Feasibility and acceptance of retinal imaging in a medical clinic by non-expert imagers

Purpose: To assess feasibility and acceptance of retinal imaging with non-mydriatic Color Fundus Photographs (CFP) and OCT imaging performed by non-expert personnel in a medical clinic setting. We hypothesized that non-experts could acquire diagnostic quality retinal images in a non-ophthalmology medical clinic, and that this process would be accepted by patients.

Methods: We recruited adults at risk for retinal disease from an endocrinology clinic (inclusion criteria: diagnosis of diabetes), and a geriatrics clinic (inclusion criteria: age>70y). After informed consent, participants underwent non-mydriatic retinal imaging on the iFusion device (Optovue, Fremont, CA). Imagers without expertise in ophthalmology were trained and certified to use the iFusion. After remote imaging, subjects completed a questionnaire about the experience and were scheduled for a reference standard dilated examination by a retinal specialist with imaging (CFP and OCT). Remote images were graded dichotomously by masked readers for interpretability and presence of referable retinal pathology, with each eye graded independently.

Results: For the first 50 subjects (100 eyes) enrolled in the study, 68% of remote CFP and 97% of OCT were interpretable. 42 subjects (84 eyes) completed reference standard examination thus far, and of these, 31 eyes (37%) had referable retinal pathology. Sensitivity (SE) and specificity (SP) to detect referable retinal pathology for remote CFP was SE=90%, SP=57%; for OCT, SE=81%, SP=0.83% when uninterpretable images were considered equivalent to referable pathology. Only 33% of eyes with uninterpretable CFP had referable retinal pathology on reference standard exam. Questionnaires indicated that 57% favored remote imaging over in-person examination, 35% expressed no preference, and only 8% expressed a preference for in-person examination.

Conclusions: These results indicate that non-expert imagers can successfully acquire non-mydriatic OCT images (97% interpretable) using the iFusion system. Acquisition of interpretable CFP in these high-pathology populations is more challenging (32% uninterpretable). The high SE and lower SP for remote CFP was driven by uninterpretable CFP which forced referral. Survey results indicate a high degree of acceptance and preference for remote imaging versus full examination. Rigorous comparative effectiveness research will be required to evaluate emerging remote diagnosis systems.