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INFORMATION EDGE

Wireless at the Point of Care: Demise of the Desktop?

Executive Summary

Use of wireless technology is increasingly becoming an integral part of the care process. Organizations as diverse as Kaiser Permanente Mid-Atlantic in the Washington, D.C., area, Ohio State University Medical Center in Columbus, Ohio, and Cedars-Sinai Medical Center in Los Angeles have all adopted wireless as a critical enabling technology at the point of care.

Driven by strategic applications such as computerized physician order entry (CPOE) and user demands for mobility and convenience, wireless has already gained a foothold in the inpatient environment through wireless local area networks (LANs), where physicians use laptops for hospital rounds. On the outpatient side, wireless has gotten a much bigger media splash in the form of handheld devices used by physicians primarily for prescribing and formulary review. While those palm-sized devices present a more compelling picture than the bulkier laptops bolted to hospital carts, use of such wireless devices in outpatient settings is still in its infancy partly because physician practices, smaller and more numerous, are much more difficult to automate than hospitals.

Pressure for reducing medical errors through use of CPOE has reached a crescendo nationally, and wireless is becoming a favorite mode of CPOE transmission. Senior executives should carefully consider wireless technology because of the grassroots nature of its growth: users greatly prefer it to being tied to a desktop. Despite the fact that much—if not most—of care today lacks IT enablement, when technology finally arrives, it may very well do so in wireless garb, leapfrogging the traditional desktop PC altogether. In the context of patient care, the demise of the desktop—or at least the supplanting of it for order entry and some types of data review—just might be a good thing.

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Two flavors

Wireless applications at the point of care come in two "flavors," according to Fran Turisco, a director in emerging practices research at First Consulting Group (FCG). The vanilla flavor belongs to so-called "niche" wireless vendors with single-function applications that run on a personal digital assistant (PDA) or other handheld computing device. Companies providing these types of applications include Patient Keeper, Allscripts and iScribe; applications typically e-prescribe—write prescriptions—and capture charges at the point of care.

A second flavor encompasses wireless hospital information systems (HIS) applications with multiple functions such as order entry, results reviewing and a medical record that operate on electronic tablets or laptop computers. Vendors include traditional HIS firms like Cerner and SMS. Hospitals use a wireless LAN as the infrastructure; small cards with tiny antennae inserted in user devices link to "access points" located typically in the ceiling throughout a hospital or other care setting.

Wireless LANs in the hospital or other treatment setting have arrived. Speed is fast enough, reliability is high and the cost has dropped enough for many hospitals to consider this increasingly viable technology.

Wireless carts

That's the case at Ohio State University Health System in Columbus. CIO Asif Ahmad oversees a wireless Aeronet network from Cisco Systems throughout inpatient areas and the emergency department. Physicians use wireless laptops bolted to hospital carts on their patient rounds to enter orders.

Both Ahmad and Director of Applications Phyllis Teater are quick to point out that wireless was never the goal when they built the system. OSU had launched a physician order entry pilot project in 1998 that was successful but had to be put on hold during Y2K remediation. When the CPOE project resumed deployment in early 2000, the speed and bandwidth of wireless had improved and the cost had dropped so much that wireless became an obvious enabler.

The need to reduce medical errors, comply with mandates such as HIPAA and improve efficiencies of process fueled the move to CPOE, according to Asif. Wireless made it easier. [The Leapfrog Group and other organizations have recognized CPOE as the first step in an IT solution to reducing medical errors and will be discussed in more detail in next month's Information Edge report on patient safety].

Indeed, wireless technology helped increase physician acceptance of the CPOE project because it made it easier for physicians to conduct their rounds, says Asif.   "You must be able to make computerization part of the process, and not *add* to the process," he says.

Don't look back

For example, he notes OSU's intensive care unit incorporates 32 beds in a U-shaped layout in which physicians make rounds bed to bed, one end of the U to the other. "If physicians have to go back and feed patient information they've gathered into a stationary device [like a PC] rather than in a linear direction, then it's not going to work," he says of the CPOE.

Teater emphasizes that, while the cost of the wireless technology is relatively inexpensive, a hospital needs to have a high-speed network backbone in place. "We've always been proactive in investing in infrastructure," she says. The organization uses about 120 laptops on its 20 tertiary-care units and 12 cancer-center units, all with access points in the ceiling that link the laptops to the SMS hospital information system.

Because OSU wanted an access device that would stay with the geographic unit instead of one that travels with a physician or service, the laptop was the best choice. Teater counsels others to install the wireless technology enough ahead of the software applications to allow thorough testing. "We had

stability problems. The wireless network would drop connections at the same time we were testing the order-entry system," she says.

