

## Public Policy Implications for Using Remote Monitoring Technology to Treat Diabetes

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### Abstract

Daily medical practice in the United States is at the threshold of a significant and permanent change. The driving force is technologies that permit remote physiological monitoring of patients who have diabetes and other chronic diseases, along with widespread access to the Internet and the adoption of email as a primary means of communicating in our society. Utilization of these technologies not only improves the quality of patient care, it also reduces the need for frequent physician office appointments, costly emergency room visits, and unnecessary hospitalizations. The Remote Monitoring Access Act of 2007 will eliminate disincentives in current Medicare rules that only provide payment for face-to-face meetings between patients and their doctors.

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It is no exaggeration to state that the U.S. health care system is at the threshold of a significant and permanent change that could fundamentally alter the daily practice of medicine. The driving force behind this change is the increasing availability of technologies that permit remote physiological monitoring (RPM) of patients with diabetes and other chronic diseases, along with widespread Internet access and growing use of email as a primary means of communication. This is good news for those who can still remember when doctors made house calls and miss the personal connection such visits fostered. At the dawn of the 21st century, we are witnessing the evolution of the "electronic" house call and a new form of patient/physician intimacy born from maturing technologies.

Remote physiological monitoring is a powerful, but underutilized, tool that could dramatically benefit patients with chronic diseases, including diabetes, congestive heart failure, cardiac arrhythmias, epilepsy, and sleep disorders. Diabetes provides a special opportunity to take advantage of this new technology. Patients with diabetes often do not understand or recognize signs that their condition is worsening and often fail to make appropriate changes to their health regimen. Without closely watching his or her blood glucose and other indicators, a patient's condition can deteriorate rapidly, resulting in additional health problems and emergency hospitalizations. With RPM and frequent electronic communications, early warning signs can be quickly detected and addressed by a physician or

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**Abbreviations:** (A1C) HbA1c, (RPM) remote physiological monitoring, (VHA) Veterans Health Administration

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other health care professional remotely, reducing the need for follow-up visits to the physician's office and avoiding expensive hospital admissions.

Every clinician knows that type II diabetes is fast becoming the most prevalent chronic disease in the United States.<sup>1-3</sup> Treating the complications of diabetes costs approximately \$90 billion a year, and the federal centers for Medicare and Medicaid services project that one in three Medicare dollars will be spent treating diabetic complications.

Improving glucose management is a major goal of the medical device industry, which is at the forefront of developing new RPM technologies. These technologies include less invasive blood tests and more sophisticated blood glucose monitors. Manufacturers such as Medtronic, Johnson & Johnson, and Philips are developing devices with increased memory capacity, as well as continuous glucose monitoring devices that are integrated with insulin pumps. For diabetes management in some technologies, patients can download their glucose levels and insulin delivery information from pumps to their computer. Software then generates a report showing patients how their levels change over time and patients may then send that report via email to their physician. This longitudinal information gives physicians a more accurate picture of how levels are changing over time and helps with adjusting insulin levels and/or providing recommendations for lifestyle changes.

However, progress in utilizing RPM is stalled at an important crossroad. The current health care system denies reimbursement for physician time spent in non face-to-face encounters. As a result, patients must print the results of their RPM, wait for appointments with their physicians, drive to the physician's office, and sit in the waiting room simply to spend 10 minutes showing the physician blood glucose results that could have been sent via wireless technology. With few exceptions, physicians are provided no means of payment for their time reviewing data gathered by remote monitoring. In effect, the current payment system undermines the opportunity for physicians to practice modern, state-of-the-art medicine.

Managing a patient's diabetes with RPM data and email requires the same skills physicians use in any face-to-face patient visit. According to Stephen Clement, M.D. (personal communications, March 20, 2007), a pioneer of RPM and electronic patient communications at Georgetown University Medical Center in Washington, D.C., initial skepticism and caution by insurers in the early years of development of new technologies are understandable. However, the continued refusal by insurers to recognize

RPM and electronic communications between physicians and patients as a legitimate medical practice is hard for him to understand. A decade ago, Clement led some of the first studies documenting the benefits of managing diabetes with RPM and electronic communications. As in many studies conducted since then, Clement found statistically significant drops compared to controls in HbA<sub>1c</sub> (A1C), which measures the amount of glycosylated hemoglobin in blood and indicates how well diabetes is being managed over time.

