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The smartphone revolution is well underway in hospitals

Executive Summary

Smartphones have been adopted more rapidly in hospitals than almost any other technology and physicians are riding the wave. Hospital clinicians are also beginning to push for smartphones to alleviate the frustration of continually searching for staff, patient data, and equipment. Smart hospitals are responding by defining a vision for technology innovation that outlines expectations and outcomes for mobile tools. A well-articulated vision statement focuses on improving patient care and describes how technology can help achieve this objective.

Hospitals must first conduct a site assessment, in which all stakeholders are interviewed and issues are discussed to help formulate a comprehensive mobility strategy. Pilots and proofs of concept help test new technology and the perceived impact on clinical workflow. End-user training and support are also needed to encourage buy-in and appropriate use to achieve goals.

After the initial site assessment, a “deeper dive” needs to focus on a hospital’s infrastructure to address both the physical and digital landscape. Device and network security are also critical considerations to protect patient data. Alarm and device management are additional concerns when readying a hospital’s infrastructure for mobile device integration. The hospital needs to manage how messages, calls, and alarms are routed and dispatched, as well as how devices are managed.

As a key factor in a mobility strategy, workflow guidelines must be aligned to define how smartphones will be used—from replacing batteries to defining communication methods. The smartphone revolution is well underway and hospital leadership needs to be proactive about incorporating smartphones and other mobile devices. This white paper explores the steps that a hospital must take to get ready for smartphone integration.
Introduction—Smartphones Are Here

A new generation of feature-rich, easy-to-use smartphones is keeping people organized and connected wherever they go and doctors are helping set the trend. No longer are CTOs and CIOs the only ones pushing for smartphone integration. Clinicians are also asking for hospitals to integrate smartphones to increase their productivity. According to a recent study of physicians and healthcare technology, Manhattan Research reported that 72 percent of doctors use smartphones personally and professionally, with that number expected to rise to 81 percent by 2012. By comparison, less than 20 percent of the adult population in the U.S. uses smartphones.¹

Both doctors and nurses are frustrated with having to search for staff, patient data, and equipment and smartphones and other mobile devices deliver “anywhere” access to people and information. According to a report published by healthcare market research firm, Kalorama Information, the healthcare industry is among the fastest growing handheld device markets and the total market is expected to reach $8.8 billion for 2011, a seven percent increase over last year. Furthermore, a research report recently published by Chilmark Research predicts that 100 percent of physicians will use smartphones with content applications by the end of 2013.³

This white paper explores the steps a hospital can take to get ready for the smartphone revolution — developing a vision for innovation, creating a mobility strategy, preparing the infrastructure, and aligning workflows.

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—Kalorama Information
Create a Vision for Innovation

As smartphones grow more popular, hospitals are developing mobility strategies to ensure they properly implement the right tools to improve patient care, streamline workflows, and increase efficiency. As part of this process, the first step is defining a vision for technology innovation. The vision sets a long-term mobility roadmap of where the hospital would like to be in a five to 10-year time frame. A clear definition of expectations and outcomes are developed to help translate a strategic vision into measurable tactics. A well-articulated vision statement focuses on improving patient care and provides a catalyst to defining the path needed to achieve these objectives. Examples of expectations and outcomes could include:

- Improving response time to call bell by 10 seconds
- Reducing bed falls of 25 percent by the end of the first year
- Acknowledging critical lab results within five minutes

According to Scott Cebula, former CIO and President of Cebula IT Consulting, "The first step in developing a successful vision statement is to involve end-users in the evaluation process. In this way, clinicians, rather than hospital executives, address the real issue of patient care from the beginning. Because smartphones are clinical devices, nurses, physicians, and all caregivers must be involved to ensure the right devices and applications are correctly integrated into workflows to help solve real healthcare problems."

Develop a Mobility Strategy

After developing an overall vision for smartphone integration, a mobility strategy helps guide the day-to-day efforts to achieve this vision. Elements include a clinical site assessment, pilots, and proofs of concept.

Clinical Site Assessment

A clinical site assessment provides feedback to develop a mobility strategy. This involves the integration team walking hospital floors, talking with physicians and nursing staff, reviewing the floor plan and hospital layout, and evaluating workflow considerations. During this process, all stakeholders are interviewed and problems are discussed to help formulate a mobility strategy.

Technical and administrative stakeholders should be defined up front. For example, mobile devices raise networking and security issues so the IT department needs to take the lead on researching appropriate security measures. Also, the hospital may need to work with telecom providers and other third parties to upgrade existing equipment.
According to Trey Lauderdale, Vice President of Innovation for Voalté, “The clinical site assessment contributes valuable information to the mobility strategy by considering all the moving parts, especially people. The mobility strategy should be an actual document — a living, breathing plan that is continually revised to keep all stakeholders on the same page and ensure that issues have been carefully discussed and evaluated.”

