



Redefining point-of-care communication

BRIDGING THE GAP:

Smart Hospitals Collaborating for Successful Smartphone Implementation

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Smartphones are emerging as the technology of choice

Executive Summary

Hospitals nationwide grapple with a shrinking pool of qualified clinicians, reduced budgets, and escalating patient care needs. Many hospitals are implementing technology to expand the capabilities of clinical staff to meet these demands. Smartphones emerge as the technology of choice because of their wireless connectivity, portability, and the fact that clinical staff can use these devices to access the Internet, their email, and critical medical applications. Without a clear understanding of the clinical staff's communication workflow, however, the smartphone implementation team could adopt a solution mismatched for the hospital's needs.

In order to create an effective solution from the beginning, clinical, IT, and ancillary department staff members must collaborate to create a system that meshes well with the entire patient care continuum. The team must understand each portion of the clinical communication workflow and how that process connects with each department in the hospital. Then, with expert IT support, the hospital staff must implement the technology incrementally and test each stage of the implementation to pinpoint problems and devise solutions. The results will empower hospital staff to meet patient care needs through a less chaotic and efficient process.

Cross-Functional Collaboration Supports Smartphone Implementation Success

Nursing shortages, as well as shrinking hospital budgets, mean that clinical staff must serve more patients and coordinate more activities within a clinical unit. To help ease these demands, hospitals are integrating communication technology solutions into the daily workflow to increase the efficiency of clinical staff while enhancing the quality of patient care. Healthcare providers are embracing smartphones in particular as an effective tool that clinicians can use to effectively manage the communication workflow at every point of patient care. In addition to communication, clinical staff can use smartphones to document vital signs and input other clinical data into patient records, view critical test results, access policy and procedure information, or view medications and their pertinent side effects.

Several studies on nursing workflow recommend the use of technology to make patient care delivery more effective and efficient. The University of California San Francisco Medical Center collaborated with several vendors to determine whether a solution developed for a mobile device might enhance patient care and clinician workflow. The study revealed that when clinicians used mobile technology in their workflow, they experienced the following results:

- They spent 60 percent less time documenting vital signs, saving each clinician 30 minutes per eight-hour shift.
- The time between when a clinician captured vital sign data and entered it into the electronic medical records was reduced by more than two hours per eight-hour shift.
- Clinicians logged in 12 times per shift, rather than 42 times when they did not use mobile technology.
- Clinicians increased point-of-care charting beyond the automated vital sign acquisition by 20 percent.

In order for the smartphone implementation team to successfully rollout a mobile solution, the team must understand the staff's workflow. This requires that all departments such as IT, clinical, and those that have interdependencies and support the patient care process collaborate in order to integrate the technology with current or desired process systems. A hospital must undertake a clear process to bridge the gap between IT and clinical teams to ensure a successful smartphone implementation.

“The clinician spends an average of 42 minutes of an eight-hour shift resolving operational failures such as missing medications.”⁴



Bridging the Gap Between Cross-Departmental Teams

Assembling Key Stakeholders

The first step in a successful smartphone implementation is for the implementation team to involve key stakeholders early in the process. Hospitals that involve key stakeholders have a high success rate in adoption of new technology. Aaron Levie, founder and CEO of Box.net, commented on this point in a recent article in TechCrunch. “Traditionally, enterprise technology has been designed with the sale to the CIO in mind, and this produces solutions that are inevitably feature-bloated to ‘satisfy’ the vast majority of a customer’s requirements,” Levie said. “This has created an oddly perverse dynamic where the vendors with the most feature-rich solutions win the contracts, but the users lose due to the complexity of the technology.”²

Departments across the hospital must collaborate in implementing a smartphone solution. Without collaboration, parties may misunderstand the practical and real end-use requirements of the technology. When the IT department takes the lead in the project and does not involve the clinical side, then the IT staff does not clearly understand how clinicians will use the technology. As a result, IT may implement a smartphone strategy that fails to fit the needs of the clinician. The IT staff may not fully appreciate the often hectic patient care environment with demands at the bedside, vast amounts of required documentation, and the barrage of

interruptions. One study revealed that clinicians typically spend 10 seconds or less on 40 percent of their activities.³ Another study showed that clinicians must spend so much time coordinating patient care that they are only able to devote 31 to 44 percent of an eight-hour shift to direct patient care. Additionally, the clinician spends an average of 42 minutes of an eight-hour shift resolving operational failures such as missing medications.⁴ Conversely, if the clinicians conduct the smartphone system research and determine what type of device they want without input from IT or other departments, the device may not be compatible with the hospital’s IT infrastructure or it may not be a good fit cross-functionally.

