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Remote Control for Health Care

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The communications system at her home bedside can't cure Heather Huntoon. But it may be helping keep her alive.

Since the night 18 months ago when she woke up fearing she was having a heart attack, Mrs. Huntoon's life has been dominated by a succession of heart, kidney and circulatory problems that have repeatedly landed her in the hospital.

"When you go through what I've been through, you have an overwhelming feeling that you can't trust your body any longer," said Mrs. Huntoon, who is 42 and lives near Wichita, Kan.

But Mrs. Huntoon does trust the lifesaving potential of an array of devices that let doctors monitor her condition remotely. Mrs. Huntoon's setup is among the most sophisticated of the remote-monitoring systems now in use around the country to follow several hundred thousand patients.

The centerpiece of her system is an implanted device that regulates her heartbeat, delivers lifesaving shocks when necessary, and wirelessly communicates with her doctors via the Internet.

The same communications system is also linked to her blood-pressure monitor and a bedside electronic scale. By remotely watching data on her condition for signs of the next potentially life-threatening development, her doctors have occasionally been able to change her heart medications in time to let Mrs. Huntoon avoid yet another trip to the hospital.

A month ago, the system alerted her doctors that it might be time for her to be readmitted. Weight gains picked up by Mrs. Huntoon's monitors led to a series of phone consultations in which she reported unusual dizziness and breathing problems. She was quickly sent to the hospital where a CAT scan revealed the onset of pneumonia. She was released a week later.

Medical device makers see patients like Mrs. Huntoon as harbingers of technology changes that will allow tens of millions of Americans with chronic problems like heart failure, diabetes and mental illness to have their conditions constantly monitored, remotely and virtually, as they go about their daily lives. The payoff for patients could be more effective use of drugs, fewer and shorter hospital stays, and longer stretches between routine visits to physicians' offices.

"It's about just-in-time medicine, instead of just-in-case," said Dr. Adam Darkins, a care coordination expert at the Department of Veterans Affairs, which oversees the Veterans Health Administration.

The department is currently using relatively simple home monitoring devices to help manage the treatment of nearly 14,000 military veterans suffering from heart disease, depression, diabetes and post-traumatic stress disorder, Dr. Darkins said. It plans to expand to 21,000 patients by October.

The many companies betting on remote-monitoring medical technology include makers of implantable devices like Medtronic, instrument companies like Honeywell and Philips, and countless hardware and software companies ranging from start-ups to giants like Intel.

Business executives say that demographics and health care economics will give patients and doctors little choice but to adopt the technologies as they improve.

"The aging population and chronic diseases create an untenable drain on the health care delivery system," said L. David Whitlinger, a health care electronics specialist at Intel, which sees the growing array of networked devices being developed for remote and automated medicine as a huge new market for its microchips.

"The hospital bed and waiting room of the future is your home," Mr. Whitlinger said.

For every extreme case like Mrs. Huntoon's, there are many more patients like Mason Bohana.

Mr. Bohana, an 82-year-old World War II veteran, has been able to move from living in a hospice under round-the-clock medical supervision to a Brooklyn studio apartment with the help of a relatively simple monitoring system from Health Buddy Networks.

The hand-held Health Buddy console, which plugs into his phone, delivers his blood pressure and weight readings to a Veterans Affairs nurse. It also prompts him to answer a series of qualitative questions about his lung and circulatory ailments, like whether his breathing is better or worse than the day before.

"This is so simple a 2-year-old could do it," Mr. Bohana said.

Still, the industry's vision of an electronic health care network that never sleeps is a long way from reality.

Even leading-edge systems like Mrs. Huntoon's currently fail to provide a comprehensive picture of chronic diseases. She had to be hospitalized in July when a drop in potassium levels in her blood - something none of her devices track - destabilized her heart.

For many doctors, there is also a pragmatic financial concern about gathering and reviewing remote data because many insurers are providing little or no reimbursement for such work.

"There's only so much time in a day you can devote to some of these things," said Dr. Stephen T. Husted, a doctor in Coon Rapids, Minn., who implants heart devices like Mrs. Huntoon's.

