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**Practicing with wireless solutions**

**Overview**

More and more, hospitals and healthcare professionals are finding wireless is the way to go for better patient care and more efficient operation.

The Frost and Sullivan Research Firm predicts the wireless market for hospitals will grow at a compound rate of 52% a year and reach $175.1 million in sales by 2005. There s a good reason: Hospitals investing in wireless boost efficiency in administrative tasks, and give doctors better on-site resources for patient care.

Hospital LANs (local area network) are especially convenient in high patient-traffic areas such as emergency rooms, critical care wards, nursing stations, and patient waiting areas. Your hospital may be cordless already: in 2004, more than 1,200 U.S. hospitals responded to a survey about their use of wireless technology.

So what does that mean to health professionals? It means going wireless is the wave of the very near future, and it can mean improved patient care, more efficient record-keeping and better productivity.

Busy health professionals are already using electronics to improve patient care. Many practices have electronic medical record systems (EMR) which allow electronic billing, scheduling, and sharing of secure patient information, with experts predicting that EMR will be the standard within a decade. Mobile devices such as Notebook PCs, Tablet PCs, and Handheld PCs have become popular tools for doctors and nurses when moving from a paper to electronic environment.

Now wireless marries all these tools and makes them as mobile as doctors and nurses. With wireless, doctors can remotely access patient records, order lab tests, x-rays or prescriptions, and go online for more information or consult with a colleague -- all from the exam room, bedside or even at home. Now nurses can update patient data on the spot, without having to return to a workstation for manual data entry.

And you can stay in touch with your patients and your medical practice from many offices, hospitals, airports, convention centers and Wi-Fi Hotspots. Soon, airplanes will be wireless-connected as well: In December (2004) the Federal Communications Commission (FCC) voted unanimously to allow high-speed Internet access on commercial domestic flights. The service could be available by 2006.

Wireless networks are a bonus for private practice and smaller clinics and hospitals because they are easy and less expensive to set up than a wired network. Many of today s electronic tools come wireless equipped or can be easily and inexpensively made wireless.

With new products hitting the market on an almost daily basis, there s a myriad of mobile solutions to choose from. This Health Mobility How-To Guide delivers some practical advice on how wireless and mobile technology can extend and support your practice with no strings attached.

» **Understand it:** wireless technology basics

» **Do it:** setting up a wireless network

» **Use it:** putting wireless technology to work in your practice

» **Buy it:** shop for the products that can help you implement your wireless networking solution

» Understand it- wireless technology basics

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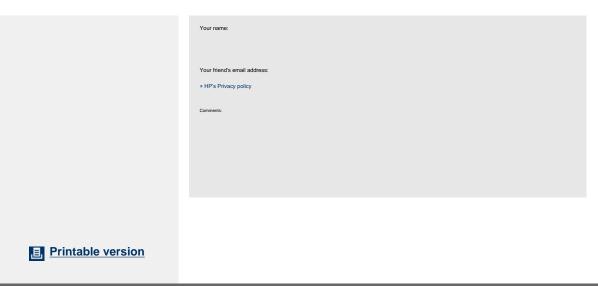» Download a pdf version of this how-to guide
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**Understand it- wireless technology basics**

Wireless technologies allow you to connect and control computers, handheld devices, printers, scanners and other peripherals without the hassle of cords and cables. The technology is growing at a rapid pace, and cable-free, wireless computing is quickly becoming the standard for connecting remote equipment into office networks and the Internet.

Wireless can make almost any place you go into your home office. Imagine being at a hospital, and being able to effortlessly login to your secure office network to retrieve patient records. Or being able to view x-rays and lab tests remotely, look up information on the Internet, order treatments, and consult with specialists---all online from just about anywhere. The most well known wireless technologies are Infrared, Bluetooth and Wi-Fi. Most PCs, printers and other computer equipment on the market today already come standard with some type of built-in wireless capability, or can be easily and inexpensively adapted to support wireless connections. Here are the basics of how these popular wireless technologies work, and examples of how they are used every day in medical centers, hospitals and practices.

**Infrared - short-range point and shoot**

Infrared (IR) technology has been around for ages, and is something that we've all come to take for granted in television, VCR and DVD remote control devices.

- **What it does:** Simple. The remote control unit and the equipment share a special radio frequency, or code, which allows the remote unit to transmit a one-way signal. Just point the remote device at whatever you want to control, and press a button. IR technology only works over short distances (less than 25 feet), and there can t be anything solid, like walls, standing in the way.

- **How it works:** Infrared technology operates over short distances and requires a clear line of sight between devices.

- **How it s used:** Most of today s computers and printers have built-in infrared technology that allows you to print without bulky cables. However, most people don t bother printing over their existing IR connections because it operates much slower than standard parallel or USB cables. Infrared technology on handheld devices such as the HP iPAQ Pocket PC allows people to sit at a table and beam addresses, notes and other data to one another s devices. You can also use IR to update information between your PC and your handheld.