**Pilots and New Technologies**
The implementation of a well-conceived mobility strategy involves establishing pilots and proofs of concept to test different devices and applications. Not every device will work in every case or in every location, so establishing processes and procedures for testing new devices is critical to innovation. If a device or application works well, it can then be expanded quickly. Hospitals may also want to capture a quantitative baseline of critical performance metrics to help successfully manage outcomes.

CIOs, CTOs, and other IT leaders also need to stay attuned to the consumer technology market to predict mobile trends. “The best mobile device strategy provides a forward-looking complement that embraces new technology,” says Scott Cebula.

“You don’t want innovations like the iPad to blindside your hospital. Instead, hospitals must innovate strategically by evaluating new devices and then making an educated guess about what may appear in the hospital in the next year or so.”

**Staying Agile**
Hospitals require a great deal of agility when it comes to creating a mobility strategy. One device will not work in every situation so hospitals need to accommodate a variety of new devices and applications to be used for different situations. “Just like desktops and laptops are used differently, doctors will use BlackBerries differently than they use iPhones,” comments Cebula.

**Training and Support**
As part of developing a mobility strategy, hospitals must also make adequate provisions for training and support. “Some CTOs assume that because consumer devices are popular, all caregivers will understand how to use them,” Cebula advises. “Hospitals must develop a safety net of user training and support. Lack of knowledge can cause users to avoid new technology, which undermines the efficiency gains that smartphones can offer.”

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— Scott Cebula
President, Cebula IT Consulting

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Vice President of Innovation, Voalté
Prepare the Infrastructure

Following the site assessment, a "deeper dive" is required that focuses on the hospital’s infrastructure. Can the existing network handle the new mobile device traffic? Can the wireless network accommodate device use in all areas of the hospital? Both the physical and digital landscape must be considered to clearly understand what can and cannot be accomplished. A series of meetings are held involving all stakeholders so concerns and expectations can be discussed early on. According to Oscar Callejas, Voalté’s Chief Experience Officer, “From our experience, problems occur when we do not convene stakeholder meetings that involve every single group within a hospital.”

According to Jim Portaro, Founding Principal of RF-Works and a voting member of the IEEE 802.11 Standards Committee, “Integration must be considered from several different perspectives. Some smartphones are used for data and text transmission while others are used for voice. Some phones are cellular while others are WiFi-based. As infrastructure assessment unfolds, a hospital must address other devices that will be used within the facility, including tablet PCs, laptops, patient monitoring devices, and computers on wheels (COWs), as well as handheld devices used by phlebotomists, respiratory therapists, or any clinicians roaming the facility.”

When considering the wide array of available devices, both wired and wireless infrastructures must be configured to withstand the load. A hospital’s wireless infrastructure must meet certain criteria, such as the appropriate levels of RF (radio frequency) connection between the devices. This criteria depends upon the hospital’s need for bandwidth and the user density at any given time or location. “Hospitals have unique requirements. For example, mobile devices must be accessible from almost everywhere — bathrooms, stairwells, even elevators. Because clinicians roam the facility, it’s important to deliver radio coverage in all areas,” says Portaro.

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Vice President of Innovation, Voalté

Integration must be considered from several different perspectives
Device and Network Security
Because of the sensitive nature of transmitted data, device and network security is always a critical concern. Hospitals need to consider technical and workflow-related security measures in a mobile environment. From a network security perspective, how devices authenticate to the network and communicate to network servers are important security considerations that must be resolved. Distinctions should also be made between what visitors to the hospital can access — a public “guest” network to connect personal devices — versus the network that connects clinical devices to physicians and nurses.

While smartphone integration may not affect a hospital’s current network security policy, associated device security workflows can differ greatly. Policies may dictate that smartphones be locked when not in use, for example, or that nurses keep text communications within the hospital to avoid leaking information that could violate patients’ HIPAA (Health Insurance Portability and Accountability Act) rights.

Alarm Management
Alarm management is an additional concern when readying a hospital’s infrastructure for mobile device integration. Alarm management accounts for how a message is transmitted from a source device, how it travels through the network, where the alarm is sent, who receives it, how it is acknowledged, and how it is prioritized. A smartphone that receives multiple alarms, alerts, and notifications can overwhelm caregivers so this consideration must be addressed before distributing phones. For example, when a bed rail drops and triggers an alarm to a smartphone, should the alarm only be sent to the patient’s assigned nurse or should a backup alarm also be sent to a supervisor?

Alarms and ringtones can be prioritized according to importance. Completed lab results might generate a lower priority alert, for example, than an alert indicating that a patient’s IV drip needs to be reset. “As an important part of infrastructure planning, alarm management ensures that alarms are delivered appropriately to smartphones to ensure patient safety,” says Voalte’s Trey Lauderdale.

