

UMass Memorial Medical Center:

Yielding benefits for patients and providers



On a mild May morning, Tom Danna kneels in the damp soil of his garden. He carefully plants beans and squash, cucumbers and tomatoes, as

he imagines the late-summer harvest his efforts will yield. "I knew when I woke up this morning that I'd have a good day," he says.

"I could tell that I'd be able to do what I wanted because of the scale."

The scale to which Mr. Danna refers is part of Agilent Technologies' Interactive Healthcare Services (IHS), a suite of in-home monitoring devices for patients with congestive heart failure (CHF). The easy-to-use weight, blood pressure, and heart rhythm monitors automatically transmit patients' vital signs from their homes to their health care providers. Since day-to-day changes in these measures can signal a worsening of disease, IHS data enables clinicians to closely manage their patients and to intervene quickly when measurements move outside predetermined parameters.

Mr. Danna has the devices in his home because he is one of 29 patients participating in a University of Massachusetts Memorial Medical Center study. According to Theo E. Meyer, M.D., D. Phil, director of the Center's Heart Failure Wellness Center, the Agilent solution has been used as part of a comprehensive program to reduce hospital admissions and emergency room visits among the Center's highest-risk patients.

Results have affirmed the effectiveness of IHS. Hospital re-admissions among study participants have been reduced by a factor of 10 since the in-home monitoring began. Mr. Danna is a case in point. In the last two years he has had CHF, he's been rushed to the hospital more than half a dozen times for CHF-related causes. "A couple of those times I was just about dead," he says. In the year that Mr. Danna has had the Agilent devices in his home, however, he hasn't had a single hospitalization.

A reduction in hospital admissions for CHF translates into enormous savings. CHF is the leading cause of hospital admissions for people over 65 in the US, and most of those admissions are re-admissions: the rate of re-admission within three to six months of initial hospital discharge varies from 29 to 47 percent. Since approximately three-quarters of the \$30 billion spent annually to treat the disease covers hospitalization, a 10-fold decrease in re-admissions would save billions of dollars annually.



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Fewer crises and hospitalizations would also improve the quality of patients' lives. Congestive heart failure is a cruelly limiting disease. Because the heart is not pumping properly, the kidneys receive inadequate blood flow. They interpret this as meaning that the body is low on fluids

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and respond by retaining sodium, which in turn leads to a build-up of fluids in body tissues—the congestion of congestive heart failure. The fluids swell the legs and seep into the liver and lungs, leaving patients uncomfortable, exhausted, short of breath, and, too often, perilously close to death.

Yet the disease can be controlled. "About 90 percent of congestive heart failure patients can be controlled with diuretics," explains Dr. Meyer. "But giving diuretics is not like giving antibiotics. They need constant adjustments because so many variables influence the amount of fluid a patient retains." The data that the Agilent devices transmit provides the information doctors need to appropriately adjust medications.

The Wellness Center patients using IHS are mostly elderly individuals who have multiple health problems or inadequate support systems at home. They may have limited vision or mobility, which makes getting to the doctor on a regular basis difficult. Such patients also have trouble using traditional scales or blood pressure devices and tend to wait until they are very sick before seeking help.

Single-touch or automatic activation, voice read-outs, large digital displays, and other features of the Agilent in-home devices compensate for patients' limitations. The scale, for example, has a wide base and grab bars so that someone with balance problems can get on easily. Two simple wristbands transmit the heart's rhythm to the ECG recorder, and the blood pressure unit, which also measures pulse, uses a cuff that slides up the arm easily and pumps automatically.

"When we first started using the equipment, we were concerned that our elderly patients might be intimidated by it," says Ellen Chrysogelos, RN, NP, coordinator of the Heart Failure Wellness Center, "but that hasn't turned out to be the case. Patients not only find it easy to use—they don't want to give it up once they have it!"

Once the devices take a measurement, their radio transmitters send the results to the Home Hub, which in turn transmits them over ordinary telephone lines to the Agilent Clinical Review Software in the Wellness Center's computers. The software enables clinicians to review patient measurements, track trends, store and retrieve data, and generate reports.

Ms. Chrysogelos reviews patient data daily. Any measurements outside of expected ranges are flagged and prompt a call to the patient. "We need to find out what's going on so that we can evaluate the patient and determine whether any changes in diet or medication are necessary," she says.

The Wellness Center staff has found IHS to be a valuable adjunct to the treatment program for these high-risk patients. Emergency room visits, hospitalizations, and home visits by visiting nurses are all down, while compliance with diet and exercise regimens, which help control CHF, are up. Dr. Meyer reports that daily monitoring increases attention to the patients' health problem, which has in turn fostered greater patient satisfaction and more trusting relationships with clinicians.

Mr. Danna couldn't agree more. Because weight gain is the most sensitive bellwether of fluid retention, he weighs himself first thing every morning. He uses his morning weight as a forecast of what he'll be able to do for the day. "If I've gained weight, I know I have to do things more slowly" he says. "If I haven't, I know I'll be okay. I'll have a pretty decent day." And for Mr. Danna, a decent day in the garden will yield weeks of heart-healthy eating when his cucumbers and tomatoes are harvested in the fall.



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