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Are PDAs the Future of Health Care I.T.?

PDAs' diminutive size is a key to their growing success—and an obstacle to greater use. But size doesn't matter for a steadily increasing number of caregivers enthusiastically clamoring for PDA-enabled applications.

Information technology leaders and other executives at MedStar Health, a delivery system in Baltimore, have determined that personal digital assistants will play a significant role in the future of health care. They didn't reach this conclusion yesterday, last month or even earlier this year. They made the determination five years ago.

The organization first distributed PDAs, brimming with medical reference applications, to residents in 1998. MedStar quickly found that the budding physicians were eager to create interactive PDA applications of their own. Before long, the residents began using their hand-helds to document patient notes; they even included data from MedStar's clinical information systems.

But the delivery system concluded such duplicate data entry created the potential for inaccurate information. Still, it recognized tremendous possibilities if caregivers had mobile access to clinical data, says Cindy Henderson, MedStar's application manager.

"There was a driving force to use PDAs," she remembers. "So we asked our health care I.T. vendor to develop a way we could use PDAs to access clinical information."

In mid-2000, MedStar physicians, I.T. staff and their vendor, Siemens Medical Solutions Health Services Corp., Malvern, Pa., developed an application designed to transmit data from the vendor's patient charting software to PDAs for viewing by caregivers. The application can communicate with PDAs running the Palm OS operating system from Sunnyvale, Calif.-based PalmSource Inc. and the Pocket PC operating system from Redmond, Wash.-based Microsoft Corp.

Today, 100 physicians regularly synchronize their PDAs—from a variety of hardware vendors, including Palm Inc., Sony Corp. of America Inc., Dell Computer Corp. and Hewlett-Packard Co.—with the organization's clinical systems.

Through hot-synching, up-to-date patient chart information automatically is transferred to the hand-held devices. The delivery system anticipates additional benefits if it can enable wireless, real-time access to clinical applications, Henderson says.

Multitude of uses

Like MedStar, a growing number of health care organizations believe PDAs hold great potential. And these organizations—along with the burgeoning mobile health care vendor community—continually are developing new ways for PDAs to access, enter and transfer health data.

"The opportunities that PDAs offer at the point of care for information access and capture create a multitude of uses for health care organizations," says Claudia Tessier, executive director of the Mobile Healthcare Alliance, a Washington-based organization working to

remove barriers to increased use of mobile devices in health care. "Additionally, PDAs will be adopted more quickly than other forms of I.T. because physicians are interested in them."

Further, by enabling point-of-care information access for clinicians, PDAs help improve patient care and reduce medical errors, giving the technology a bright future in health care, she adds. The small devices, however, have some potentially large drawbacks, many experts contend.

Though more health care software vendors are "PDA-enabling" their applications, the majority have yet to take this step. This can leave organizations investing in hand-helds today high and dry for applications. Conversely, some niche vendors offer limited health care applications for PDAs but cannot yet integrate them with conventional software from other companies. And on a related note, many of the health care organizations eschewing the hot-synch process in favor of a wireless network that enables real-time data access via PDAs are finding wireless to be costly both in dollars and resources.

The size of PDAs also can be a hurdle to more ubiquitous use in health care. The small devices, for instance, can easily be lost; as a result, many health care organizations can't afford the responsibility of maintaining and securing them.

MedStar doesn't provide attending physicians with PDAs because of the cost of replacing the devices if lost, Henderson says. Instead, the delivery system offers maintenance and security services for physicians' personal PDAs used to access patient charting software.

Another size-oriented obstacle concerns the limited "real estate" of PDA screens. Because clinicians often view a large amount of data simultaneously, or very near so, small PDA screens potentially can hinder rather than help, some experts say.

"PDAs are great for maintaining calendars, coding and prescription writing," says Mark Anderson, CEO of AC Group Inc., a Spring, Texas-based health care I.T. consulting firm. "But when it comes to using full-blown CPOE or electronic medical records applications, most physicians say they just won't work. It always comes back to the screen real estate. While software vendors are starting to make their applications work on PDAs, most physicians want to view them on something bigger."

Despite various stumbling blocks, though, many health care I.T. experts agree that PDAs do have a role to play in the future of health care.

