# Documentation Goes Wireless: a Look at Mobile Healthcare Computing Devices

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*Patient care information often suffers as it travels from handwritten notes, dictation, or the memory of the clinician to the medical record. Hand-held devices equipped with mobile healthcare applications can bring documentation to the point of care. In this article, learn how mobile healthcare computing devices can decrease medical errors, increase efficiency, and improve the delivery of care.*

Accurate, accessible, and shareable health information is a well-known prerequisite of good healthcare. Yet many healthcare practitioners continue to document patient care using practices that diminish the quality of the health information. For example, practitioners make handwritten notes that may or may not be entered into the computer later by an assistant. Or, after a patient encounter, they dictate information for transcription. In both cases, it is easy to lose important health information—information that could be captured if the practitioner recorded it during an encounter. In short, timely recording at the point of care can provide better documentation that will lead to a higher quality of care. Such recording provides more current and reliable information on which to base subsequent assessments and decisions for patient care. Data that is entered post-encounter, based on memory or handwritten notes, may be incomplete, inaccurate, or misinterpreted, which increases the risk of medical errors and inefficiencies.

Hand-held devices present a solution in the struggle for improved documentation. Equipped with mobile healthcare (m-health) applications, these devices facilitate at least three activities:

- accessing information
- recording information
- transmitting/communicating information

A major benefit of mobile devices is that these activities can be performed at the point of care (particularly in the exam room), while walking in the hospital or on a medical center campus, or even off the provider premises, such as in a car or at home.

Typically, practitioners use cellular phones and pagers for communication. In addition, personal digital assistants (PDAs) are used for storing addresses, organizational tasks, and scheduling functions. In fact, mobile devices are available that combine these functions into one unit, providing the user with PDA, pager, and cell phone functions plus e-mail and Internet access. These devices, known as mobile healthcare computing devices (MHCDs), range from the size of a cell phone with a tiny screen to tablets with a screen resembling the size of a standard sheet of paper to laptop computers with even larger screens, weighing from a few ounces to two or three pounds. Because of their potential to reduce medical errors and improve efficiency in delivering care, there's no question that HIM will soon need to address the integration, use, and security of MHCDs.

## The Spectrum of Functionality

The functional categories of MHCDs each have different requirements for hardware, security, communication, and systems integration. Following is a closer look at each category:

### MHCDs as Information Resources

Practitioners use handheld devices to access drug formularies and databases that show potential adverse drug reactions among medications, as well as policies, health plan guidelines and protocols, and other information that is useful at the point of care but does not require frequent updating. Information updates may be done by replacing a simple chip every 30 days or every three to six months. This type of unit has minimal requirements for security and is not used to communicate confidential health information unless it can also be used as a cell phone.

### Intermittently Connected Devices

MHCDs can easily be connected to desktop computers or the main healthcare information system through computer ports. The most popular connection is USB (Universal Serial Bus), which allows high-speed transfer between the main computer and the MHCD. This would enable a physician to download patient schedules or information about 10 or 20 patients onto the MHCD, making relevant information immediately accessible. Such information can be synchronized daily, during breaks, or whenever needed and possible. Intermittently connected MHCDs entail greater security risks than those serving as information devices, because users must ensure that the MHCDs are not lost, misplaced, or used by an unauthorized person (usually accomplished via password authentication). In the future, MHCDs with biometric authentication such as fingerprint recognition and speech pattern recognition will be available.

### Continuously Connected Devices in a Local Area

Substantial benefits can be derived when a practitioner is continuously connected to the health information system while he is in the hospital or on the campus of the medical center. For example, the practitioner can be alerted as lab reports come in, stay in touch with a nursing station, access patient information online while doing rounds, prescribe at the bedside, or consult a colleague at the point of care.

For this functionality, a provider institution creates a network of access points, which send and receive information wirelessly within a certain range, typically a radius of 100+ feet (in all directions) through walls and other obstacles. It is important that the network of access points is set up to cover the provider area appropriately. Some of this communication is being transmitted using the Bluetooth standard, a wireless specification for compatible communication. The most commonly used standard, however, has been IEEE 802.11b, a very economical and popular standard that many vendors automatically include with new laptop computers. IEEE (the Institute of Electrical and Electronics Engineers) is a technical, professional association that creates standards in several industries. Unfortunately, 802.11b has a security weakness: it is possible to easily break into the system and "listen" to confidential information within the hospital network. For protection, additional features that include greater security and encryption should be implemented. A new version of this standard is IEEE 802.11a, offering faster transmission and better security; but it is still quite expensive. A third version in development, IEEE 802.11g, is expected to be safer and faster.

### MHCDs Geographically and Independently Connected

The final application category allows practitioners to receive or transmit health information anywhere. This allows a practitioner to receive or send text messages while on the way to the hospital or to access Internet-based guidelines anywhere. Security measures must be put in place for these applications, too.

