



Using Telemedicine to Prevent Blindness in West Virginia's Diabetic Population

West Virginia University Medicine includes physicians and scientists of the West Virginia University Health Sciences Center, and the hospitals, clinics, and health professionals of the West Virginia University Health System, including the West Virginia Eye Institute. Together they provide the most advanced healthcare possible to the people of West Virginia through a network of primary care and specialty physicians, community hospitals, critical access hospitals, a children's hospital, and a 645-bed academic medical center that offers tertiary and quaternary care.

Established in 2013, the West Virginia Practice-Based Research Network (WVPBRN) is a partnership of primary care clinicians/practices and research entities, including WVU, that work together to answer community-based healthcare questions and translate research findings into meaningful everyday practice. A program of the West Virginia Clinical and Translation Science Institute (NIH/NIGMS Award U54GM104942)¹ WVPBRN's statewide network of 68 individual sites is focused on more than 40 projects and a variety of topics, including prevention of diabetic retinopathy in West Virginia's diabetic population.

CHALLENGE

The characteristics of West Virginia present special problems in the delivery of health care and specialty care, particularly eye care. In this rural state, due to transportation challenges, education or economic issues, 64% of West Virginians with diabetes are at risk for blindness. With limitations of both access to care and diabetic education unfortunately patients are unaware of the importance of prevention and the potential rapid progression of diabetic eye disease. The lack of information creates a lack of urgency to seek out necessary preventative care and treatment options, including the annual Diabetic Eye Evaluation (DRE).

For physicians and other healthcare providers, the high rate of patients with diabetes not receiving this critical evaluation impacts not only patient outcomes, but also key quality measures that are important to long-term financial sustainability and success.

In partnership with West Virginia University (WVU), WVPBRN set up a program with the hopes of accurately identifying and improving the true rate of diabetic retinopathy (DR) in West Virginia. To ensure that the project was given sufficient time to assess reimbursement and sustainability, WVPBRN and the WVU Eye Institute applied for funding to help rural sites obtain a diabetic retinopathy telemedicine solution. With funding, they were able to acquire the cameras and the technology behind the IRIS Intelligent Retinal Imaging System. After successfully receiving a pilot grant from the WV Clinical and Translational Science Institute, WVU and WVPBRN were ready to implement the program and determine the effectiveness of implementing IRIS DRE technology in a primary care setting as a way to increase compliance for this highly vulnerable patient population.

THE SOLUTION

Partnering with IRIS, WVPBRN and WVU implemented their DRE program at three primary care sites across the state that were part of the WVPBRN, as well as at two WVU academic sites. Working with the primary care sites, the WVPBRN sought to recruit adult patients with diabetes who had a care gap for the annual DRE within the current and previous calendar year.

Telemedicine is an efficient, reliable, and cost-effective diagnostic process. Instead of the patient traveling long distances to consult experts, telemedicine leverages technology that enables remote and timely patient evaluation. By implementing the IRIS technology at the primary care level, patients receive the preventative DRE during routine office visits with their primary care provider, whom is likely to already be managing their diabetes with other diabetic tests such as their HbA1cs and annual foot checks.

In what is typically a less than five-minute process, front line staff captures a fundus photograph of the retina. Through IRIS telemedicine, images are immediately exported securely through the cloud where ophthalmologists and retina specialists interpret the images via an FDA II telemedicine grading platform. Leveraging the bidirectional interface, the final graded results are delivered directly to the patients' electronic medical record (EMR) with ICD-10 discrete data.

Through the telemedicine platform, recommended care plans and referral paths are returned to primary care. Referrals are made for appropriate follow up treatment with a specialist based on the level of severity diagnosed.

The identification of retinal disease in patients with diabetes is an indication that their diabetes is not being adequately controlled. As such, physicians can also use this information to identify where it is necessary to apply systemic control criteria more aggressively. Providers in the program are also taking the new information and using it to better educate their patients, and manage their diabetes.