"The barrier for increased use of PDAs in health care isn't their form factor, it's what clinicians can or cannot do with them once they have one," says Becky Quammen, president and CEO of the Quammen Group, a Winter Park, Fla.-based health care I.T. consulting firm. "PDAs will work well for smaller applications. And in the future, the health care industry will use a blend of devices to satisfy the various desires and levels of users."

To meet the needs of its caregivers, Hinsdale (Ill.) Hematology Oncology Associates Ltd. has chosen mobile hardware that to date is rarely seen in health care. And it has high hopes for the technology.

In May it purchased three combination PDA/smart phone devices from Siemens Information and Communications Mobile Group, San Diego. The mobile hardware, model SX56, runs the Pocket PC operating system. Hinsdale Hematology physicians use the hand-held device to access information in their practice management and electronic records applications from Impac Medical Systems Inc., Mountain View, Calif.

The group practice connects to the vendor's Web site via the PDA phones to gain secure mobile access to the applications. The Internet connection is created using general packet

radio service, a wireless communication standard that sends data at up to 115 kilobits per second over cellular access points.

Some limitations

Though Hinsdale physicians now benefit from real-time access to patient data from almost anywhere, the practice concedes some limitations, says Michele White, practice administrator.

"We don't have access to the complete applications on the PDAs, only certain data that's been reformatted for PDAs. We also can't create documents on the PDAs," she explains. "The vendor couldn't put the large programs on a device with such a small screen."

Staff members are nonetheless optimistic about the future of PDAs in health care. Physicians routinely use the PDA phones when at home on call and need a patient's lab or X-ray information.

They also use the devices in the practice when corresponding with pharmacists about patient drugs.

Further, staff members believe enhancements could enable physicians to use their PDA phones to access and share patient information while inside a hospital or other health care facility.

"There are always limitations the first time you use a technology," White says. "When the technology gets better, everything else will improve with it." John Halamka, M.D., CIO at Boston's CareGroup HealthCare System, also believes PDAs and PDA-enabled clinical applications will become more robust.

CareGroup HealthCare enables physicians to use any brand of PDA they prefer, rather than supporting a single technology, like MedStar's PDA phones.

In May 2001, CareGroup created the Digital Dashboard application to give physicians access to information about emergency department patients via PDAs.

The delivery system uses the CACHE post-relational database from InterSystems Corp., Cambridge, Mass., to Web-enable emergency department data then send it to physicians' PDAs via a wireless local area network. The database is updated every minute.

In September 2002, CareGroup partnered with PatientKeeper Inc., Brighton, Mass., to develop XML-based applications that enable physicians to view clinical data, including lab results, electronic medical records and other urgent data on PDAs.

While these applications can give physicians increased knowledge about patient information at the point of care—and potentially improve care—only a dozen of the delivery system's physicians are using PDAs to access them, Halamka says.

Personal preference

"PDAs are very personal devices," he says. "They are limited by their small screen size and the way data must be entered into them; using a stylus to enter data doesn't always fly. Their form factor is only useful for certain clinical applications. So we're looking for platforms that enable PDA access rather than investing in more PDAs."

All hand-held devices, he adds, must come with adaptable keyboards before they can become ubiquitous in health care.

Though not the robust software that Halamka describes, PDA-based reference materials have done a lot to get physicians, nurses, residents and other caregivers using PDAs.

Like medical reference software, any application that tickles the fancy of physicians could boost mobile health care and help the industry overcome barriers to greater use of PDAs, says Mat Raftree, health care practice lead at ArcStream Solutions, Watertown, Mass.

"In many health care organizations, PDAs have been brought in by physicians who use their own medical reference software," he says. "And those physicians now are asking I.T. staff to make their PDAs able to access in-house applications."

Numerous residents and a few physicians at the Stanford (Calif.) University School of Medicine and the Stanford Hospitals and Clinics use PDAs, mostly to access reference applications. But it's only a matter of time before the clinicians get hungry for more PDA software, says Tony Burgos, M.D., assistant professor of pediatrics at Stanford.

While practicing at Lucile Packard Children's Hospital and the Johnson Center for Pregnancy and Newborn Services, Burgos uses a Tungsten C PDA, from Milpitas, Calif.-based Palm Inc., to look up drug information and collect patient satisfaction data for research.