The best solution is for the implementation team to bring together the key stakeholders first. If it is a process in the ER or a nursing unit, the stakeholders might be the chief nursing officer, the chief medical officer, and the director of the area. Their buy-in is essential for creating the mission and to set the expected end result of the new technology – the problem they want the technology to solve. The team can help the key stakeholders understand the capability of the technology. Once the key stakeholders are inspired, they can determine the area or specific process where the technology will be applied and then identify frontline clinical and non-clinical staff, and representatives from the ancillary departments.

“The vendors with the most feature-rich solutions win the contracts, but the users lose due to the complexity of the technology.”

*– Aaron Levie
Founder and CEO
Box.net*



Evaluating Current Clinical Communications Workflow

From the beginning of the project, the implementation team should clearly understand the workflow process. Rather than relying on policy manuals and process flow maps, the team should have frontline employees explain the step-by-step process of their work. The team should also observe the clinical staff at work in order to learn the work-around habits that they employ to provide patient care in the face of communication challenges.

During these fact-finding observations, the implementation team should be aware that clinical staff members may use the following four methods to evaluate a patient's needs and initiate action when the patient enters the hospital:

- Clinical assessment
- Visual observation
- Physiological monitors
- Direct patient request⁵

Clinical assessment establishes a baseline for the acute condition. Based on the assessment, the clinician creates a care plan through which tasks are launched (meds, labs, imaging, surgery, and so on). The clinician relies on electronic medical records and uses decision-support algorithms to identify risk and provide alternative suggestions. Clinicians also use visual observation, along with electronic medical records, to access the progress of the patient's condition and determine changes to the treatment plan. In addition to observation,

the clinician relies on physiological monitors (automated clinical alarms) to measure a change in the patient's condition. Some monitors integrate directly with the communication device carried by the clinician, while others generally broadcast audio/visual notification. Lastly, the clinician uses direct patient requests initiated via nurse call to evaluate patient needs and initiate action. The staff is alerted to patient needs through buttons, pull cords, and sensors on equipment in the patient's room.

In preparing for the future communications workflow model, the implementation team should keep five areas in mind:

- Who is involved in the workflow
- What are the goals of the hospital unit
- What is the process that will be undertaken to achieve those goals
- How will achieving those goals affect end users
- How will completion of those goals be measured

According to Charlotte Damato, QI Coach-Lean/Six Sigma at Sarasota Memorial Health Care System, her hospital's experience working with Voalté to implement smartphones illustrates the process of setting and achieving workflow goals. For example, the hospital staff wanted to reduce the time between when an ER physician determines that a patient needs to be admitted and the time the patient is placed in a bed on an in-patient floor.

“Sarasota Memorial Hospital staff wanted to increase patient satisfaction by reducing noise on the hospital floors. Voalté’s smartphone system achieved this objective because overhead pages were replaced with text messages, greatly reducing the noise.”

– Charlotte Damato

QI Coach-Lean/Six Sigma

Sarasota Memorial Health Care System



The goal was to reduce the length of time of the entire process to a maximum of 90 minutes for non-critical in-patient admissions and less than 30 minutes for ICU patient admissions.

At the start of the project, the implementation team and key stakeholders determined all staff that had a role in the process, including the ER physician, ER coordinator, multi-skilled technician, floor nurses, patient placement specialist, transporter, and many others – 15 people in all. Those 15 staff members mapped out the entire process flow, from step one when the ER physician decided to admit the patient to the last step when the patient was placed in the inpatient bed. After mapping the 156-step process, the ER admissions team determined that the current process was convoluted, included work redundancies, and contained poor communication processes. Historically, staff members left phone messages and when calls weren't returned, they called again. Often, the overhead paging system was used to locate clinical staff members. Communication issues caused unacceptable workflow delays.