The health system has not done any studies of the benefit of wireless per se, because studies focus on CPOE. "Wireless aided our CPOE initiative, but was not the initiative itself," says CIO Asif. Still, acceptance of the technology has been high among clinicians. "Physicians want major deployment of Palm Pilots now," he says.

'I'm a believer'

That's exactly what Andrew Barbash, M.D., has in mind. The Executive Advisor for clinical IS at Maryland-based Kaiser Permanente Mid-Atlantic, Barbash and his colleagues just completed the first officially sponsored deployment of handheld prescribing into one of the Kaiser regions. The three-month pilot involved 30 physician and nurse users at a medical center serving about 30,000 primary-care patients.

The Kaiser pilot used a prescribing system from ePhysician.

The results of a survey of the pilot are still coming in, but Barbash is already happy with what he's seen. "I'm a big believer in mobile computing," he says. For one thing, there have been dramatic improvements in legibility, which translates to reduced phone traffic between pharmacies and providers, and supports a major patient safety initiative. Other survey data will determine levels of use among caregivers, ask pharmacists how the technology affected workflow and ask patients if it changed their perception of providers.

A decision has already been made to continue use of wireless handhelds among those physicians using them in the pilot. The jury is still out on whether to extend it to the whole delivery system, Barbash says, but not in terms of its utility for physicians. Besides improved legibility, those who use it are more likely to pick the right drug for a patient, he says.

Barbash says that for a group of 50 physicians to achieve operational efficiency in an automated process like wireless prescribing, perhaps two-thirds of them might need to adopt it in order to have a positive net impact on downstream workflow in the outpatient pharmacy. That's because there are some processes—those involved with an electronic medical record, for example—that could create more workflow complexity for staff.

Not to prove its value

"One of the major reasons we did the pilot was to find out what the issues are with implementing e-prescribing in a large group practice. It was not intended to prove the value of handheld prescribing. Numerous other studies by groups like the Institute of Medicine have already done that," he says.

Among other issues, Kaiser wants to know whether real-time connectivity is essential or if hot synching, in which the data is uploaded from the handheld device using a cradle, works just as well. Other issues being investigated: Can the same technology be applied to a large multi-specialty clinic or are there unforeseen workflow obstacles? And, can a similar Internet-enabled process support the complexity of outpatient encounter-data capture? The latter will likely require another pilot study—not because of software, but because of workflow issues.

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The goal: To enable Kaiser to go to any of its geographic areas and, in a short time, install such systems to improve patient satisfaction, legibility and patient safety.

Handheld prescribing isn't the only wireless-related initiative at Kaiser Mid-Atlantic. The health system has a functioning electronic medical record involving 2,500 users scattered over 26 medical centers serving 500,000 patients in Virginia, Washington, D.C., and Maryland. The belief among some experts is that wireless technology has finally matured to the point that it can be adopted more broadly in support of the ambulatory EMR.

Ready for primetime

"Part of our EMR strategy is to achieve mobile wireless computing," says Barbash. "This technology is now converging so that it's ready for prime time. Doing this is an important milestone in the EMR." The hardware is cheaper, the connections are easier and thin-client software such as that from Citrix is readily available, he adds. ["Thin clients" are end-user devices that rely on servers to do the heavy computing, freeing the client to be more mobile and reducing end-user device and support costs.] In fact, successful mobile com-puting may be a critical foundation for the EMR, as functional requirements for applications are impacted on the ease of access to the EMR itself.

Kaiser Mid-Atlantic is also developing a tracking system for inpatient care to improve capture of records from physician rounds and to improve commu-nication between inpatient and outpatient sectors, a perennial problem. Developers are making the applications work on Palm Pilots. "Until you can provide a solution on a mobile device, you can't really solve the problem," asserts Barbash. Echoing CIO Asif, he adds that the application must work in a manner that supports physician workflow.

"The whole idea of mobile computing is not just a nice-to-have, but is a requirement for physicians."

Convergence at Cedars-Sinai

On the other side of the continent, Cedars-Sinai Medical Center (CSMC) in Los Angeles is experiencing a convergence between wireless technology, handheld devices and the Web. Physicians, nurses and other healthcare workers access clinical patient-information using a hospital-wide Web-enabled application. With the advent of wireless LAN technology, any mobile device (laptops or PDAs) with a Web browser and wireless capability can function like a full-workstation without any additional software.

"People love the wireless technology—it's very strongly user-driven," says Ray Duncan, M.D., director of technology & architecture in the Enterprise Information Services (EIS) department at CSMC. "There's tremendous demand for it. In less than a year, the organization has expanded access points to its wireless LAN to 60 from a previous six. The emergency department wants it so they can go to a bedside and register patients without having to take the family aside. It's a really nice thing to be able to follow the family rather than have them follow you," he says.

