

Age-Related Eye Disease Study (AREDS) Ocular Photographs

Ocular Photograph Grading Procedures

AREDS ocular photograph sets were evaluated (“graded”) at the AREDS Photograph Reading Center for both AMD and lens opacity, according to the following classifications.

The Age-Related Eye Disease Study Research Group. The age-related eye disease study system for classifying age-related macular degeneration from stereoscopic color fundus photographs. AREDS Report Number 6. *Am J Ophthalmol.* 2001 Nov; 132(5):668-81.

The Age-Related Eye Disease Study Research Group. System for classifying cataracts from photographs. AREDS Report No. 4. *Am J Ophthalmol.* 2001 Feb; 131(2):167-175.

The procedures used by the AREDS Photograph Reading Center are described in detail in Chapter 8 of the AREDS Manual of Operations. A summary of these procedures is provided below.

Overview of Digital Ocular Photographs Available

The ocular photographs that were digitized include the following:

- Baseline visit (Visit # = 00), 2 year study visit (Visit # = 04), 4 year study visit (Visit # = 08), 6 year study visit (Visit # = 12), 8 year study visit (Visit # = 16), and the 10 year study visit (Visit # = 20).
- First photo showing advanced AMD
- End of clinical trial photo
- Last photo available

All subjects have baseline images; if a subject missed an intervening visit, or left follow-up before year 10, the corresponding images will be missing from that subject’s series.

Image sets consist of three different image groupings, each with its own purpose(s) regarding documentation of ocular features and abnormalities: 1) fundus (retinal) photographs, 2) lens photographs, and 3) fundus reflex photographs.

Fundus (Retinal) Photographs

Fundus photographs consisted of 30-degree images, providing the following retinal views. For images designated as stereoscopic photographs, there are two constituent images, LS – left side and RS – right side.

F1M (Field 1M) – Stereo image centered on the temporal margin of the disc, and including an oblique view of the center of the macula near the temporal margin of the field.

F2 (Field 2) – Stereo image centered on the center of the macula.

F3M (Field 3M) – Monoscopic image centered temporal to the macula, and including an oblique view of the center of the macula near the nasal margin of the field. Because the photographer was not constrained to maintain optical separation between members of a stereo pair, but instead was able to choose the optical pathway through the lens providing the clearest retinal view, this image may have the sharpest focus in the set.

The oblique views may provide, in some cases, a better view of pigment abnormalities – particularly hyperpigmentation or increased pigment.

Lens Photographs

Lens photographs consisted of two kinds of images, retro-illumination (“Neitz”) and slit lamp (SL), each of which documents one or more different types of lens opacity (cataract). The Neitz camera includes cross-polarized optical filters, which eliminate the bright central circular reflection of the camera flash from the cornea, but which cause a subtle cross-shaped shading artifact in the image.

Neitz retro-illumination image pair (cortical and posterior sub-capsular (PSC) opacities), taken at two depths in the lens, due to the shallow depth of field of the camera, so as to document the anterior and posterior lens cortex, respectively.

- Anterior – Focused on the iris margin, or on the most anterior cortical opacity if present.
- Posterior – Focused on the posterior part of the lens (2.8 mm posterior to the anterior image, by linear potentiometer), or on posterior subcapsular cataract if present.

Slit lamp image (nuclear opacification, or “sclerosis”)

- Single vertical slit image illuminated at 45° from the imaging path, so as to capture an anterior-to-posterior view of the lens nucleus

Fundus Reflex Photograph

Stereoscopic fundus reflex (red reflex) image, taken with the fundus camera but documenting the anterior segment of the eye, focused on the papillary margin, capturing the cornea, anterior chamber, iris, lens, and possibly, when present, vitreous opacities. Fundus reflex photographs typically capture most cortical and/or posterior subcapsular lens opacities present – except that the bright central circular reflex of the camera may obscure a small central PSC opacity.

Image File Naming Convention

Ocular photograph images were named using a consistent file naming convention as described below.

Using the example of filename 1234¹_04²_LE³_F1M_LS⁴ each part is as follows:

¹1234 = dbGaP Subject ID (ID2).

²04 = Study Visit (VISNO). All study visit codes will be 2 digits (e.g., 00, 01, 02, ...24, etc.).

³ LE = Left eye. RE = Right eye.

⁴ F1M_LS = Photo type. The following are the possible photo types for each eye and what they mean:

Fundus photo types:

F1M_LS = Field 1M - left side

F1M_RS = Field 1M - right side

F2_LS = Field 2 - left side

F2_RS = Field 2 - right side

F3M = Field 3M

FunRef_LS = Fundus reflex - left side

FunRef_RS = Fundus reflex - right side

Lens photo types:

Neitz_Ant = Anterior Neitz

Neitz_Pos = Posterior Neitz

SLTLMP = Slit Lamp

ADDENDUM added by dbGaP in 2014:

In 2014 over 134,500 additional fundus photographs have been released.

While the specifications of the document: "Age-Related Eye Disease Study (AREDS) Ocular Photographs" still apply, please note that the new (2014) image files are not directly linked to Areds_subject_ids, but are linked to RC_IDs referring to the image directory. To facilitate look-up of subject ids, a mapping file has been created and is available in Authorized Access (AREDS image files/ AREDS Image Files 2014): **AREDS_Image_Mapping_ImageDir_ID2.txt**. This file includes two columns: RC_ID and id2, referring to the image directory id and the Areds Subject id, respectively, and allows mapping of the two ids.