



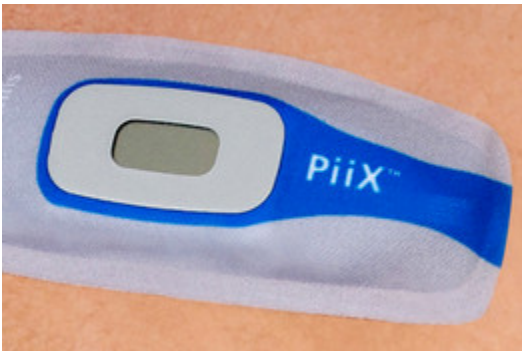
TAKE TWO DIGITAL PILLS AND CALL ME IN THE MORNING

Silicon Valley Has a High-Tech Prescription to Cure Health Care's Swollen Costs and Inefficiencies, but the Prognosis is Uncertain

August 4, 2009

Hospitals are costly places. Andrew Thompson hopes his company can help keep people out of them.

His Silicon Valley start-up, Proteus Biomedical Inc., is testing a miniature digestible chip that can be attached to conventional medication, sending a signal that confirms whether patients are taking their prescribed pills. A sensing device worn on the skin uses wireless technology to relay that information to doctors, along with readings about patients' vital signs.



Corventis's wireless sensor monitors patients on the go.

Mr. Thompson predicts the company's technology will generate a wealth of new information about patients' evolving conditions and the impact of drugs they take. Doctors might decide to intervene, for example, when they notice a heart patient isn't sleeping well or is taking incorrect dosages -- problems that could lead to congestive heart failure.

Proteus isn't alone. Dozens of large and small companies are turning to wireless technology to achieve what the Obama administration is seeking through legislation: a health-care system that keeps people healthier for less.

"Wireless applications have the potential to change every one of these areas," said Eric Topol, a cardiologist and genomics professor at Scripps Research Institute, at an industry event in San Diego last week.

Dr. Topol, who is also chief medical officer of the West Wireless Health Institute, a San Diego nonprofit research organization, cites a 2008 study that was distributed by a coalition of companies and organizations that support health-care reform. It put annual savings from remote monitoring at \$10.1 billion for U.S. sufferers of congestive heart failure, \$6.1 billion for diabetes and \$4.9 billion for chronic obstructive pulmonary disease.

But claims about cost savings from new technology often don't pan out. There are "precious few" studies that back up such promises involving remote monitoring, says Mark Holland, managing director of System Research Services, an advisory firm focusing on health-care technology. And if reimbursements from Medicare or private insurers don't cover the cost of high-tech approaches, doctors and hospitals won't want to deploy them.

Using wireless technology has the potential to reduce costs in part because part of the infrastructure already is in place. With more than four billion cellphones sold to date, a large percentage of the world's population has access to devices and networks that can send medical data to doctors.

Another factor is the advancing sophistication of sensors. Triage Wireless Inc., a San Diego-based start-up, is testing a wearable device for wirelessly measuring vital signs in hospital rooms -- including a long-sought ability to continuously measure blood pressure, rather than conducting spot checks by inflating a cuff around a patient's arm. Corventis Inc., of San Jose, Calif., is focusing on



monitoring patients on the go -- with a Band-Aid-style sensor called PiiX that includes measurement of respiration, fluid status and physical movements.

Chip makers, seeing medical applications as a big new market, are racing to make such devices more capable and less expensive. Qualcomm Inc., known for its cellphone chips, is also developing low-power variants for wearable medical applications.

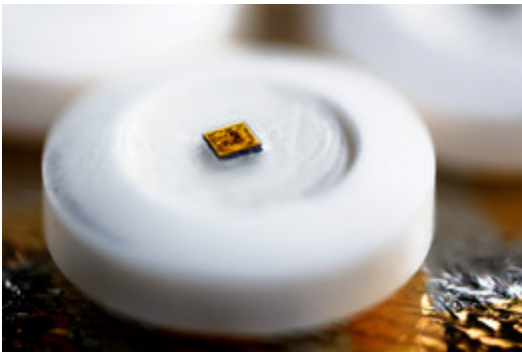
Intel Corp. has teams of researchers studying devices to help care for senior citizens at home, including what it calls a "magic carpet" -- a mat with sensors to track how a patient moves. The goal: to gather data to prevent falls, a major cause of accidental deaths and a big contributor to health costs.

Industry executives say they have been helped by changing attitudes in the medical community. Cellphones were once banned in many hospitals, for example, for fear of interference with medical instruments. But as those concerns have diminished, hospitals now see cutting wires as a way to cut costs.

For example, the cables that relay high-definition images from medical instruments to monitors are fragile and need to be sterilized between procedures, said William Chang, vice president and chief technology officer of the endoscopy unit of Stryker Corp. His company used technology from Israel-based Amimon Ltd. to help send such images without wires.

Smartphones such as Apple Inc.'s iPhone also have had a big impact. AirStrip Technologies LLC offers a smartphone application that allows obstetricians to remotely view data such as fetal and maternal heart rates.

But such advances come with concerns about safety and privacy, which could cause regulatory delays. Mr. Thompson of Proteus doesn't expect its technology to arrive in the U.S. until 2012, in part because of the regulatory review. He said its circuitry is safely digestible and, in high-volume production, will add less than a penny to the cost of a pill.



Michael Sugrue

Proteus Biomedical is testing digital chips that are implanted in conventional pills.

Then there are cost questions. Doctors who only get reimbursed for office visits, for example, might not eagerly prescribe new technology that saves money in the long run by keeping patients at home, Mr. Holland said.

CardioNet Inc., a pioneer in remote monitoring of heart patients, believes the reimbursement system isn't properly evaluating its technology. Shares of the Conshohocken, Pa., company fell sharply last month after it disclosed that a unit of Highmark Inc. -- a regional administrator of Medicare services -- had proposed a 33% lower reimbursement rate for a monitoring program using CardioNet's technology, which had been set at about \$1,100. A Highmark spokesman said the company establishes such rates after careful evaluation of Medicare requirements.

Randy Thurman, CardioNet's chief executive, estimates that similar monitoring in hospitals costs \$26,000. The company is trying to have the reimbursement decision reviewed.



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