

Tele-ophthalmology in the Community Pharmacy Setting: A Novel Model of Care

Diabetic retinopathy (DR) is a retinal vascular disorder characterized by changes in the blood vessels of the retina that begins without symptoms and can advance to blurry vision, dark or floating spots, difficulty differentiating colors, and/or problems focusing.^{1,2} Blindness and vision impairment in adults due to DR are highly prevalent and disabling conditions in the US, affecting at least 3.3 million people over age 65.²⁻⁶ The number of people with DR will increase more than three-fold by 2050, creating an immense and costly public health problem.⁷⁻⁹ In 2004, for example, blindness from DR accounted for approximately \$500 million in direct medical costs, and exponentially more in indirect costs to society.¹⁰ Clinical trials demonstrating the efficacy of these treatments led the American Academy of Ophthalmology and the American Diabetes Association to recommend that all patients with diabetes have annual **dilated fundus examinations (DFEs)** to reduce their risk of vision loss.^{11,12} In addition, *Healthy People 2010* goals encourage 75% of all persons with diabetes to have a DFE.¹³ New effective treatment can also slow the rate of progression of retinopathy¹. Despite this fact, only 50% to 60% of adults with diabetes follow this recommendation and an estimated 50% of patients are diagnosed too late for treatment to be effective.¹³⁻¹⁵

The Wills Eye Institute Department of Research is participating in a collaborative study with the Centers for Disease Control and Prevention along with other leading U.S. eye care institutions. One of the initiatives being tested is the use of a non-dilated eye screening program for people with diabetes, in a pharmacy-based setting. These screenings have the potential to improve health care outcomes and compliance by increasing access to eye care and earlier detection of diabetic retinopathy.

Eye screenings are taking place at the outpatient pharmacy operated by the Thomas Jefferson University Hospital in Philadelphia. Before patients are screened, they complete a brief questionnaire to capture the patient's past medical history, hemoglobin A1c levels, and current diabetes medications. The screening process takes less than ten minutes and consists of a visual acuity test, followed by a fundus photo (painless, non-dilated image of the retina taken with a Nidek camera). The images are sent electronically to the Wills Eye Department of Telemedicine and read by retina specialists. The final diagnosis and follow-up recommendations are mailed to the patient within two weeks. This technology has the potential to facilitate access to eye care for patients with diabetes, and to delay the progression to diabetic retinopathy. Furthermore, when located in a community pharmacy setting, this screening is very convenient for patients who are short on time or do not have the financial resources or health insurance to cover visits to a specialist. Since this eye screening does not require dilation of the pupils, minimal time is spent getting an eye exam.

While tele-ophthalmology screenings hold promise for improving patient care, the utility of this technology in community settings depends on the volume of patients screened. The current study is being conducted in a pharmacy with an average of 1700 prescriptions filled weekly. Long-term sustainability will depend on 1) whether or not insurance companies will add it to health care coverage, and 2) whether participating pharmacists are afforded the necessary time to contribute. To date, Wills Eye has screened a total of 143 patients; preliminary findings suggest that more than 10% of patients show signs of diabetic retinopathy (background diabetic retinopathy,

proliferative diabetic retinopathy, pre-proliferative diabetic retinopathy, maculopathy or previous laser treatment). Early data also suggest that the camera has the potential to detect other eye abnormalities such as cataracts and hypertensive changes. These results provide incentive and purpose for future utilization of tele-ophthalmology screenings.

The program represents a novel model for engaging community pharmacists in a team approach to managing diabetes. Pharmacists are considered to be trusted health professionals and are generally very accessible. Specific actions taken by pharmacists involved in the program include: counseling patients on the importance of eye screening when they pick up their diabetes medications and providing continued reminders to the patient about the importance of following up with their physician about diabetes eye care.

Data on the impact of the program, number of patients with DR, and outcomes are being collected. Primary measures include the impact of the screening in detecting DR and the rate of patient follow-up to an ophthalmologist for ocular pathology detection at the screening. If successful, the program has the potential to stimulate adoption of this emerging technology in other community pharmacy settings. ■

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REFERENCES

1. Fraser C, D'amico D. Classification and clinical features of diabetic retinopathy. UpToDate. <http://www.uptodate.com/contents/classification-and-clinical-features-of-diabetic-retinopathy> Accessed June 19, 2012.
2. The Eye Diseases Prevalence Research Group. Causes and prevalence of visual impairment among adults in the United States. *Arch Ophthalmol.* 2004; 122:477-485.
3. The Eye Diseases Prevalence Research Group. Prevalence of cataract and pseudophakia/aphakia among adults in the United States. *Arch Ophthalmol.* 2004; 122:487-494.

4. Lee PP, Feldman ZW, Ostermann J, et al. Longitudinal prevalence of major eye diseases. *Arch Ophthalmol*. 2003; 121:1303-1310.
5. Vitale S, Cotch ME, Sperduto RD. Prevalence of visual impairment in the United States. *JAMA*. 2006; 295:2158-2163.
6. Kempen JH, O'Colmain BJ, Leske MC, et al. The Eye Diseases Prevalence Research Group. The prevalence of diabetic retinopathy among adults in the United States. *Arch Ophthalmology*. 2004;122(4):552-563.
7. Saaddine JB, Honeycutt AA, Narayan KM, et al. Projection of diabetic retinopathy and other major eye diseases among people with diabetes mellitus. *Arch Ophthalmol*. 2008;126:1740-1747.
8. Fricke KD, Gower E, Kemben J, et al. Economic impact of visual impairment and blindness in the United States. *Arch Ophthalmol*. 2007; 125: 544-550.
9. Javitt JC, Zhou Z, Willke RJ. Association between vision loss and higher medical care costs in medicare beneficiaries. *American Academy of Ophthalmology* 2007; 114: 238-245.
10. Rein T, Zhang P, Wirth K, et al. The economic burden of major adult visual disorders in the United States. *Arch Ophthalmol* 2006; 124: 1754-1760.
11. Diabetic Retinopathy Summary Benchmark - November 2008: *O.N.E. Network*: American Academy of Ophthalmology. <http://one.aao.org/CE/PracticeGuidelines/SummaryBenchmark.aspx?cid=ea5c6d25-2ab9-4398-b00b-8efcb8cc5bc7>. Accessed June 19, 2012.
12. Diabetic Retinopathy. American Diabetes Association. *Diabetes Care* 2000;23 (Suppl 1): S73-76.
13. Department of Health and Human Services. Healthy People 2010: Understanding and Improving Health. 2nd ed. Washington, DC: Department of Health and Human Services; 2000.
14. Zhang X, Saaddine, JB, Lee PP, et al. Eye care in the United States. Do we deliver to high-risk people who can benefit most from it? *Arch Ophthalmol* 2007;125: 411-418.
15. Schoenfeld E, Greene J, Wu S, et al. Patterns of adherence to diabetes vision care guidelines, *Ophthalmology* 2001; 108: 563-571.