**Bluetooth - two-way short-range connections**

Bluetooth is similar to infrared, but taken a step further. Instead of one-way transmissions, Bluetooth allows multiple devices from multiple manufacturers to speak the same wireless language without the quirky conflicts that are sometimes found in standard infrared. The Bluetooth standard was jointly developed by a group of key players in the technology industry to ensure compatibility between various wireless devices.

- **What it does:** Bluetooth operates over short distances (30 feet or less), and requires a clear line of sight between devices. Bluetooth allows you to create your own private wireless area a personal area network (PAN), where you can hook up to eight devices without the hassle of cords and plugs. Popular day-to-day use of Bluetooth can be found in many of today s wireless keyboards, wireless trackballs and mice, cell phone headsets, handheld devices, mobile telephones, and even computers and printers.

- **How it works:** Bluetooth operates over the unlicensed 2.5 GHz radio spectrum, which allows Bluetooth-enabled equipment to operate anywhere in the world. Bluetooth uses more than 71 different frequencies, which allows a signal to hop around from one frequency to another to avoid conflicts with other devices. For more technical information about Bluetooth, see HP s Bluetooth Technology Overview White Paper.

- **How it s used:** Bluetooth-enabled PDAs, such as the HP iPAQ Pocket PC, can synchronize e-mail, documents and contact information with a Bluetooth-enabled PC, without the need for cradles, cables and plugs. Bluetooth-enabled mobile phones can zap addresses and telephone numbers to the HP iPAQ Pocket PC or a desktop computer, providing a simple way to get your bits of contact information and other data in synch. Bluetooth enabled HP Printers provide a method of wirelessly printing medical documents such as controlled substance prescriptions which federal regulations still require a printed copy. Bluetooth-enabled wireless headsets can be used with a mobile telephone to provide hands-free usage without the hassle of cords and plugs. Like IR, its limit is that it is short range and requires line of sight connections.

**Wi-Fi - fast, long-range wireless networking**

Wireless Ethernet, or Wi-Fi is the latest standard for long-range wireless networking. It goes further and faster than IR or Bluetooth and doesn t require a clear line of sight. Wireless local area networks (WLANs) are a lot less expensive and much easier to set up than traditional wired networks, and these days Wi-Fi actually works as advertised. Because they re easy and inexpensive, wireless networks have become very popular for home and small business networks, and have found a niche in hospitals and clinics where it s important to securely connect people to shared file servers, printers, Internet connections and other resources.

- **What it does:** Simple. The remote control unit and the equipment share a special radio frequency, or code, which allows the remote unit to transmit a one-way signal. Just point the remote device at whatever you want to control, and press a button. IR technology only works over short distances (less than 25 feet), and there can t be anything solid, like walls, standing in the way.

  - **80211b:** At speeds of up to 11Mbps (megabits per second), 802.11b is the most popular wireless networking standard. Many of today s Laptops, Tablet PCs, handheld devices, printers, and other peripherals already have built-in 802.11b networking capability, or have optional adapters that can be easily installed.

  - **80211g:** At speeds of 22Mbps to 54Mbps, 802.11g is a newly emerging standard that provides backward compatibility: It is compatible with earlier versions such as the popular 802.11b devices. 802.11g runs twice as fast as the more popular 802.11b, but is less expensive than the newer, faster 802.11a.

  - **802.11a:** At 54Mbps, 802.11a is the fastest wireless standard available today. Lack of backward compatibility with the more popular 802.11b devices has slowed the adoption of 802.11a devices. Most people will opt for the less expensive 802.11g standard when they require higher speeds.

- **How it works:** Wi-Fi technology operates using unlicensed radio frequencies in the 2.4GHz to 5GHz range: 2.4GHz for both 802.11b and 802.11g, and 5GHz for 802.11a. The primary difference between Wi-Fi signals and infrared/Bluetooth is that Wi-Fi does not require the devices to have a direct line of sight. Wi-Fi transmits data over radio signals that are sent/received via little antennas that are connected to the devices. Learn more about Wi-Fi technology and the various 802.11 standards.

- **How it's used:** Wi-Fi technology is used to create a fast, no-cord, low-cost network. Notebook PCs, Tablet PCs, desktops, handheld devices, printers, multi-function devices, scanners and file servers can all talk to each other without the expense of installing cabling and cable-related equipment like hubs and switches. Wi-Fi networks (also known as WLANs) are springing up in airports, hotels, convention centers, hospitals and health care centers. Soon, airplanes will have wi-fi access.

Texas physician Stephen Fischer MD is using a wireless network which enables him to see 5 to10 percent more patients and keep up with documentation while providing better care. We use the HP Tablet PC to create patient records, do internal messaging, arrange prescription refills and keep up with all the documentation that's required in a medical practice, he says. With wireless, everything is connected no matter where he is. Read more about Dr. Fischer.

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Practicing with wireless solutions

**Do it - setting up a wireless network**

In the real world, you probably won't switch from a wired LAN to a wireless LAN overnight. You ll most likely integrate wireless into your network as it makes sense and as it better meets the needs of your practice. Wireless LANs can be an extension of your existing wired LAN, such as an examining room or record room. Or the new Wi-Fi LAN can be a completely new wireless environment, such as in with a branch office or clinic addition or a finishing resident who is starting their own practice. Our Wireless Networking How-To Guide takes you through the steps of setting up a wireless network from planning to deployment and network security.

