

The (Remote) Eye Doctor Will See You Now



The patient arrives at the Emergency Department of Howard County General Hospital after splashing a chemical in her eye. Until recently, if she needed an ophthalmologist, she would have been sent—by ambulance if necessary—to The Johns Hopkins Hospital. Now, she remains in Columbia for a remote eye assessment from an ophthalmologist at home, Fasika Woreta.

“I was able to obtain a history and look at an external image of the eye in real time,” says Woreta, director of the Eye Trauma Center at the Wilmer Eye Institute at Johns Hopkins. “I determined that she did not need to be transferred in the middle of the night.”

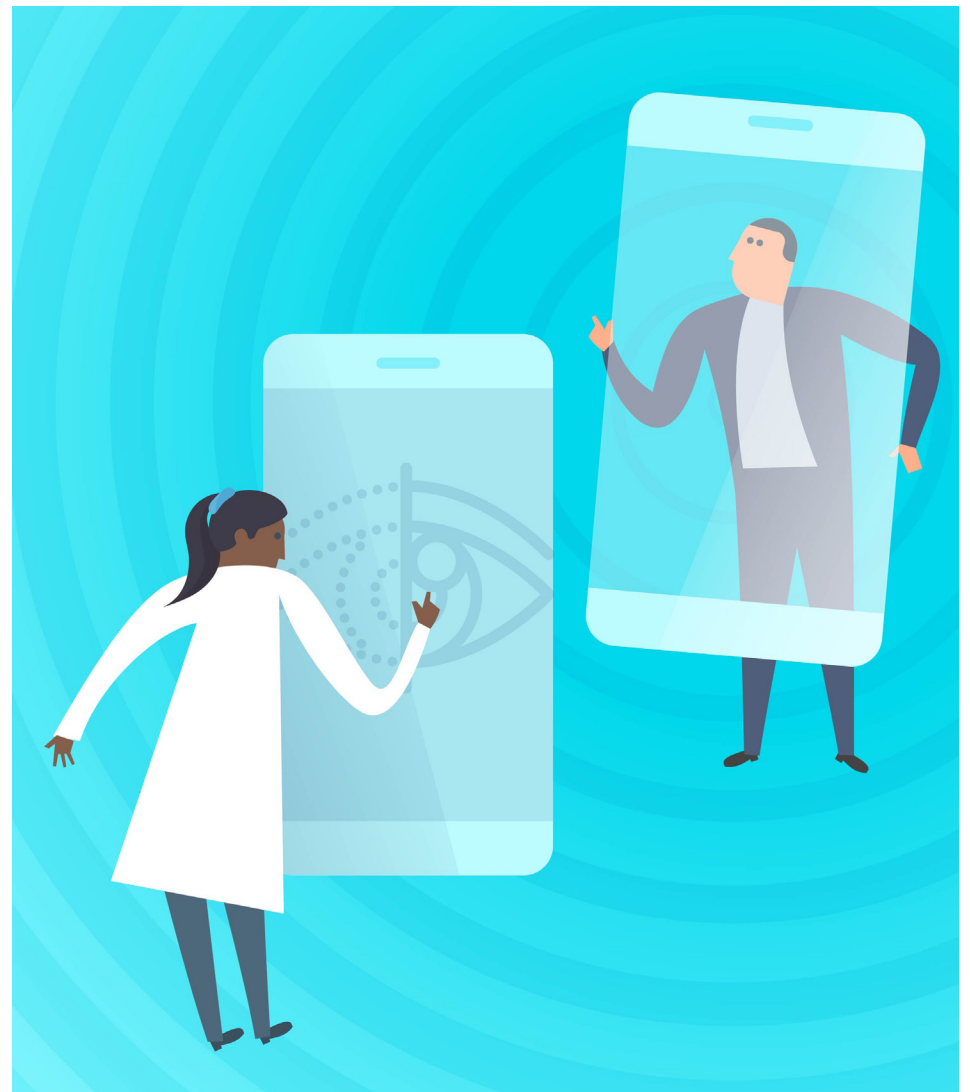
The ophthalmology telemedicine program, launched in May by Johns Hopkins Telemedicine, connects Woreta to Howard County General Hospital emergency room clinicians and patients on weekends and evenings, when the hospital does not have a local ophthalmologist on call.

Woreta uses a telemedicine app that’s been installed on her laptop, while the physician assistant or a nurse connects through a computer linked to the Epic electronic medical records system, which is part of a portable telemedicine cart.

The cart has a high-definition autofocus camera affixed to an articulated arm, which delivers real-time streaming images of the eye on Woreta’s laptop and on the telemedicine cart’s screen. It also has a freeze frame feature that automatically chooses the clearest image.