"We are expanding our deployment of wireless access points into patient-care areas within the medical center," says Duncan.

As at OSU in Columbus, wireless just happens to be the right enabler at the right time. EIS has Web-enabled patient care at CSMC by developing an intranet because it is less costly and requires less support and maintenance. Wireless, mobile computing found a special role in that architecture partly because it took up less room.

"As we build new buildings, it's cheaper in a lot of ways," says Duncan. "Our patient-care areas are out of space, so we're using laptops and PDAs. There's nowhere to put PCs," he says. Space issues notwithstanding, Cedars-Sinai Medical Center's 2,000 doctors and 200 residents/fellows need to look up patient data from both clinical units and their offices. In addition, the job of installing PCs or workstations for each of them was too cumbersome a strategy to pursue.

Wireless handheld grassroots

Since 1998, and independent of CSMC's Web strategy, Jerome Wang, M.D., an internist/pediatrician in EIS, was studying the clinical use of handheld devices, both "clamshell" types with mini-keyboards and half the normal screen, and even smaller palm-sized devices running the Windows CE operating system. "We developed a variety of handheld patient-tracking applications to facilitate physician-to-physician communication and improve the quality of medical documentation," he says.

Using the wired cradles and network points, hospital-based physicians are able to upload and download information to a central database. "However, we encountered problems with synchronization, especially if multiple users changed information on the same patient prior to synchronization," says Wang. "These inherent problems with mobile devices can be overcome with real-time wireless access."

Eventually, the grassroots effort of the handhelds and the wireless Web strategy found each other.

"It just turned out they work really well together," says Wang, who tells the story of an enterprising anesthesiologist who popped a wireless card into a slot in his PDA one day and discovered it worked as a mobile Web-terminal. Soon, other physicians, nurses and caregivers began clamoring for the devices.

And residents who are on their feet all day don't have to take turns on a stationary workstation. They can enter or access information even while on an elevator.

Slower than dot-coms

Despite the successes, however, not every expert sees wireless in healthcare booming.

Peter Kilbridge, M.D., a clinical information expert at FCG, says the spread of handheld wireless in patient care had been slower than anticipated during the dot-com explosion. "Outpatient wireless is not getting accepted as quickly as possible because of the difficulty of marketing to small physician groups and the fact that many physicians are wondering about the reliability of the technology," he says.

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"We are deploying the whole medical center to be entirely wireless."

Handheld wireless is useful for charge-capture and for electronic prescribing; the latter helps to reduce pharmacy call-backs, according to Kilbridge. It is likely to have a modest impact on reducing medical errors. "Outpatient use of wireless technology has a limited impact on patient safety because most patients see multiple doctors in different practices, and don't stay in one place. Electronic prescribing provides cleaner, legible prescriptions, but drug-drug interaction checking is limited to medications prescribed at the practice that uses the wireless system. In the inpatient setting, the hospital centrally controls all the information," he says.

In the inpatient environment use of wireless technology for charge capture is starting to become popular as a way to demonstrate return on investment, says Kilbridge.

He predicts that the next two years will see consolidation of the marketplace among outpatient wireless vendors. Also, most companies will continue to add multi-functionality to their mobile devices. "The technology always continues to improve. The speed will increase and make it more desirable."

Conclusion

While it's a good time for organizations to consider wireless technology—there are plenty of good examples of hospital wireless LANs, lots of experimentation going on with wireless-handheld prescribing in outpatient settings and extensive coverage of the topic in the trade press—wireless technology is not a "slam dunk" in all cases.

For example, the capacity to make wireless technology work in old buildings may be limited. A thorough assessment needs to be completed in order to ensure that the physical environment supports the technology. A high-speed network infrastructure is a prerequisite.

On the financial side, executives looking for a clear return on investment will be disappointed, at least for now. The ROI of wireless is often unquantifiable, largely because wireless technology is an enabler, a role player in larger strategic initiatives such as CPOE. While it may be possible to determine the ROI for CPOE in terms of such factors as reduced medical errors and increased efficiency, wireless is just a part of the CPOE equation.

The answer to the ROI question lies in user demand: physicians like the convenience wireless offers. The key is to integrate wireless applications within the context of physician workflow, not to add extra steps, which has always been one of the prime reasons for traditional physician resistance to using computers in the first place. The tale will be told as more applications are added to wireless handheld e-prescribing in the outpatient setting. If provider organizations can ensure that wireless sings from the physician song-book, it will thrive as an IT solution.

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