



- JOHN BREAKEY, NETWORK INDUSTRY COLUMNIST -

# Wireless Technology in Healthcare

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## Wireless Technology in Healthcare

There's no doubt that technology innovation is continuing at a rapid pace. A plethora of new products all seem to have something to offer; yet the true value of many is still questionable. Recent reports [ULI1] show IT spending is decreasing in Canadian hospitals, so investments are being made in areas that offer the best potential improvement to patient care. Recently the use of wireless networking has been making significant headway in healthcare, which should come as no surprise in an environment that can be described as "organized chaos". In this article, we'll take a look at some systems and applications that take advantage of wireless technology to deliver significant benefit to the patient and to hospital administration.

## Electronic Medical Record

The Electronic Medical Record (EMR) has attracted a lot of attention over the last few years, but deployment isn't as far along as it could be. There are efficiencies to be gained with the reduction of paperwork, but the key benefit is fast access to accurate patient information. This access to information, especially if the EMR is accessible by all parties providing medical services to a patient, can result in a vast decrease in both waiting times and the issuance of unnecessary tests. Perhaps the biggest improvement that can be gained is increased accuracy of medication administration. The physician can enter the exact prescription into the system while still attending to the patient. Likewise, computerized dispensing of meds can improve accuracy and efficiency, based on a common data repository.

The definition of "fast access" to information is loosely defined, usually relative to the existing processes. Wireless networks that provide an interface to a patient's test results at bedside are often envisioned, but there is more to a successful project than just building the infrastructure. Staff that are accustomed to writing on a patient chart with a pen may not be prepared to wheel a computer as they make their rounds. Fortunately, user interface improvements are being made. With the new generation of tablet computers, in conjunction with a well-structured interface, adoption should catch on.

## Wireless VoIP

Computer networks that use the Internet Protocol (IP) are ubiquitous in every healthcare environment. Voice over IP (VoIP) technology leverages this network to carry voice conversations as well as data. Voice over IP deployments have been steadily increasing, usually as a way to reduce costs. Wireless data networks broadly extend this IP infrastructure to any compatible device. Traditionally, we think of notebook computers using the network for anytime/anywhere access to Email and the Internet.

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This foundation can be leveraged much further in that any compatible device can be used, even a wireless IP telephone.

In some patient-care environments, caregivers can spend up to an hour per shift simply walking between nursing stations and patient rooms. With a legacy nurse call system this overhead is increased, as a trip back to the nursing station is required to identify the source of a call. In conjunction with a Wireless Local Area Network (WLAN) and compatible Nurse Call System, VoIP technology can be taken to the next level, by sending relevant information directly to the nurse's portable phone. Additionally, the caregiver's response time is improved, because the phone can immediately connect to the patient's bedside speaker, or escalate to somebody else if they're unable to respond.

Similar to today's cellular phones in shape and size, a WLAN-compatible VoIP phone would be integrated into the hospital's internal phone system, providing seamless access and minimal training requirements. For healthcare, ergonomics are especially important, as such hands-free operation is a key requirement. This isn't just a convenience factor; a system like this could provide instant communications to a support team in critical situations.

## Radio Frequency Identification

Perhaps the most exciting, yet most controversial wireless technology is Radio Frequency Identification (RFID). The technology isn't new, with roots dating back to the 1960s, but privacy advocates have been warning against RFID and the potential privacy implications. Essentially, an RFID system consists of transponder devices and readers. Each transponder has an ID associated with it, and can be attached to or embedded in an object. When the device comes in close proximity of a reader (such as a scanner) the reader will recognize the RFID and perform whatever process is required. There are several existing implementations of RFID technology, such as the fuel retailer that uses the technology to provide rapid payment, pet ID chips, and the "Nexus" Canada-US border-crossing program.

In healthcare, there are several possible uses. With many assets of considerable value being used portably (e.g. IV pump), one obvious possibility is to use RFID to track the whereabouts of these devices. Much like barcode systems, RFID can be used to maintain accurate and up to date inventory control. The key difference is that the scanning does not require a direct visual of the tag, nor does it require the close proximity that barcode scanning does. True, the range is somewhat limited (most systems have a range of only a few meters) when using self-powered tags, but is more than sufficient for inventory tracking purposes.

This technology is also suitable for access control systems (and is already widely deployed). When used for this purpose, security is improved by ensuring encryption is used to verify the validity of the RFID transponder. Many organizations already use this technology to control door access, but haven't considered another use - controlling access to computer systems in public and semi-public areas. It is conceivable that given the appropriate reader device attached to the computer system, application access could be granted simply by detecting a valid transponder (embedded in an ID card) in close proximity. Of course, if that user were to leave the computer terminal, the system would then enter a "locked" state. We should also note here that this kind of authentication isn't considered totally secure, since a misplaced or stolen card could be used to access the system. To mitigate this risk, it can be used in conjunction with a password, but even without ultimate security, it's better than leaving workstations unattended with access to information.

A logical extension that could cause some uproar with privacy advocates is to include RFID in patient bracelets where appropriate. Movement around campuses can be tracked, similar to the ID badges, but without necessarily requiring the device to be "swiped". Although the paranoid will surely cry foul, what is there to be worried about? The bracelet is worn only on the campus, and can be removed if necessary. This scenario could prove especially beneficial with infants and small children or psychiatric patients, sounding an alarm if the system detects a bracelet removed from the secured zones.

## What's Next?

This article has discussed wireless networking and a handful of applications that take advantage of it. There are many other applications not directly associated with healthcare that can be enabled, such as video surveillance, lighting system control, and of course, standard administrative functionality. Technology in healthcare is always advancing, but lately WiFi has gained a fair bit of momentum, which is going to continue strongly into 2004.



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