# Digital Health in Modern Optometry: Advanced At-Home Monitoring for Age-Related Macular Degeneration

Patients with AMD can receive comprehensive monitoring services from remote providers.

**By Sean W. Smolenyak, OD**

Patients with intermediate Age-Related Macular Degeneration (iAMD) may be at increased risk for converting to neovascular AMD (nAMD). Since frequent patient visits (ie, more often than every 3-6 months) to monitor for disease conversion can be impractical for clinicians and patients alike, Optometrists often turn to an Amsler grid. By instructing patients on how to use it, the hope is that patients will report signs of metamorphopsia that could suggest the presence of nAMD.

However, the Amsler grid is too simplistic a tool to screen for the worsening of such a complex disease. Incorporating digital health care models can help propel a practice into the realm of artificial intelligence (AI) and leverage the latest innovations in remote monitoring. In the case of monitoring iAMD patients for conversion to nAMD, the digital health care provider that leads the way is the Notal Vision Diagnostic Clinic.

Digital health care models have been embraced elsewhere in eye care. The iCare Home (iCare) is a tonometer designed for home-based IOP monitoring. Constant glucose monitoring, wearable heart monitors, and contact tracing technologies have become commonplace in endocrinology, cardiovascular medicine, and public health arenas, respectively. The time for embracing a digital health care model for retinal care has arrived.

## NOTAL VISION DIAGNOSTIC CLINIC

Patients with iAMD who enroll in the Notal Vision Diagnostic Clinic's ForeseeHome AMD Monitoring Program perform daily at-home testing with automated data analysis for evidence of conversion to nAMD. At-home monitoring supplements routine in-person examinations, allowing clinicians to have patients continually monitored for evidence of nAMD between office visits. In the case of the ForeseeHome AMD Monitoring Program, the system uses a daily preferential hyperacuity perimetry test.

A HIPAA-compliant portal allows physician access to individual patient ForeseeHome AMD monitoring data provided by the Notal Vision Diagnostic Clinic.
Image: Notal Vision

Results from the daily at-home tests are securely uploaded to the cloud and are analyzed by an AI algorithm to detect aberrations from the patient's baseline metamorphopsia map. In the event that a change is detected, which may indicate that a patient has converted from iAMD to nAMD, an in-house eye physician at the Notal Vision Diagnostic Clinic reviews the patient's most recent visual testing.

If the in-house provider observes that nAMD activity may be present, the Notal Vision Diagnostic Clinic alerts the referring Optometrist's office via an encrypted email that contains a link to an online portal with the patient's most recent at-home diagnostic examination. If the referring clinician's office does not read the message, the Notal Vision Diagnostic Clinic will then contact the office via telephone. At this point, the referring clinician decides the best course of action, which is usually an in-person examination. The Notal Vision Diagnostic Clinic only communicates with the patient

directly if they are unable to contact the office after multiple attempts. By not interfering with the doctor-patient line of communication unless required, the relationship and trust between the patient and the Optometrist is maintained.

An Optometric practice that refers patients to the Notal Vision Diagnostic Clinic's ForeseeHome AMD Monitoring Program does not incur any costs. After an order is sent to enroll the patient in the program, the Diagnostic Clinic is responsible for confirming benefits with the patient's health insurance, shipping the device to the patient, remotely training the patient on how to set up and use the ForeseeHome platform, as well as monitoring patient compliance. With the Notal Vision Diagnostic Clinic taking on these responsibilities, the referring practice can focus on providing care to patients rather than on managing the logistics of eligibility, inventory, and setup.

If the Notal Vision Diagnostic Clinic detects that at-home monitoring has stopped, the patient is contacted directly to inquire about the patient's health and to offer troubleshooting support. Patients who wish to take their ForeseeHome device to a new location—perhaps on vacation or to another home—can coordinate with the Notal Vision Diagnostic Clinic to reconnect to the platform.

Clinicians who wish to monitor use patterns and testing results for particular patients have 24/7 access to online patient records. Other clinicians might prefer monthly summaries of patient data or may opt to review patterns and results from the time period shortly before a patient's next in-office examination.

Just as routine in-clinic monitoring alone is inadequate for the detection of nAMD conversion, home-based monitoring by itself is not the most effective method for observing evidence of disease activity. At-home monitoring should be viewed as a supplement to, not a replacement of, in-clinic examinations.

## HOW THE LATEST DATA SUPPORT HOME-BASED MONITORING

Two recent studies found that early detection of nAMD may be key to preserving vision, and that use of an at-home/in-person model for detection is an effective screening method for disease conversion.

A 2020 retrospective study reviewed data of real-world patients with nAMD. The study authors found that eyes that presented with at least 20/40 VA at baseline maintained a mean VA of at least 20/40 after 1 and 2 years of anti-VEGF therapy.[1] However, among eyes that had less than 20/40 VA at baseline, mean 20/40 VA was not achieved at either 1 or 2 years. Approximately 66% of real-world patients in the study presented with VA worse than 20/40, illustrating that a majority of real-world patients lose significant vision before being detected.

A 2021 retrospective study reviewed the data of patients who used the Notal Vision Diagnostic Clinic and had at least 20/60 VA at baseline (ie, when at-home monitoring was prescribed).[2] Patients in the study were monitored for disease progression by both the device and by in-person examination conducted routinely or when symptoms presented.

Researchers identified 306 patients who converted from iAMD to nAMD. Among them, 69% of patients had disease detected via at-home monitoring. Median baseline at the time of nAMD detection was 20/32-1, which is above the 20/40 threshold described in the 2020 study above. Approximately 36% of patients who converted to nAMD had at least 20/40 VA at baseline, and 81% of those patients had 20/40 VA when nAMD disease activity was detected.

Given the findings of these two studies, Optometrists should strongly consider referring their iAMD patients to the Notal Vision Diagnostic Clinic, facilitating early detection and a qualified referral for treatment for patients who convert to nAMD.

## PUSHING EYE CARE INTO THE MODERN AGE

As patients become more familiar with digital health care models, they may come to expect that their Optometrist embrace such frameworks. The Notal Vision Diagnostic Clinic uses at-home monitoring to supplement the in-person examinations that patients have come to rely on without interrupting the workflow of a practice, thus enabling maximum patient engagement with minimal clinical disruption.

In this digital health care model, at-home testing devices, AI systems, remote monitoring centers, and a patient's Optometrist combine forces to provide the most comprehensive monitoring system available to patients with iAMD. For some, it could mean the difference between early intervention and permanent vision loss.

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1. Ho AC, Kleinman DM, Lum FC, et al. Baseline visual acuity at wet AMD diagnosis predicts long-term vision outcomes: an analysis of the IRIS registry. Ophthalmic Surg Lasers Imaging Retina. 2020;51(11):633-639.
2. Ho AC, Heier JS, Holekamp NM, et al. Real-World performance of a self-operated home monitoring system for early detection of neovascular age-related macular degeneration. J Clin Med. 2021;10(7):1355.



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