INSIGHT

TAPPING INNOVATIVE SOLUTIONS & TECHNOLOGY AT JOHNS HOPKINS MEDICINE

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EpiWatch App Records Seizure Data Using Apple Watch

Johns Hopkins researchers haven't wasted a moment when it comes to developing new technology to track epileptic seizures: EpiWatch is the first app created for Apple Watch that uses Apple's open-source software called ResearchKit. The invention will ultimately help people with epilepsy detect the most common types of seizures and notify help when appropriate.

For now, the app works like this: Patients who experience warning symptoms before a seizure can tap the EpiWatch icon. The app relies on the accelerometer and heart rate monitor in Apple Watch to record physiological changes and prompts users to play a memory game to gauge patient responsiveness during the seizure. The software works with patients who experience auras before having a seizure, but it can also be activated by caregivers.

EpiWatch's inventors, neurologists Nathan Crone and Gregory Krauss, say the app can help patients track seizures as well as medication use. Users are asked daily whether they've taken their medication and had a seizure; that information is then used in a journal that can help patients understand their illness and complications, such as drug side effects.

"We want to be at the forefront of this revolution in patients gaining control of their conditions through mobile devices," says Crone.

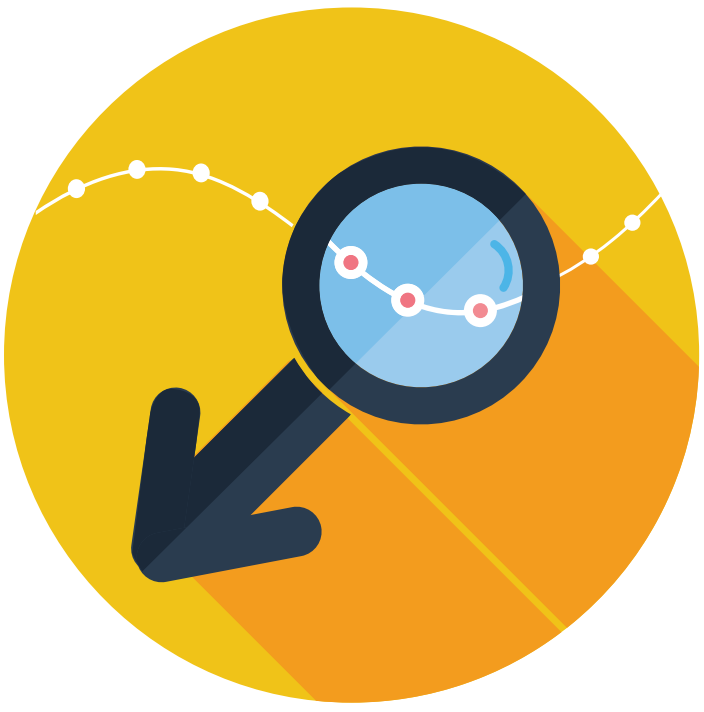
Crone and Krauss have big plans for EpiWatch—they've started a study with the data collected by their EpiWatch users to better understand epilepsy. Within one to two years, they hope to develop an app that detects most seizures and alerts emergency services or caregivers—something that could help people with epilepsy live more independently.

EpiWatch took about three months to develop, with help from the Johns Hopkins Technology Innovation Center. A provisional patent has been submitted.

WEB EXTRA: For information about how to create apps using ResearchKit, click on this article at hopkinsmedicine.org/insight or email tic@jhmi.edu.

New Compound Allows a Better Look at Prostate Cancer

Until Martin Pomper and his team engineered a new radioactive compound to light up prostate cancer cells on PET scans, it was hard to be sure that patients were cancer-free after treatment. Pharmaceutical manufacturer Progenics recently licensed the breakthrough imaging agent, which is currently in clinical trials.



Prostate cancer, the second most common lethal cancer in American men, is also among the hardest to see. Buried deep behind the bladder, the prostate appears on X-rays and PET scans as a ghostly, oblong shadow. Even metastases due to the disease are elusive with conventional imaging methods.

