

Using AI to screen for diabetic eye disease feasible in the real world

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New research shows that an automated, artificial intelligence (AI) screening system accurately detects diabetic retinopathy 95.5 percent of the time. The system doesn't require the input of an expert

ophthalmologist and it can provide a reading in 60 seconds, making real-time screening possible for primary care practices and diabetes centers. Accurate, automated screening is an important development for millions of patients living with diabetes who need to be screened yearly for vision-threatening diabetic retinopathy. The researchers present their study today at AAO 2019, the 123rd Annual Meeting of the American Academy of Ophthalmology.

The number of people in the United States with [diabetes](#) is exploding. Today, more than 30 million Americans have diabetes. One in four will develop [diabetic retinopathy](#), which has become the leading cause of blindness among working-age Americans.

Diabetic retinopathy can develop over time in people with diabetes, especially when they have poor control over their [blood sugar levels](#). High blood sugar can damage tiny blood vessels at the back of the eye. Sometimes, tiny bulges protrude from the blood vessels, leaking fluid and blood into the retina. This fluid can cause swelling or edema in an area of the retina that allows us to see clearly. At first, diabetic retinopathy may cause no symptoms or only mild vision problems. Eventually, it can cause blindness.

Ophthalmologists have effective treatments for diabetic retinopathy, but they work best when the condition is caught early. That's why ophthalmologists recommend patients be screened every year. But as the number of Americans who require regular screening grows, ophthalmologists need an accurate, automated system that can identify patients who need to be seen for treatment.

A system called EyeArt has shown promise in earlier studies. But ophthalmologists want to be sure they can rely on it. To learn more, Srinivas Sadda, MD of the Doheny Eye Institute/UCLA and his colleagues across the United States compared EyeArt against experts

using the gold-standard grading system (ETDRS) as part of a pivotal trial.

EyeArt was used to screen 893 patients with diabetes at 15 different medical locations. Results were then reviewed for clinical accuracy by certified graders. Using only undilated images (patients' pupils were not dilated), the EyeArt system's sensitivity was 95.5 percent, and specificity was 86 percent. Only a small fraction of eyes required dilation to achieve an image good enough to be graded. When including these additional patients in the analysis, the sensitivity remained the same, specificity improved to 86.5 percent, and gradability improved to 97.4 percent. More than 90 percent of the eyes identified as positive by the EyeArt system had diabetic [retinopathy](#) or another eye disease per the reference standard.

"Diabetic patients already outnumber practicing ophthalmologists in the United States, and unfortunately, that imbalance is only expected to grow," Dr. Sadda said. "Accurate, [real-time](#) diagnosis holds great promise for the millions of patients living with diabetes. In addition to increased accessibility, a prompt diagnosis made possible with AI means identifying those at risk of blindness and getting them in front of an ophthalmologist for treatment before it is too late."

Provided by American Academy of Ophthalmology

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