Through the link, Woreta, the patient and the emergency physician can speak to and see each other. Woreta can ask questions and request new camera angles.

By the end of August, Woreta says, she had used the technology to assess eight patients. In each case she recommended outpatient follow-up instead of transfer to The Johns Hopkins Hospital, saving patients considerable time and stress and saving the health system the cost of a second emergency department visit.



Three Approaches to Precision Medicine for Improved Patient Care



“A lot of people think precision medicine is genetic medicine,” says Scott Zeger, biostatistician and co-director of the Johns Hopkins Individualized Health Initiative. “While it does include genetic medicine, it has to be much more.” At Johns Hopkins, precision medicine means using the most modern science—today this includes bio-medical and data science—to address individual patients. The three main approaches include:



A mechanistic solution

This approach aims to find the specific mechanism, or physical cause of disease, in a person’s body.

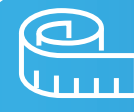
For example, if someone’s breast tumor has the human epidermal growth receptor 2 (HER2) gene, the individual can take a drug called trastuzumab (Herceptin). This treatment can help patients with the HER2 gene in early stage tumors by reducing the risk of recurrence and death.



A new way to measure the state of a disease

Measurements can provide information to more accurately determine how a disease is progressing in a patient and guide interventions for that patient.

An example from Johns Hopkins Medicine is a sweat sensor to monitor cystic fibrosis. People with cystic fibrosis have abnormally high chloride levels in their perspiration. The sensor automatically assesses the concentration of chloride ions in an individual’s sweat to monitor the status of the condition in near-real time.



New interpretations of measurements

By using large quantities of historical data about patients with a certain condition, clinicians can make better analyses of similar patients.

An example is a web application that predicts the status of an individual’s low-risk prostate cancer. The Johns Hopkins Medicine application synthesizes an individual’s demographic, clinical, biomarker and biopsy data into graphs that predict the person’s disease risks based on 20 years of data on similar patients.

WEB EXTRA: Learn more about Hopkins inHealth by clicking on this article at hopkinsmedicine.org/insight.



A look at innovative developments outside the halls of Johns Hopkins Medicine

Apps for Addiction

Developed by a chemical dependency and alcoholism counselor and a team from The Ohio State University, **SoberTool** teaches coping skills for people struggling with various addictions. It calculates the number of clean days and money saved and provides virtual rewards. A search engine lets users enter their feelings and find answers to deal with those feelings. SoberTool also asks questions and then provides answers to change relapse thinking to recovery thinking. 📱

Addicaid, built by a recovering addict and entrepreneur, helps people find support groups, connect with others and get inspired. The app lets users save support group meetings to a calendar, reminds them to attend and enables them to favorite, comment and tag meetings. Addicaid encourages people to get motivated through curated news, videos and a music feed, as well as asks questions to learn about the individual so it can offer personalized support. 📱

A University of Wisconsin team designed **ACHES** for patients leaving a treatment facility for alcohol use disorders. The app helps people build a network of peers and caregivers to provide 24/7 support. When in need, people can activate a real-time notification that is sent to caregivers. When a GPS locator finds a person is near an area they previously identified as an unhealthy environment, they are contacted and given reminders to engage in healthy behaviors. For caregivers, a weekly survey documents the patient's progress and presents a graph that reflects coping confidence over time. 📱

Testing a More Streamlined Way to Screen Patients



To simplify the process of screening patients before they make a trip to The Johns Hopkins Hospital or Johns Hopkins Bayview Medical Center, neurosurgeon Nick Theodore is working to customize existing software to gather and consolidate all of a patient's information in one place.

Traditionally, surgeons may need to review emails, imaging reports, electronic medical records and notes from different systems to obtain all of the information they need to decide which patients would benefit from an in-person consultation.

With this new system, patients will be prompted to complete a minutes-long, streamlined process via a website to provide their medical history and upload medical images. The neurosurgeons will then be able to access all of the information in one place to make a recommendation.

