

# Remote medical monitoring

By Keith Schleiffer

The spiralling cost of healthcare provision in the United States has been front page news for a decade and has spawned a raft of schemes and initiatives. The simple, undeniable fact is that better health outcomes provide economic benefit. Helping chronic patients stay healthy means costs saved by fewer emergency hospital visits and a smaller drugs bill.

One area that is attracting considerable interest and a corresponding increase in activity at the moment is the electronic transmission of health information in the niche of monitoring chronic-care patients. As the financial benefits become clearer, monitoring processes are gaining momentum.

The Center for Medicare and Medicaid Systems (CMS), the US government agency managing healthcare expenses for the elderly and the poor, is in the middle of pilot studies exploring how to better serve and manage chronic patients, such as those

with diabetes or congestive heart failure. The pilot studies are focused on reducing the number of hospitalisations for these chronic patients. Electronic access to the patient's daily vital signs information is part of the monitoring process for several of these pilot activities.

We have already seen Intel®, a company best known for its microprocessors, obtain US Food and Drug Administration (FDA) clearance for its first regulated medical device in July 2008. Intel's product, the Health Guide, is to be used to connect patients to their care givers, as well as to support more personal communication. Intel intends that the Health Guide provide a broad range of communications opportunities for monitored patients to stay in contact with their circle of friends and family. The model is that more intimate patient contact will help ensure problems can be detected earlier in support of more cost-effective intervention.

The broad issue facing America is geographic separation of family units: whereas previously it was not uncommon for three generations to live together under one roof (as they still

do in many other countries), now they may not even live in the same time zone. The specific challenge is the development of purpose-built computers and a telecommunications infrastructure that provide a more effective link despite the distance between individuals.

In the coming few years, we expect to see strong growth for products to monitor patients at home. Developing products for medical monitoring requires effective integration of a wide range of technologies. There are also competing needs and requirements that have to be balanced. Typically these may include:

- the sensors of regulated medical devices
- user-friendly consumer electronics
- secure and flexible telecommunications connections
- a support service to monitor the data transmitted.

Even after the integration, good technology alone isn't enough. Technology can be intimidating, especially to the elderly, so good design is essential to success. In the ideal product, the patient will experience the benefits instead of the technology.

This convergence is creating opportunities for companies prepared to integrate these disparate functions.

Pulse oxymetry, for example, is increasingly used in home settings for patients at risk of hypoxia due to pulmonary or neural disorders. Tracking the trend of hypoxic events can help diagnose the reasons for the disorder. We have recently shown how pulse oxymetry data can be collected on a mobile telephone and passed, via the mobile network data channels, to a server, where individual patient trends can be monitored.

It is important not to overlook the service element of this trend. Monitoring devices are only as good as the back-office services that convert data into actionable information. In the near term, the customer for monitors will be organisations responsible for the care of chronic patients. A monitoring product that offers a complete solution will support data aggregation and a strong communications technology to support high-touch patient contact.

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