



**Wireless technology:  
Creating a link between patients  
and health-care professionals**

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## Introduction

Demands on health-care systems worldwide have increased to the point where the delivery and cost of medical treatment has become a critical global issue.

Global demographics are changing. An increasing population over 65 years of age and an increasingly sedentary lifestyle in many countries has the potential to lead to a huge increase in long-term patients with one or more chronic diseases.

Based on the current situation worldwide, more than 300 million people suffer from obesity, 600 million from chronic disease, and 500 million from aging. When the cost of medication adherence is factored in, this accounts for more than \$300 billion in expenditures. *(Source: World Health Organization)*

Most national health-care budgets are already under tight financial constraints, and many governments are looking to stabilize them. The additional demands that an aging population will impose are simply unsustainable using current practices.

Transforming the treatment and management of chronic diseases and increasing medical compliance for millions of people will be the key to controlling costs and increasing the quality of medical service worldwide.

Adoption of new technologies to transfer patient information can enable patients with chronic illnesses to connect with ease to their caregivers, which can ultimately improve quality of care. An example of a technology is cellular embedded wireless modules that can build a bridge between home and hospital through:

- Remote monitoring of patients with implantable devices
- Remote treatment of chronic disease
- Wellness and preventive medicinal solutions
- Telemedicine services for patients and professionals
- Medical data on web-based platforms

Integrating cellular embedded modules into overall technology solutions used in the health-care system will enable faster exchanges of patient medical information. This seamless and secure transmission of information from health care professional to hospital, care facility or even patient may reduce health expenditures and increase possible scenarios for home care in the future.

## Information transfer

Wireless technology ensures a highly reliable connection so health-care practitioners can transfer proprietary medical documents and information securely and efficiently from wherever they are working.

The wireless health-care market falls into three main categories:

- **Medical**, which refers primarily to the use of devices in a professional medical environment such as a hospital, doctor's office, or care-giving facility.
- **Well-being**, which relates primarily to the monitoring of chronic conditions away from the hospital or institutional environment.

- **Sport-Fitness**, which refers to any sports equipment devices with sensors providing real-time results to analyze and ultimately improve an athlete's performance. Wireless high-performance equipment can enhance the training experience for both athletes and coaches.

In wireless health care, security for transferring sensitive private information is performed by using a combination of different features available on the cellular embedded wireless module, providing endpoint authentication and communication confidentiality over networks. Cellular encryption technology, communication protocols used for the Internet and other similar networks (TCP/IP stack), cryptographic protocols at the transport layer (SSL), and virtual private networks (VPN) all make data travelling over the network seamless and secure.

Medical applications are numerous (diabetes monitoring, heart monitoring, hypertension, sleep disorders, ultrasound exams, MRI) and can vary from a few kilobytes in size to very large files. As a result, knowledge and information transfer in some medical applications require high-speed broadband capability and quality of services enabled through HSPA cellular technology.

In addition, the need to deploy cellular wireless medical terminals in most countries around the world means a need to exchange data on numerous types of networks, including GPRS, EDGE, CDMA, WCDMA, TD-SCDMA and HSPA.

### **OEM requirements**

At the design conception stage, it is very important for the medical terminal/device maker to have an embedded wireless module portfolio solution. Devices in this portfolio should support various network and wireless technologies, and should be adaptable to medical applications without requiring changes to the mechanical platform or the electronic/software interface.

The result is development cost savings, significantly lower certification costs, and reduced time to market. Minimizing the changes brings additional control on performance monitoring, especially on the radio behavior and medical application.

Finally, using an embedded SIM solution that removes the plastic from a conventional SIM card and embeds the silicon die inside an embedded cellular wireless module in the medical terminal reduces the logistical challenges represented by physical SIM cards, such as inventory management, secure storage and network activation. An embedded SIM solution can also enhance product reliability by protecting it from shock, vibration, and extreme temperatures.

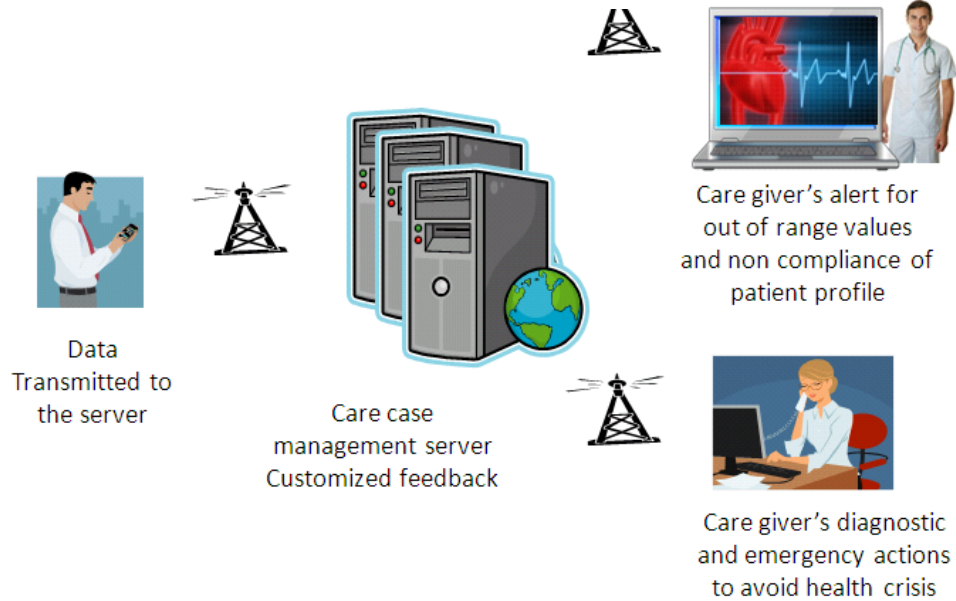
In addition, an embedded cellular wireless module solution avoids the burden of a fixed-line network's complexity and costly installation, and offers the patient more mobility.

Integrating embedded cellular wireless modules into diagnostic medical devices allows each patient the comfort of being virtually attached to his physician and providing:

- Real-time transmission of testing results
- Real-time feedback on health issues
- The ability to identify urgent problems and respond in real time

- The ability to identify and reach out to those not complying with care

The diagram below outlines information transfer between Health-care professional and patient over a wide area wireless connection.



The ability to transmit and monitor health and vital sign information wirelessly over a cellular network allows medical practitioners to have immediate and up-to-date patient information.

For long-term treatment of chronic diseases, physicians can monitor patient data and issues in real time, enabling an immediate understanding of the patient's condition, thereby providing better treatment. This allows a more efficient way to:

- Manage chronic diseases
- Prioritize care between several patients
- Identify timely intervention for individuals
- React immediately, thereby avoiding a potential health crisis requiring costly hospitalization

There is increasing demand for wireless embedded technology in medical devices. Medical equipment capabilities are improving, and there is the opportunity for remote monitoring and management. The ability to remotely upgrade the medical product not only adds value to the product, but also translates into operating cost saving and improved quality of service for both the patient and the caregiver.

A medical device management solution with embedded cellular wireless technology connected to a back-end server offers a turn-key solution that enables remote monitoring and secure software upgrades for devices in the field.

## **Conclusion**

Wireless technology can have a significant impact on efficiencies within an increasingly stressed health-care system. Embedding cellular wireless modules in medical devices improves efficiencies around patient care in many ways and enables medical practitioners to transform the way they transfer and share critical patient information.