## M-health Applications at Work

A number of mobile healthcare applications have been successful in different healthcare arenas:

- **Emergency department** (ED): MHCDs are used for two functions in EDs. First, when the admission process incorporates MHCDs, practitioners can treat the patient immediately while admitting personnel with MHCDs accompany the patient. The result is more prompt care and higher patient satisfaction, because the patient does not have to wait through the admitting processes before being triaged. MHCDs are also used by practitioners to access information, perform order entry functions, and communicate at the point of care with other professionals.
- **Order entry and results reporting**: Many providers are focused on reducing medical errors, making electronic order entry a key project for many hospitals and clinics. Ideally, order entry should be done at the point of care, and critical

results, such as certain lab reports, should be received by a practitioner as soon as they are available, wherever he or she is.

- **E-prescribing**: Electronic prescribing of medication at the point of care has many advantages, including reducing errors related to misinterpreting physician handwriting. Further, pharmacists do not have to call back for clarification as often as with traditional prescriptions. Finally, e-prescribing allows for easier facilitation of drug management. Because of these benefits, several vendors began marketing e-prescribing systems with MHCDs several years ago. However, they have not been successful in implementing large numbers of units, partly because providers are expected to fund these systems, even though the beneficiaries are pharmacies and health plans. Additionally, success depends largely on the integration of such a system within both the pharmacy and the provider information systems. It is expected that this application will expand in the near future as alliances among vendors and systems integrators improve conditions.
- **Point-of-care computing**: Clinical documentation away from the desk and at the point of care may change in the next decade. The transition from handwriting and free text to interactive, structured documentation has just begun. This has led to dictation and medical transcription where support personnel capture, edit, and structure information. In the future, it will be the clinician who will interactively record structured information at the point of care with an MHCD. This may also involve dictating into the MHCD, as well as pointing and clicking on data entry screens.
- **Other applications**: The range of other applications includes medical device communication, clinical trials, automated coding, and charge capture. The concept of charge capture is not fully developed because of lack of standards, but today it is technically possible to capture charges on a handheld device, send the claim to the payer, and receive responses or approvals before the patients leave the provider's premises.

## Hurdles to M-health

M-health is not yet easy to use, which is one of the biggest hurdles to its widespread implementation. Many clinicians don't want to use small screens or small keyboards, carry around relatively bulky computing devices, or work with complicated operating systems. As the industry addresses these issues, greater ease of use can be expected. Further, many recent medical school graduates have already used these devices and believe their benefits outweigh their limitations.

Prior to implementation, MHCDs need an infrastructure that addresses legal issues, as well as authentication, security, and data integrity. For example, specific measures are needed for ensuring the legality of e-prescriptions. Security, particularly under HIPAA, is a major hurdle. As the vendor and provider communities struggle to define an end-to-end messaging flow that complies with HIPAA in traditional systems, they recognize that HIPAA compliance with MHCDs is even more complex.

Integration is another problem. MHCDs use a different logic for interactive use than traditional information systems. Also, they tend to use Internet protocol and XML-based communication rather than traditional messaging.

The biggest challenge with MHCDs, however, is the lack of standards on interference. In the past, some mobile devices have interfered with medical devices through low-level radiation. Because of these reports, most providers have policies that prohibit the use of cell phones and other wireless communication devices. Although the general rule is that a MHCD should not be used within three feet of a medical device, there are exceptions. Every healthcare provider should examine its current policy in light of the opportunities and benefits that mobile healthcare devices present. A standard model policy is needed.[1]

## The Future of M-health

MHCDs will dramatically affect the collection and exchange of health information; however, this does not mean that their implementation is simple or that the transition will be fast or seamless. The integration of m-health into any provider setting will be an interesting challenge for HIM professionals. There are many questions to answer first, including:

- What **operating platform** should be chosen? Palm, iPaq (from Compaq), and RIM (Research in Motion, maker of BlackBerry handhelds) are just a few of the options
- How can MHCDs be **integrated into the existing system**?
- How can **HIPAA compliance** be ensured?
- How should **current policies** regarding MHCDs be changed?

Take the first step toward m-health through education. Explore the technology available to move documentation to the point of care and the m-health opportunities in your facility. M-health promises to transform the delivery of care; make it your job to get

ready.

## Note

1. MoHCA (Mobile Healthcare Alliance) is developing such a policy, and both ISO TC 215 and ASTM E31 are working on related standards.

## M-health Terms to learn

Below are some commonly used mobile healthcare terms and their definitions.

**access point**—sending and receiving station for wireless communications

**e-prescribing**—electronic prescribing

**IEEE**—Institute of Electrical and Electronic Engineers

**interference**—low-level radiation that may interfere with and cause malfunctioning in medical devices either connected to patients (such as a pacemaker device) or providing vital patient data within a provider organization

**intermittently connected device**—an MHCD that is not connected to sending/receiving stations but is synchronized intermittently to provide stable information at the point of care

**m-health**—the concept of mobile computing at the point of care or away from the desktop

**MHCD**—mobile healthcare computing device; new term for all mobile and hand-held computing devices used in healthcare

**PDA**—personal digital assistant, a mobile device providing scheduling, organizer, address book, and other functions

**tablet**—a portable computing device that is lightweight and resembles a traditional tablet

**wireless computing**—computing in an environment that uses sending/receiving stations

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**Article citation**:
Waegemann, C. Peter, and Claudia Tessier. "Documentation Goes Wireless: A Look at Mobile Healthcare Computing Devices." *Journal of AHIMA* 73, no.8 (2002): 36-39.

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