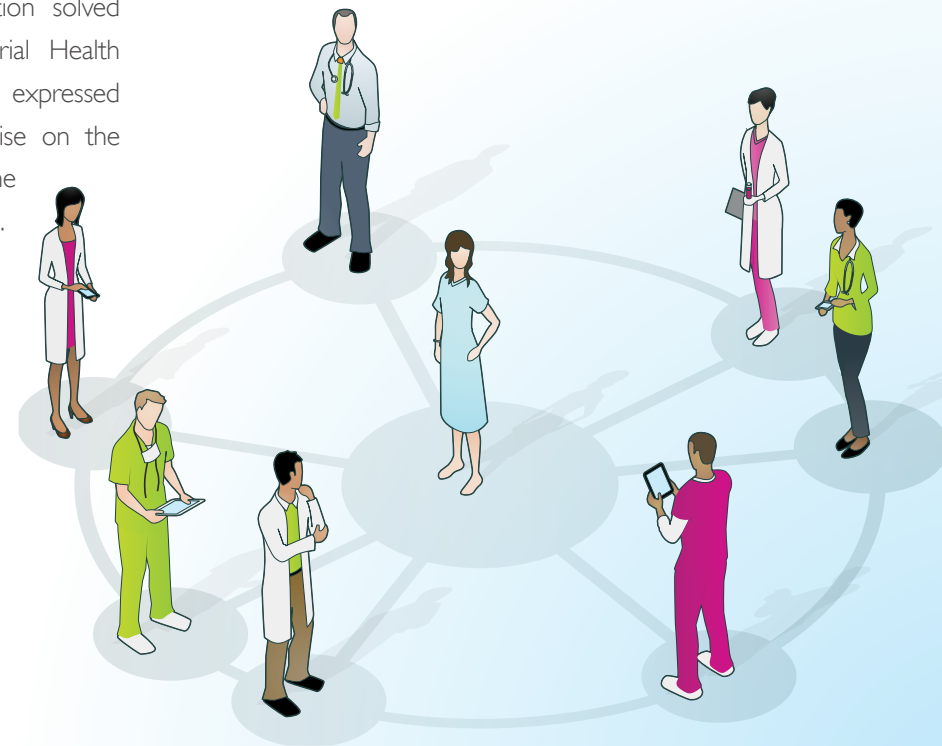
The team decided that the ER admissions process needed to be redesigned to integrate smartphone technology as the preferred communication method. As the team mapped out the new process, the smartphone solution was added at each point of communication. For ninety percent of the communications, clinical and non-clinical staff members now send secure text messages.

A nurse receives a text message that a patient is on the way. The housekeeper receives a text to clean a room for a new patient arrival. The multi-skilled technician receives a text that shows the room number for the new patient. The ER physician receives a text that the consulting physician has returned the call on line one. Soon, the floor nurse will receive a text that the ER handoff report is ready for review. The list of smartphone uses grows each day. As smartphones are used more frequently in the process, additional uses for the technology are found.

Since process implementation, Sarasota Memorial Health Care System has been able to reduce ECC process waste by 33%. In addition to improved communication, the smartphone solution solved another problem at Sarasota Memorial Health Care System. In the past, patients had expressed dissatisfaction with the amount of noise on the hospital floor that was created when the staff used the overhead paging system. The volume of noise was reduced significantly when the staff used smartphones, rather than the paging system, to communicate.

“For ninety percent of the communications, clinical and non-clinical staff members now send secure text messages.”

