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## Non-mydriatic fundus Photography for the Evaluation of Patients with Vision Loss in Canadian Emergency Settings

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**Introduction:** Fundoscopy is an essential component of the initial evaluation of patients with vision loss but is challenging for non-ophthalmologists. For emergency medicine physicians, non-mydriatic ocular fundus photography is superior to other forms of ophthalmoscopy in sensitivity, specificity, and inter-examination agreement. Our study evaluates the use of non-mydriatic photography as a triage and telemedicine tool for the evaluation of patients with vision loss in a Canadian emergency setting. The study design is a prospective cross-sectional study of patients presenting to emergency ophthalmology clinics at the Trillium Health Partners-affiliated sites between August and October 2023 with a chief complaint of vision loss.

**Methods:** Non-mydriatic fundus images of both eyes were obtained by a non-ophthalmologist using a handheld, non-mydriatic fundus camera prior to pupil dilation. The images were shared with a single fellowship-trained ophthalmologist without patient context. The reviewer was asked to (1) select the best photo obtained for each eye and rate image quality on a Likert scale of 1 (critical features of the posterior pole can not be distinguished) to 5 (all details of critical features visible), (2) comment on the presence or absence of fundus abnormalities and (3) provide an opinion on whether the fundus image would have changed patient disposition if available at the time of the initial ED exam. In the second phase of the study, the same fundus images will be shared with the referring ED physician, who will be asked the same three questions.

**Results:** Of 36 patients thus far evaluated in the ED for vision loss, only 5 (13.9%) had a documented fundus examination. All 36 patients had fundus photos obtained at the time of next-day Ophthalmology consultation, and 86.1% (62/72) of images were deemed to have acceptable quality (Likert scale  $\geq 2$ ). Factors limiting image quality included media opacity (i.e. vitreous hemorrhage, cataract), pupillary miosis, photosensitivity, and eyelid/periorbital abnormalities (i.e. edema). 16.7% (6/36) of patients had a visible fundus abnormality noted on photography that was not seen at the time of the initial ED exam. In each case, ED consultation with Ophthalmology was not sought, and outpatient consultation with Ophthalmology was arranged. Fundus abnormalities included macula-off retinal detachment, optic disc pallor, macular scarring, macular hemorrhage, and dot-blot hemorrhage.

**Conclusions:** Fundoscopy is infrequently performed in the emergency setting for patients presenting with vision loss. Our interim results indicate that non-mydriatic ocular fundus photography is a cost-effective, reproducible method of fundus examination, even for non-expert examiners. Further analysis is needed to determine if in-person or remote viewing of fundus images can inform more accurate triage decisions, either by indicating the need for expedited care or by providing reassurance that Ophthalmology consultation can occur less urgently.