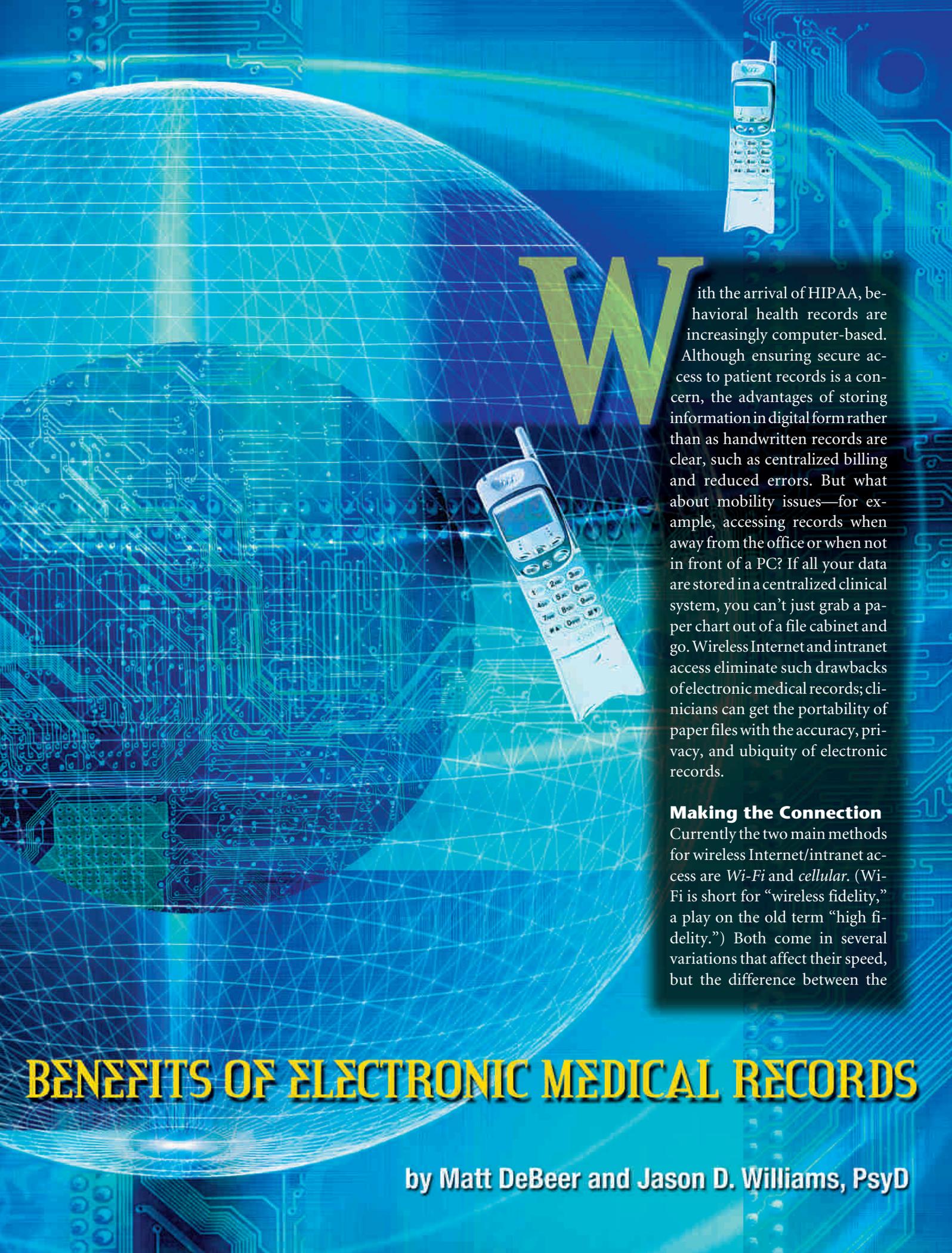




# Unwiring With **WiFi** and **Cellular** Technologies

**NEW DATA-ACCESS OPTIONS ENHANCE THE**



**W**ith the arrival of HIPAA, behavioral health records are increasingly computer-based. Although ensuring secure access to patient records is a concern, the advantages of storing information in digital form rather than as handwritten records are clear, such as centralized billing and reduced errors. But what about mobility issues—for example, accessing records when away from the office or when not in front of a PC? If all your data are stored in a centralized clinical system, you can't just grab a paper chart out of a file cabinet and go. Wireless Internet and intranet access eliminate such drawbacks of electronic medical records; clinicians can get the portability of paper files with the accuracy, privacy, and ubiquity of electronic records.

**Making the Connection**  
Currently the two main methods for wireless Internet/intranet access are *Wi-Fi* and *cellular*. (*Wi-Fi* is short for “wireless fidelity,” a play on the old term “high fidelity.”) Both come in several variations that affect their speed, but the difference between the

## BENEFITS OF ELECTRONIC MEDICAL RECORDS

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two can be summed up thus: Wi-Fi is faster but has a much smaller range; cellular is available just about anywhere but until recently was very slow and expensive. As a result, Wi-Fi would generally be used inside an office, and cellular would be used when off site.

**Wi-Fi.** For access to a database or other centralized system in an office via a wired local network, a cable connects a computer to a central hub. All the office's computers are connected to this hub, and the hub connects them to the Internet and to other computers on the network. Wi-Fi is basically a radio signal that replaces the cables. Wi-Fi runs at speeds of 11 to 54 mbps (megabits per second; 0.05 mbps = 50K), versus 10 to 100 mbps for a wired network and 0.05 mbps for a dial-up connection, which makes it a good substitute for a wired network where running cables would be impractical or inconvenient. Its range of 150 feet from a Wi-Fi access point (hardware that enables a wired Internet connection such as DSL to be shared wirelessly) means that it can cover an office with multiple access points and provide a net of wireless coverage throughout a building.