*– Charlotte Damato
QI Coach-Lean/Six Sigma
Sarasota Memorial Health Care System*



Clinical Communications Workflow Basics

In order to clarify a hospital's communication workflow, the implementation team should first identify the caregiver at the hub of patient care and define their role. Next, the team should identify the ancillary departments involved in the patients' care, their roles, how their communication workflow is part of the clinical communication workflow, and the accountability of the ancillary departments' actions. In order to analyze the communications workflow, the team should look at the message source (Figure 2):

- Voice
- Text message
- Nurse call (pillow speaker, lights, and tones)
- Alarms (patient monitors, pumps, ventilators and pulse oximeters)
- Critical values (lab, blood bank, diagnostic, and pathology)

Then, the team analyzes the message content, the message recipient, and the device through which they receive the message. Each message prompts an expected action and the team focuses on real-time actionable communication, rather than updates that can be obtained from the electronic medical record. Next, the team clarifies the escalation – the process of moving the call to the next person in line, such

as the unit secretary, if the recipient does not respond. Finally, the team analyzes the audit trail, which serves as a task list for patient care. The Joint Commission's National Patient Safety Goals require a specific audit trail. The team determines how far back one must review previous messages and how those message sources are tied together.

Also, the team must identify the types of communication: routine, patient critical, role-based (such as the communication between clinical staff and environmental services to prepare a room for a new patient), and manage the volume of messages sent to clinical staff so they are not inundated with messages.

Advanced communication workflow must also be considered. A call type categorized as "urgent" should escalate differently than a "routine" call. For example, if the clinical staff has identified a patient at risk of falling, the call escalation for that patient should be different from that of a low-risk patient.

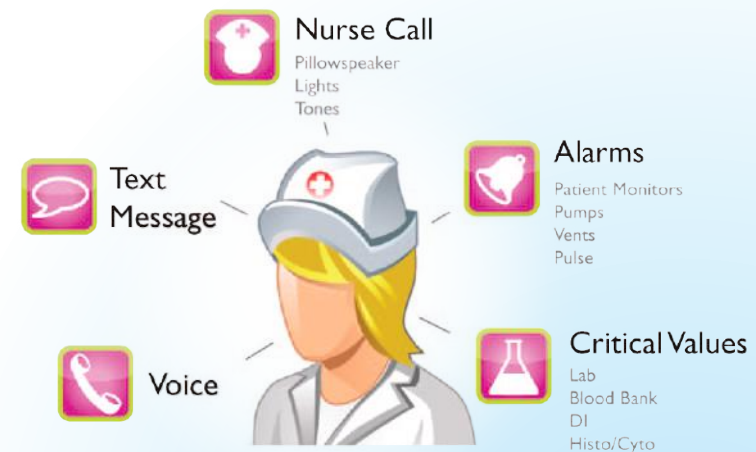


Figure 2: The smartphone implementation team must understand each component of the clinical communication workflow in order to deploy an effective solution.



“Texas Children’s Hospital addressed the issue of alarm fatigue when it implemented Voalté’s smartphone solution in its clinical communication workflow.”

*– Melita Howell
Application Architect
Texas Children’s Hospital*

Preventing Alarm Fatigue with Effective Alarm Management

One important step to include when a hospital implements a smartphone strategy is effective alarm management. When clinicians are continually bombarded with the incessant buzzing of alarms, they may become distracted and less effective on the job. Frequent false alarms can desensitize clinicians, rendering them less responsive to alarms. On a 15-bed unit at Johns Hopkins Hospital in Baltimore, the staff documented an average of 942 alarms per day — about one critical alarm every 90 seconds.⁶ The problem has reached epic proportions across the country. The Boston Globe reports that between January 2005 and June 2010, 200 hospital patients nationwide died and their deaths were linked to alarm problems. “The problem typically wasn’t a broken device. In many cases it was because medical personnel didn’t react with urgency or didn’t notice the alarm,” according to a report issued as a result of the investigation.

Texas Children’s Hospital addressed the issue of alarm fatigue when it implemented Voalté’s smartphone solution in its clinical communication workflow. In a recent webinar, Melita Howell, Application Architect, offered advice on how a hospital can deal with the issue. “You need to take steps to eliminate nuisance alarms,” Howell said. “Consider introducing brief delays for non-critical alarms so that if it is an artifact, it resets before it ever hits the device. Also, consider using central surveillance to triage the amount of messages being sent. When you look at critical values and meeting the Joint Commission’s National Patient Safety Goals, make sure there is enough bandwidth to absorb that information so that it can be channeled appropriately.”⁸

When a hospital keeps its telemetry centralized, then it can set guidelines that manage alarms. Hospital staff can triage the alarm, speak with the patient to identify the need, and send the information to the nurse. In addition, the hospital should know its average escalation rate and use this information as a baseline to control alarms. Once the alarm fatigue problem has been corrected, a hospital must monitor data continually to ensure the problem does not resurface.

