

High-Tech Alternatives to High-Cost Care

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MENTION health care reform and the image that instantly comes to mind is a big government program. But there is another broad transformation in health care under way, a powerful force for decentralized innovation. It is fueled in good part by technology — low-cost computing devices, digital sensors and the Web.

The trend promises to shift a lot of the diagnosis, monitoring and treatment of disease from hospitals and specialized clinics, where treatment is expensive, to primary care physicians and patients themselves — at far less cost.

The new models emphasize early detection of health problems, prevention and management of chronic disease. The approaches have adopted a range of labels including “wellness,” “consumer-directed health care” and the “medical home.”

The potential transformation faces formidable obstacles, to be sure. Some of those hurdles include getting patients to embrace healthier lifestyles and persuading the government and insurers to reimburse at-home testing and monitoring devices.

Yet the promise, according to Dr. David M. Lawrence, the former chief executive of Kaiser Permanente, the nation’s largest private health care provider, is “an array of technology-enabled, consumer-based services that constitute a new form of primary health care.”

To glimpse the business opportunity — and the challenge — at the forefront of this emerging, decentralized health care market, let’s look at a start-up in the field of sleep medicine.

The start-up, Watermark Medical, offers an at-home device and a Web-based service for diagnosing sleep apnea. Characterized by snoring and pauses in breathing, sleep apnea is a serious health problem that often goes undiagnosed.

Typically caused by tissue in the back of the throat obstructing the airway to the lungs, it contributes to the severity of chronic conditions including diabetes, heart disease, obesity, hypertension and depression, adding an estimated \$3.4 billion to the nation’s health costs.

Sufferers battle chronic fatigue, and sleep experts suspect that apnea is the cause of many workplace and car accidents. Treatments include a masklike apparatus that pumps air to keep the patient's airway open; an oral appliance, resembling an orthodontic retainer, that helps open the throat; and surgery to shave tissue that blocks the air passage.

Today, sleep apnea diagnoses are mainly done in specialized sleep clinics, where the patient sleeps under observation for a night or two, at a cost of up \$4,000 — with the expense usually shared by insurers and patients. Given the cost and inconvenience, physicians say, patients often do not go to a clinic and seek treatment until their sleep troubles are severe.



Dr. Lee Surkin, with his wife, Elizabeth Webster, uses a Watermark Medical device to record patients' sleep patterns, which specialists interpret and summarize for him.

Watermark Medical traces its technical origins to the work of Dr. Philip Westbrook, a Stanford-educated sleep expert who led the sleep disorder centers at the Mayo Clinic in Rochester, Minn., and at Cedars-Sinai Medical Center in Los Angeles. But during a brief period in private practice in California, seeing the expense and trouble sleep-testing was for patients, Dr. Westbrook decided there had to be a simpler, more efficient way.

He teamed up with a pair of medical-device technologists and won an innovation grant from the National Institutes of Health to finance a prototype. They came up with a headband that holds a blue plastic device — smaller than a deck of cards and resting on the forehead — equipped with a microprocessor and sensors, and a tube that fits into a patient's nose. If the tube falls out, the patient hears a voice prompt.

In 2004, the device was approved for use by the Food and Drug Administration. “We had a better mousetrap, but no business or marketing expertise,” Dr. Westbrook said.

But there also wasn't a real market, until the Centers for Medicare and Medicaid Services approved reimbursement for home sleep-testing in 2008. That was when two young entrepreneurs, Sean Heyniger and Charles Alvarez, who had recently sold PDSHeart, a remote heart-monitoring company, to a larger corporation, were looking for another opportunity. They researched the sleep market and found Dr. Westbrook, who is now Watermark's chief medical officer.

They founded Watermark in March 2008, tweaked Dr. Westbrook's device, produced a business model and conducted pilot projects. Watermark began introducing its testing device last September. Its sensor-equipped headband, powered by Intel's Atom microprocessor, measures 10 things, including blood-oxygen saturation, air flow, pulse rate and snoring levels.

The patient wears the device for a night or two, then returns the device to the doctor's office. The data is downloaded to a personal computer, then sent on the Web to a network of sleep professionals, one of whom delivers a report to the physician within 48 hours, with a diagnosis and suggested treatment. The physicians typically charge from \$250 to \$450 a test, and a doctor collects \$100 to \$150 of that. "It's a new revenue stream for the physician," said Mr. Alvarez, Watermark's president.

Watermark also charges the physicians \$4,000 for each digital headband.

So far, 35,000 patients have been tested using the Watermark device, with more than 1,000 doctors prescribing about 4,000 tests a month.

DR. LEE SURKIN, a sole practitioner in Greenville, N.C., is one of them. He has three Watermark devices and has done at-home tests on 50 patients so far.

Owning his own sleep lab, Dr. Surkin said, would be far more lucrative under current insurer reimbursement rates, but he prefers the at-home tests as a low-cost way to diagnose and treat far more patients. "This is a tool that moves health care toward where it has to go," he said.

If successful with sleep, Watermark plans to branch out to other kinds of Web-based personal devices to monitor chronic conditions like heart disease and diabetes. The company's executives talk of their technology as a platform that can add many other services someday, a bit like Apple's applications store for its consumer devices.

Indeed, Watermark's co-chairman and a major financial backer is John Sculley, the former chief executive of Apple. "We're starting with sleep, but the model can extend to many other diagnostic services," he said.

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