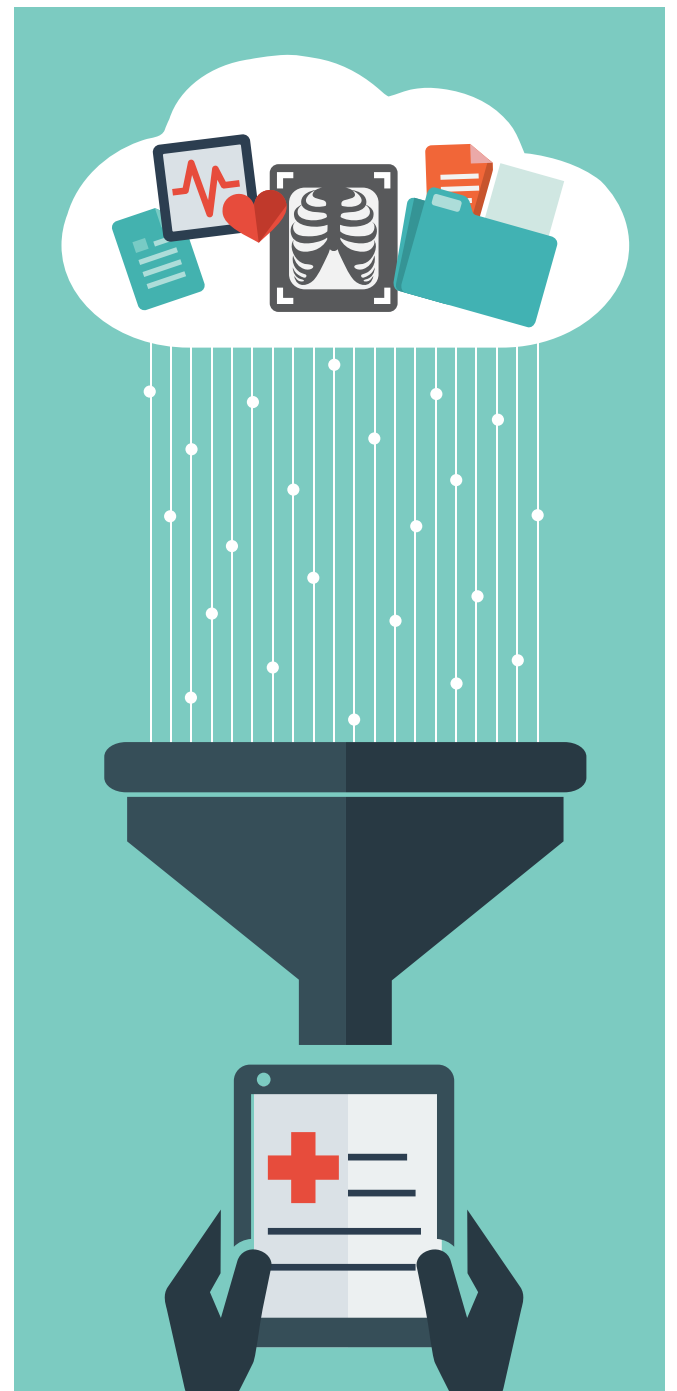
"When we review the MRI and history, we can make a decision whether we need to see the patient in person," Theodore explains. "Over the course of a lifetime, most people will experience lower back pain

but the percentage of those who need surgery for it is very small."

For patients who would not benefit from surgery, referrals are made to specialists in areas such as physical therapy and neuropsychology. "At that point, it's a matter of getting the patient to the right doctor," says Theodore.

This pilot program will be tested at The Johns Hopkins Hospital and Bayview Medical Center with patients seeking care from a spine neurosurgeon. If successful, the program will be implemented across the Department of Neurosurgery.

Ultimately, Theodore hopes to streamline the screening process so patients can quickly get the care they need and feel better sooner.



App to Make Medication Compliance for Opioid Addiction Easier



Research shows that people struggle to take prescription medication on a regular schedule. A mobile platform for medication adherence and patient engagement, called **emocha**, was licensed from Johns Hopkins and is now tackling the problem for people with opioid use disorder (OUD).

A critical component of treating OUD is medication-assisted treatment. One of the medications is buprenorphine, but many providers hesitate to prescribe it because they can't be sure it will be taken as prescribed.

The emocha technology helps patients achieve stability during buprenorphine treatment by video recording them taking their dose each day and asking them to report side effects or symptoms. It also helps patients keep track of their appointments, and it supplies educational content. Internet connectivity is not required to use the application—everything is date and time stamped and transmitted whenever a patient connects to data or Wi-Fi.

When providers review the patients' videos on a secure web portal, they can confirm medication adherence and address patient needs.

"If patients don't record themselves, it's considered a missed appointment," says

Sebastian Seiguer, co-founder and CEO of emocha Mobile Health and a Johns Hopkins alum. "An email alerts the provider, who can reach out to them to provide additional support. For those who did record themselves, the provider watches the video and verifies whether the medication was taken appropriately."

The platform is currently being implemented as part of a National Institute on Drug Abuse Small Business Innovation Research grant at the University of Washington and Boston Medical Center.

Seiguer co-founded

emocha Mobile Health with fellow Johns Hopkins alumni Morad Elmi and Gorkem Sevinc. The startup offers similar

apps for the management of tuberculosis and hepatitis C treatment.



WEB EXTRA: Learn more about emocha by clicking on this article at hopkinsmedicine.org/insight.