No clinical signs of RVO or history of RVO on fundus
RAO	Any acute or chronic branch/central RAO: Retinal whitening in an arterial territory (sharp margin) Cherry red spot for CRAO Attenuated arterioles with corresponding optic pallor or ischemic changes Suspected old RAO (arterial attenuation, localized or diffuse atrophy, ghost vessels)	No clinical signs of RAO or history of RAO on fundus
AMD	Intermediate AMD (AREDS category 3): Large drusen ≥ 125μm (soft drusen) or many medium drusen with pigmentary abnormalities in the macula Advanced AMD - exudative (neovascular) AMD: subretinal hemorrhage, exudates, fibrosis, PED or polyp-like elevation, disciform scar, vitelliform lesion, PCV or PCV rupture - geographic atrophy involving or approaching the fovea	include fundus photo with only a small number of drusen <125 μm (small to medium size) Without pigmentary changes, without GA or CNV, any hemorrhage or exudation
MMD	Posterior staphyloma visible on fundus photography (bulging of posterior pole, large oval area of chorioretinal atrophy)	No myopic retinal degenerative lesion Tessellated fundus without

	OR Pathologic myopia with features - myopic CNV or CNV scar - lacquer cracks, Fuchs spot - hemorrhage (CNV) - retinoschisis - Myopic macular traction - Diffuse chorioretinal atrophy - Patchy chorioretinal atrophy - Macular atrophy	diffuse/patch/macular atrophy or any plus features included in referable MMD
DR	Worse than moderate NPDR on fundus photography : when 45' fundus photo shows multiple hemorrhages, venous beading, IRMA, NV Any signs of DME surrogate on color fundus: Hard exudates or hemorrhages on macula Tractional RD or fibrovascular membranes on color fundus photograph Preretinal or vitreous hemorrhage	No DR or mild NPDR only hemorrhage or hard exudate not visible on 45' color fundus
ERM	Fovea-involving ERM, absolute macular pucker, retinal folds converging to fovea, pseudohole, lamellar hole, loss of foveal reflex OR ERM with retinal distortion (wrinkling/distortion)equivalent to Stage ≥3. (dense, thick membrane, marked vessel tortuosity, macular distortion)	Perifoveal or extrafoveal ERM only Minimal macular wrinkling without clear foveal involvement Thin ERM
Optic pallor	Definite diffuse or sectoral optic disc pallor (temporal, altitudinal, diffuse etc) Pallor not explained by high myopia, artifact Suspect optic neuropathy	Normal disc color or physiologic variation Borderline temporal pallor judged as probably physiologic (ex. slight temporal pallor in high myopia)

4. Systemic condition

	Definition
Hypertension	Hypertension was defined as BP ≥ 140/90 mm Hg or antihypertensive medication use
Diabetes Mellitus	DM was defined as fasting glucose > 126 mg/dL, random glucose ≥ 200 mg/dL, HbA1c ≥ 6.5%, or use of glucose-lowering medications.

5. Image quality

Usable 0	Bad 1
Both the optic disc and macula are visible The overall resolution and contrast are adequate to evaluate key lesions such as hemorrhages, drusen, exudates, and vascular changes Mild blur, minor media opacity, or small artifacts may be present, but they do not significantly interfere with disease assessment or referability judgement	The optic disc or macula is not fully visible, or Severe blur, dense media opacity, marked over or under exposure makes it impossible to determine the presence or absence of key lesions