Device Management
An additional aspect of infrastructure preparation is device management. Hospitals must develop a plan for buying, servicing, and maintaining mobile devices. Many questions must be answered ahead of time: Who will buy the phones and applications — hospital or caregivers? Will the devices be assigned to individuals or shared amongst a team? Who will charge smartphone batteries during 12-hour nursing shifts?

“The devil is in the details — mobile device management is an integral aspect of infrastructure planning.”
—Oscar Callejas
Chief Experience Officer, Voalte
Mobile device management is an integral aspect of infrastructure planning. These concerns and more must be addressed to manage devices appropriately. "Nurses’ smartphones must be treated as workplace tools, signing phones out at the start of shifts and signing them in at the end;" says Voalte’s Lauderdale. Hospitals need to plan for secure storage when phones are not in use to prevent theft. Nurses are also held accountable when phones are checked out. According to Lauderdale, "Hospitals need to treat smartphones like the key to the medication cart. If a nurse drives home with a phone by mistake, he needs to drive right back to the hospital and turn it in. Hospitals cannot risk patient information being exposed."

Additional device concerns include who will be responsible for downloading applications onto devices and who will repair them. A mobility strategy should include a plan for device management to ensure devices, applications, and call routing plans stay up-to-date. "The devil is in the details — mobile device management is an integral aspect of infrastructure planning," says Voalte’s Oscar Callejas.

**Align Workflows**

As part of aligning workflows with a mobility strategy, plans and procedures need to address a range of concerns — such as the way that nurses communicate with doctors using smartphones. Workflow preparation also depends upon usage. If a smartphone is used primarily for calling clinicians, the battery will discharge faster, for example, than if in-hospital communications are primarily text-based. Also, systems must be considered in terms of disaster readiness with respect to backup and failover.

Workflow guidelines must be developed to help doctors and nurses understand how smartphones will be used to positively impact patient care. According to Jackie Myers, Nursing Director at Parkview Health Systems in Fort Wayne, Indiana, "Smartphones that are properly integrated into hospital workflows improve efficiency because they eliminate having to hunt for staff or equipment."

Information can also be retrieved faster and more efficiently. "Rather than having to leave a patient’s room, find a computer, and connect to a Nexus database to review research, a nurse can accomplish this task using a smartphone right from the patient’s room. This creates a change in workflow," says Trey Lauderdale of Voalte.

Choosing which nurses receive alarms and sending lower priority alarms to a nursing assistant, for example, is also a workflow consideration. Clinical staff can grow desensitized to alarm overload, which can cause negative patient outcomes. As part of a mobility strategy, hospital staff can use smartphones to triage patients by sending alarms where they need to go, at the

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right time. According to a 2008 survey of 36 hospitals on how medical-surgical nurses spend their time, nurses spent the most time at the nursing station, compared with less than one-third of their time in the patient’s room. Smartphones offer a way to reduce nurses’ wasted time, which can be documented by improved workflows. With a smartphone, nurses can receive text messages when scans are ready, for example, instead of using voice/badge solutions that require another party to communicate. Smartphones also deliver important results faster, saving time and improving patient care. ePrescribing on smartphones, for example, prevents a nurse from having to search for a COW to input prescriptions, which improves workflow. Rounding and charting workflows can also incorporate mobile tablets, eliminating paper trails, consolidating patient information, and increasing operational efficiency.

An example of how workflow affects patients occurred during one of Voalté’s recent engagements. A patient reported feeling ignored because her nurse was constantly checking her smartphone. According to Oscar Callejas, Voalté Chief Experience Officer, “The patient didn’t realize the nurse was using a smartphone equipped with a healthcare application that displayed alarm information. She thought the nurse was texting friends or updating her Facebook status when in reality she was doing her job.” Voalté proposed that the hospital display signage that explained that cutting-edge smartphones were actually enhancing patient care. Also, as part of their workflow, nurses were encouraged to explain smartphone use to patients.

**Conclusion**

Smartphone technology has already worked its way into hospitals as doctors and nurses increasingly bring personal devices to work. Smart hospitals are planning for smartphone integration to leverage these devices for maximum impact. Before a hospital can ready itself for implementing smartphones, stakeholders need to look to the horizon and formulate a vision for smartphone integration. Developing a sound mobility strategy includes preparing the infrastructure and incorporating the necessary workflow changes to benefit from smartphones. By developing a clear picture of how smartphones can help improve patient care, how doctors and nurses will use them, and how they can best be managed, hospitals can get ready for the smartphone revolution now.
Voalté provides compelling software solutions for healthcare institutions that solve communication problems at the point-of-care. Voalté products are designed to be intuitive, high value, mission-critical applications running on the latest generation of touch-based smartphones.

For more information about Voalté, please visit
www.voalte.com
or call 1-877-Voalte (1-877-862-5831).

Endnotes