So far, doctors say, there are no set standards for how frequently the available data must be checked. Many physicians currently rely on data collection services run by the device companies and independent monitoring services to warn them of anomalies that might require prompt attention. But doctors and their employees fear that plaintiffs' lawyers will try to pin legal responsibility for recognizing warning signals on them, no matter who is collecting the data.

"You have to follow up on more things," said Jennifer Gorham, one of the nurses working in Coon Rapids for Dr. Husted and his partners at Metropolitan Cardiology Consultants. "If the device is programmed to look for it, you have to look for it."

A main use of the data gathered by the newest devices is to reconstruct events that send patients to emergency rooms. In some cases involving heart implants, doctors get the data soon enough to reassure patients that their implant has restored normal heart function and there is no need for such a trip.

More often, the remotely monitored data is used to cut down on the need for routine checkups. Many of Dr. Husted's patients come to his office once or twice a year now instead of every three months. A Veterans Affairs study that followed 70 patients over three months found that remote monitoring of their heart implants freed up eight days of time doctors would otherwise have devoted to office visits.

Determining what the devices should be looking for, however, is a work in progress. In cardiac care, Medtronic and its rivals, including Boston Scientific and St. Jude Medical, have competing visions of how to provide the earliest reliable warning of fluid buildup in the lungs and other signs of imminent heart failure.

"Picking what you want to measure is a big part of what's going on today," said Mike Coyle, president of St. Jude's cardiac rhythm management division.

The various companies are also competing to develop the best systems for getting data from the devices to patients and health care providers.

Mrs. Huntoon's wireless system linking the implant, the scale and the blood pressure monitor is a product called Latitude. Guidant, which designed Latitude and began rolling it out late last year, was acquired by Boston Scientific in April.

For now, the only implantable heart device Latitude works with is Guidant's top-of-the line Contak Renewal defibrillator. But Boston Scientific plans to expand the wireless communications features to its other defibrillators and pacemakers.

Boston Scientific is playing catchup to Medtronic, which has built up a data monitoring subsidiary called CareLink that can track data from 95 percent of its heart implant product line for doctors. Medtronic says that the network currently has 80,000 patients. Medtronic is now working on extending the CareLink concept to its diabetes monitors and insulin pumps.

One hot new area for the device industry is diabetes monitors that check blood sugar levels every five minutes through a tiny catheter inserted just under the skin of the abdomen. Medtronic received Food and Drug Administration approval to market its Guardian unit in August 2005. DexCom, a start-up company based in San Diego, began selling a similar device in the \$6 billion diabetes care market in March. A third company, Abbott Laboratories, expects clearance to introduce its version by the end of this year.

The main function of the devices is to provide direct feedback to patients, letting them know when to take an insulin shot or alter their diet to avoid short-term symptoms of unbalanced blood sugar, like headaches and dizziness.

Such virtually continuous glucose monitors are more expensive, though less accurate, than the traditional finger-prick blood tests that millions of diabetics use, typically once or twice a day. The DexCom device, for instance, costs \$800, plus \$35 for sensors that are replaced every three days to limit the risk of infection.

Still, continuous monitoring is an important breakthrough, according to experts like Dr. Aaron Kowalski, scientific program director for the Juvenile Diabetes Research Foundation.

Keeping tabs on such data not only helps avoid short-term discomfort but also lowers the risks of long-term complications like stroke, blindness and heart disease. And the data collected on the devices, which can be downloaded to a personal computer, provides doctors with a much clearer picture of how well their patients are managing the disease.

"Knowing which way your glucose is going is really important in controlling diabetes," said Dr. Kowalski, himself a diabetic. He described getting a DexCom device for himself in April as "almost a life-changing experience."

Mrs. Huntoon says longer stretches between hospitalizations would be enough of a life change to make her happy. She says she hopes her doctors can add remote monitoring of her potassium levels to her routine, thus increasing the chances of stabilizing her unreliable heart.

The hospital employees know her so well they treat her like family, Mrs. Huntoon said. "But I don't want to be a part of that anymore."