A 150-foot range obviously isn't much help once outside the office. Fortunately, several companies have started to address this by setting up hot spots of wireless Internet access in popular places. Two good examples are T-Mobile's partnership with Starbucks and AT&T's partnership with McDonald's. For a monthly or hourly fee you can connect to the Internet via their wireless networks. Most newer handheld and laptop computers include built-in Wi-Fi network adapters, so it's increasingly easier to get connected.

**Cellular.** The problem with Wi-Fi is that it still has a limited coverage area, not to mention that a coffee shop isn't the most private area in which to review confidential patient records. The alternative is to use a cellular modem. Until recently, if you could figure out how to use your cellular phone as a modem (which was no easy feat), the speed of the connection was so slow as to be almost useless. The data transfer speed offered by mobile phone carriers a year ago was the equivalent of modem speeds 10 years prior.

Recently, though, data transfer speeds have become much faster. Today's cellular networks offer speeds that exceed the best dial-up modem available and approach high-speed broadband Internet connections such as DSL. A year ago the obstacles to using cellular modems were speed and price; today it is just finding the lowest price—and that's rapidly dropping. It would take another article to sort out cellular data pricing plans, but unlimited data access can be found for as little as \$50 per month.

### **Security**

The confidentiality of patient information has always been important, and with HIPAA in place it's now the law. So how secure are Wi-Fi and cellular? Paradoxically, the inconsistent quality of a cellular connection is the reason that data transferred this way are relatively secure. The algorithms used to ensure reliable data transmission with widely varying signal strength make it difficult for a hacker to figure out how to access a cellular signal. In addition, cellular data providers offer special software to businesses that make the connection even more secure.

Wi-Fi can be configured to use encryption—technology that scrambles information while it is being transmitted from your computer to the network. This works well in an office. However, in a coffee shop or other public place, access providers want to make it easy for you to connect to their networks, so that means encryption is usually turned off.