- **Planning**: Evaluate your current medical practice activities, business needs and network usage to identify areas that might benefit from wireless connectivity. You may want wireless connection throughout your exam rooms while keeping your billing and front office wired. Then, create a plan for integrating wireless connectivity into your wired infrastructure.

- **Installation**: Walk through the different steps in setting up a wireless networking solution. This section shows you exactly what it takes to get your solution up and running.

- **Security**: This is a major requirement, especially in healthcare. Patient and record privacy always a priority is even more so with the Health Insurance Portability and Accountability Act (HIPAA) rules. Learn what security measures you can take to protect your wireless communications as effectively as you protect your paper files and wired communications.

Here are the layers of security to consider:

- **Watch Physical Security**: Keep your electronic tools safe from physical theft.

- **Secure the Data**: Restrict access on personal systems with passwords

- **Get Pro Protection**: Arm your networks with anti-virus and firewall software, Virtual Private Networks (VPNs), intrusion detection and prevention systems, and web and content filtering.

- **Security Management**: Check your vulnerability, and manage patches and updates

- **Security Services**: Work with HP and our expert channel partners to get confidential and expert advice to help you protect your business from security threats

» Learn more about security issues

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Practicing with wireless solutions

**Use it: putting wireless technology to work in your practice**

Going mobile is good for patients and health care organizations. Today's wireless networking solutions give health professionals and hospitals the tools they need to stay connected and productive anytime, anywhere.

In medicine, documentation is critical for quality patient care. A mistake can result in disability or death leading to an increase in malpractice suits, putting your practice at risk. But record keeping is an overwhelming task for a busy medical practice, hospital or clinic. Paper records are awkward, sometimes unreliable and take time to access. They also take time from your practice: an estimated 50-70 percent of staff time is taken up with handling and compiling records.

Electronic medical record systems (EMR) is changing that and wireless technology allows the patient records to go where the physician goes, from office to hospital to patient. Crucial patient data can be entered on the spot, and beamed immediately to electronic files. Retrieving the data where and when you need it in your office, at the bedside, in the emergency room -- can make a major difference in patient care.

Wireless also allows doctors to order lab tests or x-rays electronically and immediately see the results from just about anywhere. The new technology is already causing a revolution in hospital handling of medication. Some hospital pharmacies have begun using mobile handheld bar code scanning and printing to track all transactions involving medication, from receiving to inventory to dispensing. Central and accessible data helps get the right drug to the right patient at the right time - and prevents mistakes.

**Wireless technology enables health professionals to provide better care**

- **Get research when you want it:** Use your HP Tablet PC to access PubMed or any online databank to get the information you need right when you need it. You can wirelessly consult with specialists, sending x-rays, lab test results, even photos of patients, right from the bedside or exam room.

- **Go roaming:** HP's free Wireless Connection Manager allows you to connect your HP iPAQ Pocket PC to wireless networks throughout the world. Connection Manager simplifies the connection process as you move from home, to office, to public hotspots - without wires and phone jacks.

- **Find the Wi-Fi hotspots:** Wayport provides a map and list of hotels, convention centers, restaurants and airports throughout the world that provide high-speed and wireless Internet access. Wi-Fi Hotspot http://www.wi-fihotspotlist.com/ is another WiFi hotspot directory that is easy to use.

- Connect applications: Tap into office network applications using your handheld HP iPAQ Pocket PC with OnSet Technology's METAMessage. METAMessage extends connectivity from the office to the mobile user by providing real-time access to your network s time entry system, case management databases, document management system, etc.

- Better your presentations: Tapping into your home office information can quickly add information to presentations at grand rounds, medical society meetings, and other talks and presentations. And you won't have to worry about being in another time zone or country without data you need for a talk.

Here are a few examples of how health professionals like you are using wireless technology in their day-to-day practice. More examples.

In private practice. Texas general-medicine practitioner Stephen Fischer, M.D, found using a wireless Tablet PC allows him to see more patients while improving care and documentation. "There's no way I'd ever go back to paper. It's primitive, dangerous, slow and expensive," he says.

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In a mobile home-visit practice. In the Greater Puget Sound area, OnSite Docs is bringing back the tradition of physician house calls, and HP wireless technology is helping make it work.

In emergency medicine. Time is the enemy of all heart attack victims. Using a wireless and digitized Cardiac and Imaging Information System to link paramedics and cardiologists, Northeast Medical Center can quickly begin treatment that makes the difference between life and death.

In a multi-specialty clinic. With 8 offices, Central Utah Multi-Specialty Clinic (CUMC) in Provo, Utah, saved $1 million and improved health care to its 200,000 patients. Using HP mobile technology, its 400-person staff and physicians are able to get more real-time information for better clinical decisions, and improve both physician productivity and physician-patient relationships.

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From the examining room to the waiting room, HP's Tablet PCs, Notebook PCs, and wireless networking solutions allow the mobile health professional to stay connected. HP's all-in-one Multifunction Printers, compact mobile printers and handheld devices are ideal products for the mobile M.D.

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