

This 'smart pill' can help patients remember their meds

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Pills. Credit: Public Domain

Forget to take your medication? Now you can get a reminder to find your pills - sent by the pill itself.

Chicago's Rush University Medical Center has become one of the few [health](#) care providers in the United States to use a grain-of-sand-sized sensor that, after being swallowed, can alert [patients](#) when they've forgotten to take medication.

Developed by Proteus Digital Health, the FDA-approved sensor is made from microscopic quantities of copper and magnesium. Powered by the human body (no batteries or antennas required), the tiny sensor turns on after reaching patients' stomachs, where it begins sending signals to a Band-Aid-like, Bluetooth-enabled patch worn on the torso. The patch then decodes those signals into meaningful health information

and sends it to users and physicians in an app.

Tony Perry, vice president of Rush's ambulatory transformation program, said the hospital has been using the Proteus technology since January, hoping it could eventually better guide care for patients with chronic illnesses like hypertension or congestive heart failure.

As many as half of all patients undergoing drug therapy for chronic illnesses fail to regularly follow prescription instructions, Perry said.

"We know from a data perspective that when we write prescriptions, a good number of those prescriptions either don't get filled or don't get taken by people," he said. "The 'click in the head' was that this is a behavioral tool that was meant to help people help themselves, and that really seemed like a neat opportunity."

In addition to reminding patients to take their meds, the Proteus technology also tracks heart rate and other important health markers, said Perry, whose clinical practice is in geriatric medicine.

More than a dozen Rush patients are currently using the digital medicine tool. The cost to patients is "net neutral" after insurance, he said.

Rush is the first [health care provider](#) in Illinois and the eighth nationally to partner with Proteus; Barton Health in California was the first. Children's Health in Texas is also among Proteus' list of health care providers.

Amanda Tosto, director of system integration and population health at Rush, said the hospital's efforts have so far focused on how to successfully incorporate the tech into its operations. It has mostly begun using the Proteus sensor, patch and app with its more technologically friendly patients through hospital-provided iPads, she said.

"You've got your patients who are really going to like this and see it as an extension as their Fitbit or their MyFitnessPal app," Tosto said. "But we've also got a couple of patients who have really benefited from being able to work with their families on medication delivery."

The Proteus sensor is sealed into a capsule along with a patient's normal medication by the specialty mail-order pharmacy Avella; it is the only pharmacy that distributes the "smart pill" for Rush.

Proteus has raised more than \$284.5 million since 2013. Kaiser Permanente, Medtronic, Novartis and Otsuka are among the privately held company's investors.

Although startups have introduced smart pill bottles and similar innovations that deliver medication reminders, Proteus considers itself the only company that does so through technology that's ingestible, according to Andy Thompson, co-founder and CEO of Proteus.

"What we are delivering in this industry is the ability to integrate silicon and software into its innovation toolkit," Thompson said. "Those are levers that every other industry has been using to massively boost their rate of innovation, and we think that same is true for pharma."

About half of all U.S. adults have one or more [chronic health conditions](#), according to the Centers for Disease Control and Prevention. Treating patients with chronic diseases accounts for 86 percent of all [health care spending](#), the CDC estimates.

The FDA cleared the Proteus sensor for marketing as a medical device in 2012. The agency rejected an application for a Proteus investor, Otsuka, to pair the sensor with the antipsychotic drug Abilify in 2016, however, citing the need for more data. Otsuka submitted a new application in May.

In 30 years, Thompson said that he believes every drug that's built is going to have some sort of active silicon inside.

"We're delighted to work with a leading [medical](#)

[center](#) in Chicago," he said. "When we look at institutions like Rush, we believe they're magnifying their physical footprint with a digital footprint and helping folks who are sick manage their conditions where they live, work, play and pray."

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