An important consideration of the implementation team is that text messages, rather than voice messages, are generally more effective in the clinical communication workflow. Text messages enable the clinician to prioritize messages and respond to them in order of importance. The clinician can also use text messages as a to-do list. The text message sender can communicate small pieces of information quickly and effectively. In addition, voice messages can be interruptive and lead to an increase in clinical errors. Also, text messaging does not require that both parties are available in order to communicate information. One investigation conducted at two teaching hospitals revealed that each time a clinician was interrupted while administering medication, the clinician made 12.1 percent more procedural errors and 12.7 percent more clinical errors. Interruptions occurred in more than 50 percent of medication administrations with error⁹ severity increasing with interruption frequency.

Progressive Technology Adoption and Quality Improvement

The implementation team may choose to add each communication type one at a time, starting with text messages and then adding voice-messaging capabilities. In terms of alarms, the team should add nurse call, then more clinical alarms such as telemetry, pumps, and so on. As each communication type is implemented, the team should evaluate performance measured against the baseline on a monthly, weekly, and even daily basis.

Texas Children's Hospital implemented its smartphone system progressively and used Plan Do Study Act (PDSA) cycles each time a new communication type was added to the process in order to analyze the technology's effectiveness. With each PDSA cycle, the hospital deployed more smartphones in additional departments. "Our goal was to make sure that the technology was a good fit in usability, security, and integration into our PBX," said Howell. "We went with voice and text initially using a small number of smartphones to make sure the smartphone plan integrated well with existing systems. At the end of the process, we looked at the user experience and at the support plan," Howell explained in the recent webinar.