The radiopharmaceutical is designed to help urologists keep an eye on patients whose prostate cancer doesn't yet warrant treatment and those who are at a high risk of developing metastatic disease. Because the entire gland—or body—is imaged at once, it offers a more complete picture of prostate cancer than a biopsy.

"We can spot lesions as small as 2 to 3 millimeters," says Pomper, a radiologist.

> "The fact that we could see where the cancer spread completely changed the direction of treatment for that patient." –Martin Pomper, *radiologist*

Patients in early tests have tolerated the radiopharmaceutical well. In addition to better-quality images, because of substantial optimization of its molecular structure, it is more specific than standard imaging methods, such as CT and bone scans.

Pomper points to a patient whose prostate-specific antigen levels were slightly elevated following removal of the prostate, indicating that the surgery didn't catch all the cancer cells. Before Pomper's new radiopharmaceutical, the treatment would have been to irradiate the patient's pelvic region in hopes of knocking out the stray cancer cells.

"But it turned out that the cancer spread up near the aorta," says Pomper. "That radiation would have been ineffective against the cancer. The fact that we could see where the cancer spread completely changed the direction of treatment for that patient."

Pomper predicts the radiopharmaceutical will become a commercial product within three or four years.

TECH/ENVY

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

Patient Education Apps

Leveraging technology to improve patient education and wellness is an important goal for health care systems. Those seizing this opportunity will have an advantage as patients search for services that best fit their needs.

Patients can sync their medical records, including lab results, radiological imaging, clinical notes and appointments, thanks to an app from Mayo Clinic and Apple. Patients' medical records can be viewed side by side with their fitness and nutrition data in Apple Health, making personalized health management even easier.

An animation-based education app helps health care professionals communicate with patients about anatomy, conditions and treatments. Called Orthopedic Patient Education, the app from 3D4Medical covers a variety of conditions, such as joint diseases and disorders, as well as physiology. A consultation feature allows clinicians to pause and then draw on any animation with the pen tool to highlight and annotate specific images within an animation. These images can then be sent to patients via email.

An app encourages people to set health goals and make changes to live a healthier and happier life. Stanford Medicine's My Action Planner app lets patients update their progress daily. At the end of the week, they can self-evaluate progress toward the goals. The app tallies self-evaluations and gives graphic reports on how well a patient does over time. Patients can use the app on their own or as part of a treatment plan guided by a clinician.