RESULTS

In the first 13 months - 1,564 exams performed.

Closing Care Gaps:

- 31% Patients Examined had identifiable pathology
- 16.17% were diagnosed with diabetic retinopathy that otherwise would have gone undiagnosed and untreated.
- 24.4% patients were identified and referred for other forms of ocular pathology such as glaucoma, cataract or macular degeneration.

Improving Quality Care Measures:

- Quality measures increased by 20% in the first four months of the program, with some providers achieving greater than 80% compliance by the end of the first year.

Improving Patient Satisfaction: Implementation at primary care has improved convenience, allowing patients to experience:

- More information about managing their disease
- Deeper trust with their physician
- Better chances for improved outcomes

Leveraging IRIS technology helps overcome common barriers to the exam:

- Exams performed quickly as part of routine check-up, and typically do not require dilation
- Improved Access to Specialty Care in underserved areas
- Improved provider-to-patient conversations about diabetic complications as a result of non-compliance
- Less travel required/time needed for a specialty care visit

Proactive communication in advance allows for better prepared patients:

- EHR integration allows for reminder call in advance of primary care appointment for a better patient experience
- Scheduling for the exam can happen at the same time of patient's existing appointment to improve patient satisfaction

Improving Provider Satisfaction:

- Care gaps are closed, billing processes start, and results are reviewed via the bi-directional EHR interface.
- True diagnoses of end-organ damage gives providers the ability to better identify levels of high-risk patients and establish an appropriate care plan.
- The increase in patient exam compliance leads to improved quality measures.
- Direct referrals to eye care specialists are more accessible for patients with diagnosed eye disease vs. those for routine screenings.

Long-term, the program will improve care access at all levels. As healthy patients are removed from the clogged referral stream, access to specialty care will improve for patients diagnosed with pathology who need care for diabetic eye disease.

By bringing the exam to the patient, the likelihood of identifying and treating diabetic retinopathy is increased significantly, especially in this largely rural state where there are potential barriers to accessing ophthalmologists or retinal specialists. For primary care physicians and their patients IRIS technology is a sight-saving imperative.

Telemedicine Connects West Virginia's Diabetic Population with Sight-Saving Diabetic Retinopathy Exams

The number of patients diagnosed with diabetes in West Virginia is approaching epidemic levels. On a nationwide per-capita basis, West Virginia currently has the second highest rate of diabetes in the U.S. More than 250,000 individuals (15%) have been diagnosed with the disease, and another 62,000 are undiagnosed but likely on a pre-diabetic trajectory with no chance of reversal.

Diabetic retinopathy is the leading cause of preventable blindness in the United States in people 20 to 65 years of age. At current rates, one in three Americans with diabetes will have diabetic retinopathy by 2050. Early detection can reduce the risk of severe vision loss by 90 percent, and can also significantly reduce long-term healthcare costs. However, an important factor to early detection is education, and in the state of West Virginia many patients are unaware of the rapid progression of diabetic eye disease and the risk it poses to their vision.

"Although patients with diabetes are supposed to get evaluated for retinopathy yearly, in West Virginia only about 60% received eye care in the past year," said Dr. Ronald L. Gross, M.D., Chair of Ophthalmology at West Virginia University. *"Telemedicine has enabled remote and timely consultations, and reduced access disparities in rural, underserved, and geographically isolated communities. Combined with the fact that most patients don't realize the importance of receiving*

regular eye exams, it's not a surprise that we have such a large gap in care."

For the hundreds of physicians and other health care providers who treat West Virginia's diabetic population, this significant care gap is cause for concern. In response, a small community hospital, realizing that their patients with diabetes were not receiving proper preventative eye examinations, reached out to the WVPBRN for help. The result was a partnership between WVPBRN, WVU and IRIS, with the goal of identifying the rate of diabetic retinopathy and whether it was feasible to implement DRE technology at the primary care level.