PDAs the answer?

With more applications, PDAs could be the answer for busy physicians who need access to patient information that is not limited to a PC at a nursing station or in a back office, Burgos says. What's really slowing the use of PDAs is the scarcity of wireless networks in health care that can bring real-time access to clinical information via the devices, he adds.

Burgos can access e-mail from his PDA on the Stanford University Wi-Fi network when he's on campus.

But the health care facilities where he practices do not have wireless networks, which could offer real-time access to e-mail, clinical applications and other systems.

"There's a trend toward using PDAs in clinical care," he says. "It's just a matter of physicians taking it to the next level to see what they can use their PDA for. However, when they're in hospitals, the extent of their PDA use will depend on whether the facility has a wireless network. It's an infrastructure barrier for PDAs, but it will be overcome in the future."

Current research supports this conclusion. Worldwide wireless local area network equipment shipments totaled 19.5 million units in 2002, a 120% increase from 2001, according to a study by Gartner Inc., a Stamford, Conn.-based research organization.

"As one of the few growth areas in network equipment, the wireless LAN market is attracting a large number of vendors. The resulting competition is forcing prices down, benefiting users by creating a wide choice of low-cost products," says Andy Rolfe, principal analyst at Gartner. And price decreases in wireless technology will benefit industries with highly mobile professionals, such as health care, he adds.

Cutting research

One such highly mobile professional has been studying how PDAs and wireless networks can benefit health care. Alex Gandsas, M.D., believes the technologies have great potential for improving clinical care.

For two years, the assistant professor of surgery at the University of Kentucky Center for Minimally Invasive Surgery, Lexington, has been studying how PDAs can be used in surgery. After receiving a grant from Palo Alto, Calif.-based Hewlett-Packard Co. to use IPAQ Pocket PC-based PDAs and wireless network access points and servers, he and a few colleagues have been researching how to wirelessly broadcast streaming video from operating rooms to hand-helds.

Gandsas, who last month started a new job practicing at Baltimore-based Sinai Hospital, believes the role of PDAs in surgery will become more important as the technology evolves.

"We continue to conduct the research; our goal is to create a way for physicians and medical students to watch a real-time video of a surgical procedure on a PDA," he explains. "We'd also like to create a way for them to use a stylus to make marks on a surgical image on the device and have them be broadcast in the operating room."

Although Gandsas believes PDAs have a bright future in health care, the surgeon does have a few reservations about using the devices.

PDAs shouldn't be used to store clinical images and data because of the potential for them to be lost or stolen, he contends. Additionally, the limited battery life of most PDAs is a barrier for health care organizations that want to use them in surgeries or on rounds, he says.

Just this spring, though, the mobile hardware industry began responding to this shortcoming by introducing PDAs with significantly longer battery life. Palm's Tungsten C, for example, boasts six hours of power from a full charge of its 1500mAh battery. And adding a slim peripheral device to the back of the PDA can double that time.

"The philosophy and logistics of using PDAs in health care are valid," Gandsas concludes. "But they need interfaces so clinicians can use them in conjunction with 'wired' systems. This will become a reality in the future."

Though it might take a while for PDAs to easily interface with hard-wired information systems, the trend is definitely there, says Quammen, the consultant.

The only thing really inhibiting more widespread use of PDAs in health care is the lack of a solid, end-to-end solution that enables Wi-Fi access to clinical applications throughout an organization, she says.

Progress in this area, she adds, may be hampered by a vicious circle of development issues: Many health care organizations have incomplete wireless LANs, or none at all, because they're waiting for more PDA-based applications.

They, in turn, are pressuring health care information systems vendors to create PDA versions of their software. Under pressure, the vendors end up releasing hand-held access in stages, which can further complicate health care organizations' goal of integrated access.

This will quickly change, Quammen contends. "There are a lot of disconnected pieces right now; but it's better than it was six months ago," she says. "A year from now, the major acute

care vendors will have released most applications that can be done reasonably on PDAs. And as PDA-based applications become more complete, the desire to use them will increase.

"There's a tremendous benefit to putting PDAs in the hands of caregivers." •