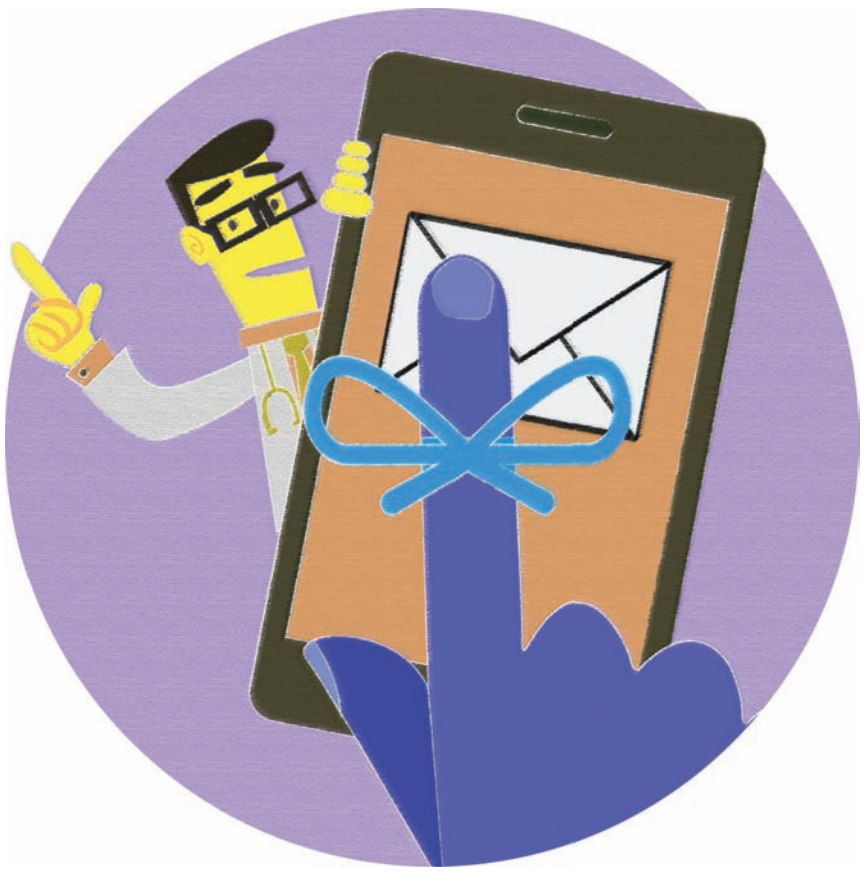
ILLUSTRATIONS: ISTOCK

Texting to Keep Mom and Baby Healthy

Low-income and minority women often fall through the cracks when it comes to routine health care. But text messages may provide a solution, finds a study led by Wendy Bennett, an internist. Bennett and her team are now designing a pilot text-messaging program, which they'll test next spring, to promote healthy behaviors in women before and after pregnancy.

The study surveyed 246 women receiving prenatal or postnatal care or care for their infants at either The Johns Hopkins Hospital or Johns Hopkins Bayview Medical Center. Of those, 95 percent reported using mobile phones, and 74 percent said they used a smartphone.

"The takeaway point was that cellphone—not just smartphone—use was very high in the whole population, regardless of race or ethnicity," says Bennett. "Almost everybody owned a cellphone and sent text messages."



Based on these results, Bennett says, clinic providers and health promotion programs could seize an opportunity to reach these women through text messages. Physicians could send reminders when it's time for follow-up appointments, booster shots or other routine visits for women and children. They could also supplement virtual health coaching to promote healthy behavior changes through text messaging.

Virtual coaching could include sending automatic messages asking women about their health and behaviors. For example, a text might ask how many fruits and vegetables a woman has eaten that day. Depending on the response, another automatic message could be sent to compliment on her success or encourage her to add a piece of fruit to her lunch.

Routine health care around a birth can set up mother and baby for a lifetime of good health care. Bennett says, "Pregnancy is a perfect time to talk about health, weight, nutrition, and sustaining healthful behaviors during and after pregnancy."

Raising Physician Profiles to the Top Ranks of Online Searches

First impressions don't take long to make, and they can be critical. That's why Johns Hopkins Medicine's Internet strategy team has been working hard to create accurate and rich online profiles of our physicians. They're also ensuring these hopkinsmedicine.org profiles appear in the top results of online searches.

"Hopkinsmedicine.org is the best source of information on our providers, and we want people to easily find these pages," says Therese Lockemy, director of Internet marketing and social engagement. "We also want to ensure people are getting accurate information."

Sometimes, searching online for a Johns Hopkins physician's name can produce mixed results. For instance, a listing for the doctor might appear first on a physician review website, like Healthgrades or Vitals. This presents challenges: The website could be inaccurate, and because most people click on one of the top three links in search results, people may end up clicking on something other than hopkinsmedicine.org.

To drive hopkinsmedicine.org profile pages to the top of online search results, Lockemy and her colleagues look at many factors search engines consider and make adjustments to improve the Johns Hopkins physician profile rankings.

"Competition for top rankings on the names of health care providers is fierce," explains Aaron Watkins, senior director of Internet strategy. "We use a suite of search engine optimization tools to gain these coveted positions."

Watkins and Lockemy track which Johns Hopkins physician profile pages already rank in the top three spots and which require improvements.

"This expands the reach of our website and, most importantly, enables Johns Hopkins Medicine to help thousands of additional people," says Lockemy.