The best solution for both cellular and Wi-Fi is to use a VPN (virtual private network). A VPN is a combination of software and hardware that creates a secure connection between two computers over the Internet. An organization can set up a VPN to provide its external employees with secure access to its internal computers via the Internet. A user connects to an organization's VPN using a software program on his computer that communicates with a software program on a network computer. The user can use any Internet connection (dial-up, cellular modem, Wi-Fi from a coffee shop, or even another client's network) to connect. The VPN software, rather than the company providing the Internet connection, enables the security. This also means the security is organization-specific.

### **A Mental Health Provider's Experience**

Wireless access was particularly desirable for Childrens Hospital Los Angeles (CHLA). The mental health division uses its electronic clinical system for intakes, scheduling appointments and therapy rooms, tracking medications and diagnoses, billing, and recording clinical notes. In addition, some therapists work with children outside the hospital at satellite clinics. We realized that with all this useful information in electronic form (and only electronic

form), it needed to be as accessible as possible.

**T**he first idea was to create an application for handheld computers that could be synchronized with the central system periodically. Initially, this was a promising solution, but as the functionality of the clinical system has expanded to include more real-time information, the importance of real-time access has grown. For example, recent changes in data such as a rescheduled appointment aren't reflected in an offline system. Likewise, a task such as scheduling a therapy room is not feasible if the user is not connected to the central system.

The second idea was to use PCs at the satellite clinics to connect to the network over the Internet. However, installing network cable, especially in older buildings, and putting computers in multiple locations are expensive propositions. As a result, the solution in many of the satellite clinics was to install one computer with a DSL connection. This meant that therapists had to come to the computer instead of the information coming to them. But with Wi-Fi this problem was easily solved. Adding a Wi-Fi access point cost only a few hundred dollars and meant that a small number of laptops could be used in multiple rooms.

This setup did not solve all of the remote access needs. Even a large urban area such as Los Angeles has areas without DSL access; these are usually the most economically disadvantaged and most in need of CHLA's services. Wi-Fi was of no use at an elementary school, for example, if we

could not bring in a sufficient Internet connection. So the alternatives were to hope six-year-olds liked coffee so we could work out of Starbucks or use cellular modems. Using cellular modems seemed to be a healthier choice.

We just have begun to test cellular modems, but the results are promising. Sprint and Verizon offer the fastest speeds because of the technology on which they are based. Experiments with Sprint yielded very favorable results. Even in areas where a regular cellular phone signal was weak or nonexistent, we were able to get a signal with the cellular modem that gave us speeds approaching 100K (about double the speed of a dial-up modem). AT&T, T-Mobile, and others that use a different technology called GSM offer speeds equivalent to dial-up.

The race is on to deploy even faster technologies. AT&T just introduced a service with speeds up to 200K. Verizon is test-marketing a service with speeds up to 500K in San Diego and Washington, D.C., right now.

### **Conclusion**

Based on our experiences, we foresee the continued deployment of both Wi-Fi and cellular data technologies, because they serve different purposes. Wi-Fi is a great setup for an office but not practical yet for mobile Internet access. Cellular technologies are rapidly becoming faster and cheaper and are much more practical when used outside the office.

It is likely a company will develop a product that seamlessly switches between the two, depending on the user's location. Vendors already are starting to bundle Wi-Fi and cellular

access plans. In fact, Dell offers a laptop that has both Wi-Fi and cellular modem adapters built in, as well as the option to order a data plan from T-Mobile or AT&T. The T-Mobile plan offers unlimited data access via its Wi-Fi hot spots and cellular network.

Technology often has a "network effect": The more people using a company's technology, the harder it is to compete with it (think Microsoft or eBay). As a result, computer manufacturers, retailers, cellular phone carriers, and Wi-Fi providers have created a flurry of deals lately to see who can provide the widest possible network for wireless Internet access. For now, though, the market is still fragmented. To find the nearest Wi-Fi access point, a good resource is <http://intel.jiwire.com>. The site includes a link to a software application that will help you locate a hot spot when you are offline. Of course, some day soon the phrase "not connected to the Internet" will be an anachronism. BHM

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