Since the late 1990s, numerous studies have addressed the efficacy of remotely monitoring patients with the major chronic diseases and tested the feasibility of employing the Internet as a new communications tool in the physician/patient relationship. Vitaly important questions have been asked and answered successfully by careful, thoughtful, and thorough investigators. Studies consistently reveal that when used to help monitor glucose levels, RPM lowers A1C levels, improves overall outcomes, and saves everyone time and money.<sup>4-15</sup>

An independent analysis of remotely monitored and nonmonitored patients<sup>16</sup> found that remote monitoring reduced hospitalization and emergency care visits and improved patients' functional status. For diabetes care, the average improvement/stabilization rate in activities of daily living for patients using remote monitoring was 77.2% vs 70.4% for those patients not using remote monitoring. The New England Healthcare Institute<sup>17</sup> studied RPM in cardiac patients and found that RPM delivers value over standard care methods by reducing patient rehospitalization rates by 32%, resulting in a total reduction of 132 patient days per 100 patients, producing a net cost savings of 25% and yielding savings of \$1861 per patient over a 6-month postdischarge period.

Remote physiological monitoring was implemented in the Veterans Health Administration (VHA) as part of a larger coordinated care program. The VHA sought to improve the quality of care and reduce overall spending by delivering the right care to the right patient at the right time, especially for patients with chronic conditions who are at high risk for hospitalization. VHA nurses used a Web-based application to review monitored patients' data. This coordinated care has resulted in decreased outpatient visits, lower hospital admissions, and fewer prescription medications. In addition,

- Emergency room visits decreased 40%.
- Hospital admissions dropped 63%.

- Patients experienced a 60% reduction in bed days.
- Nursing home admissions decreased 63%.
- Patients reported a 95% satisfaction rate with the program.

It is important to note the high level of patient satisfaction with RPM. In most studies, patient satisfaction with RPM and Internet communications with physicians remains consistently high. Patients like it because they feel empowered by the technology and because they receive more frequent contact with caregivers.

Thanks to the virtual house call, the ability of physicians and patients to care for chronic diseases is improving literally at the speed of light and with the push of a button. Many in Congress now recognize that current policies of third-party payers, which require patients to visit with a health care provider face-to-face, are barriers to timely and consistent monitoring of patient health, especially for patients in rural areas and who have debilitating conditions that limit mobility. Better quality disease management will be encouraged if Congress enables physicians and other qualified health care practitioners to receive reimbursement through Medicare for monitoring their chronically ill patients remotely.

The Remote Monitoring Access Act of 2007 would be a major step into the future. This legislation will eliminate disincentives in current Medicare rules that only provide payment for face-to-face meetings between patients and their doctors. Indeed, the current system is discouraging physicians from adopting innovative remote monitoring technologies that can provide more accurate, real-time information on a patient's condition. When asked how he was overcoming problems with time spent on RPM and electronic communications, Clement replied, "I simply stopped doing it. I don't have the luxury to do it anymore. I would be very excited to look at my patient's blood sugars on the Internet every week and manage their care more frequently with an email. It takes ten minutes. But I can't afford to do it. Now my patients have to drive sometimes from a hundred miles away and bring in a printout of their sugars so I can look at them and then bill for that. It is so archaic."

The new bill would expand the ability of Medicare to reimburse for remotely monitoring patients with diabetes, cardiac arrhythmia, heart failure, sleep apnea, epilepsy, and other diseases that the Secretary for Health and Human Services deems appropriate. In the "findings" section of the bill, Congress recognizes the following:

- Remote patient monitoring can make chronic disease management more effective and efficient for patients and the health care system.
- By collecting, analyzing, and transmitting clinical health information to a health care practitioner, remote monitoring technologies allow patients and physicians to manage the patient's condition in a consistent and real-time fashion.
- Utilization of these technologies not only improves the quality of care given to patients, it also reduces the need for frequent physician office appointments, costly emergency room visits, and unnecessary hospitalizations.
- Monitoring a patient's disease from the home reduces the need for face-to-face physician interactions, thereby minimizing unnecessary travel and missed work and providing particular value to individuals residing in rural or underserved communities who would otherwise face potentially significant access barriers to receiving needed care.
- Prompt transmission of clinical data to the physician or the patient as appropriate is essential to providing timely and appropriate therapeutic interventions, which can then reduce expensive hospitalizations.
- Despite these innovations, remote management technologies have failed to diffuse rapidly. A significant barrier to wider adoption is the relative lack of payment mechanisms in fee-for-service Medicare to reimburse for remote, non face-to-face management.

After years of development and hand-sitting, the time has come for action. If Congress is successful at passing the new law and requires Medicare to reimburse doctors for time spent analyzing data transmitted by remote patient management technologies, then perhaps private insurers will step into the future of medical practice with the rest of us.

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