Bringing DRE to the Patient

Using IRIS DRE technology, WVU and WVPBRN implemented a diabetic retinopathy evaluation program at a handful of primary care locations across the state, including three sites that were part of WVPBRN, and two WVU Medicine academic sites. Working with the WVU Eye Institute, WVPBRN sought to recruit adult patients with diabetes who have not had a DRE during the current or previous calendar year, and had no future plans to have the exam.

Implementing the IRIS solution in the primary care office, patients are given exams at their regular appointment. *"The IRIS telemedicine solution enables us to bring this critical exam directly to our patients, helping relieve the burden of getting them to the retinal specialist or ophthalmologist, which for many of our patients can be hours away,"* said Mathew Weimer, M.D., Valley Health Systems. *"Patients have also told us that they are grateful for the simplicity of the exam, which requires no dilatation and very little to no effort on their part."*

"Before implementation of the IRIS program we were facing a breakdown at practically every level, which was creating significant issues with getting our patients to complete their annual retinal exams," said Dr. Gregory Peters, M.D., Community Care West Virginia. *"Whether it was cost-related, or simply the act of follow through on either the patient or the physician side, exams weren't happening at the rate they should have been. This breakdown creates a care gap that not only impacts us financially, but puts our patients with diabetes at a much greater risk of developing diabetic retinopathy."*

Closing the Gap and Improving Quality Measures

Since program implementation more than 1,564 patients have been examined, and 253 (16.17%) have been diagnosed with diabetic retinopathy. Another 383 (24.4%) patients were identified with some other form of ocular pathology like glaucoma, cataract or macular degeneration.

“It is evident that bringing the exam directly to our patients is helping us make significant progress at closing the care gap,” said Dr. William Lewis, M.D., Harpers Ferry Family Medicine. *“Before the program at least 50% of our patients were unexamined. Since implementation that number has been cut in half, and at least 26% of patients who have undergone the examination have been diagnosed with some sort of ocular pathology that they would not have known about otherwise.”*

According to Dr. Gross, *“At each of our provider sites the implementation of this program has increased quality measures by an average of 20% in the first four months. Patients are happy that access to the exam is convenient and efficient, and our provider sites are finding that not only is the test easy to administer, the integration with the EHR makes reporting and documentation simple and streamlined.”*

Retinopathy is the leading cause of blindness in working-age diabetes patients living in developed countries. DRE is found in almost 40% of all patients with diabetes and in nearly all patients who have had diabetes for over 20 years. The number of diabetic retinopathy cases is expected to double by 2050. In West Virginia, if early results are any indication, there are a substantial number of patients who may be in danger of developing this sight-threatening condition.

“Using IRIS telemedicine at the primary point of care allows patient evaluation in a quick and accurate manner with more complete detection of ocular pathologies in the earliest stages, when treatments are most effective,” said Dr. Gross.

Forming Partnerships in the Name of Putting Patients First

For the physicians and care providers that treat West Virginia’s diabetic population the statistics, while troubling, are not discouraging. In fact they are having the exact opposite effect. It is because of the dedication to their patients and the desire to see them healthy that the program was implemented and is off to a great start. Because one community hospital decided to take matters into their own hands, thousands of patients with diabetes are able to access sight-saving preventative care. West Virginia University is now exploring how to scale this program statewide in an effort to end preventable blindness.

Not traditionally seen as partners, the joint effort between ophthalmology and primary care is creating new partnerships and creating unity across all specialties for a single cause.

“My patients trust that I am going to treat them based on all information possible,” said Dr. Peters. *“Any level of diabetic eye disease is a key indicator that I need to be more aggressive with their care. Having this partnership with my Ophthalmology peers empowers me to deliver that higher level of care to my at-risk population.”*

“This is very much a collaborative effort on the part of primary care physicians, ophthalmologists, retinal specialists and other care providers all across the state,” said Dr. Gross. ***“Because of the data being generated through this program, everyone has a clearer understanding of how we can better care for this patient population, and we are working together to improve outcomes and reduce the rate of preventable blindness in West Virginia.”***

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