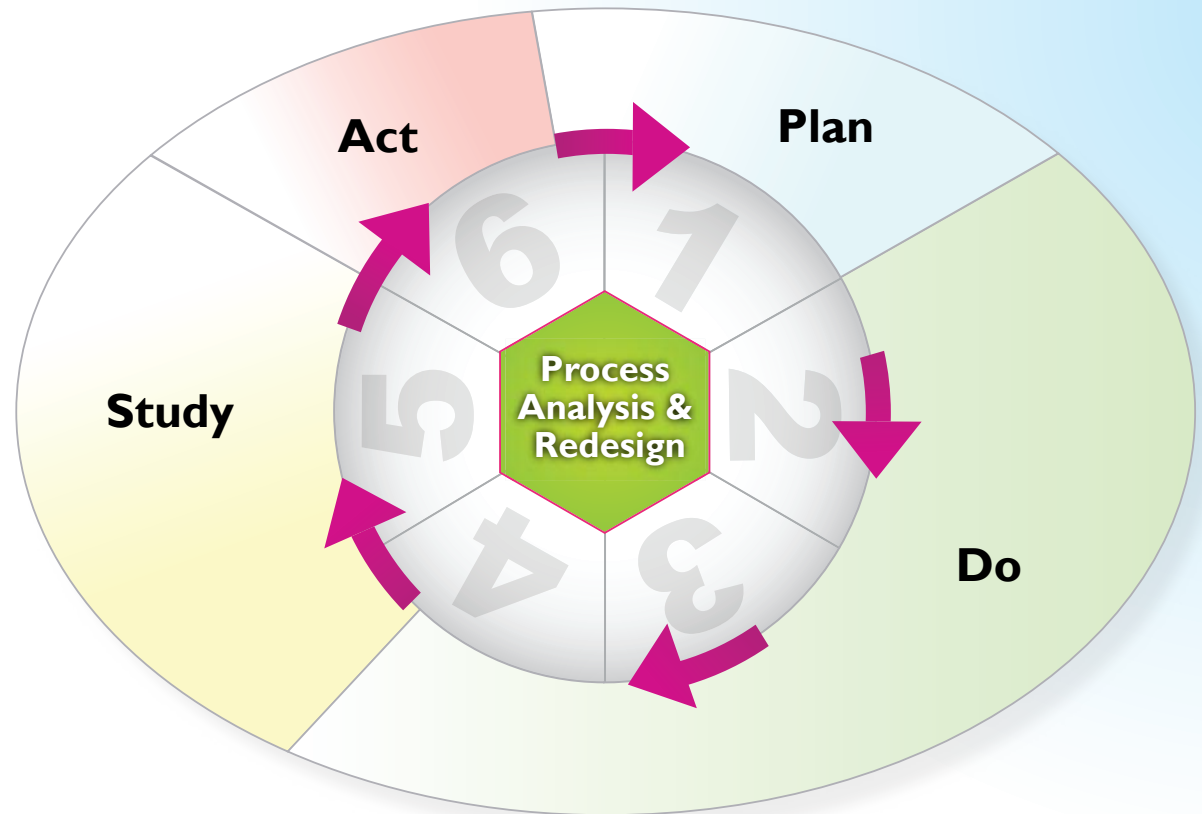


Figure 3: At each stage of the smartphone implementation, the team should analyze the technology's effectiveness using a process improvement methodology, such as the Plan Do Study Act method, before additional communication types are added to the system.

Conclusion

When the communication workflow functions inefficiently in a hospital, the financial loss in terms of physician time, nurse time, and patient length of stay is considerable. U.S. hospitals waste approximately \$12 billion annually due to poor communication among all staff involved with patient care. The loss, as a percentage of hospital revenues, equals 1.93 percent – when juxtaposed against the average hospital margin of 3.6 percent, the magnitude of waste is significant.¹⁰ A successful smartphone implementation however, can improve a hospital's bottom line in addition to dramatically improving patient care and the clinical staff's work satisfaction. As a critical first step in the implementation process, the implementation team must bring together stakeholders from each hospital department to collaborate. Each stakeholder can explain their portion of the project and better understand other departments' roles in the process. Then once a hospital implements smartphones as a primary tool in communication workflow, the team must continually analyze and improve the process to maximize the investment.

Oscar Callejas, Voalté's Chief Experience Officer, summarized the value of an effective smartphone strategy, which begins with collaboration between each department. "By providing an easy and unified solution for voice, alarms, and text messaging on an iPhone platform, today's clinicians and physicians find value in using these devices to help them reduce the 'clinical-chaos factor,' resulting in better outcomes and performance results, and greater job satisfaction."



Endnotes

¹ "A Clinician Usability Pilot: Improving Quality of Care and Workflow Efficiencies Using Mobile Technology," Research study conducted by the University of California San Francisco Medical Center, July 7, 2008. http://www.healthcaregoesmobile.com/ss_ucsf

² Aaron Levie, "Building an Enterprise Software Company That Doesn't Suck," TechCrunch, July 10, 2011.

<http://techcrunch.com/2011/07/10/building-an-enterprise-software-company-that-doesnt-suck/>

³ Donna Herrin-Griffin, "Transforming Nursing Workflow, Part 1," The Journal of Nursing Administration, 2010.

⁴ Lundgren, S., "Nurses' Use of Time in a Medical Surgical Ward with All RN Staffing," Journal of Nursing Management, 2001.

⁵ "Advancing Nurse Call: Managing Performance Improvement," Sphere3 Consulting report, 2011

⁶ Liz Kowalczyk, "Patient Alarms Often Unheard, Unheeded," The Boston Globe, February 3, 2011

⁷ Liz Kowalczyk, "Patient Alarms Often Unheard, Unheeded," The Boston Globe, February 3, 2011

⁸ "Three Steps to Get Your Smartphone Strategy Rolling," Voalté webinar, <http://www.Voalté.com/On-Demand-Webinar-Thank-You.aspx>

⁹ Johanna Westbrook, "Association of Interruptions With an Increased Risk and Severity of Medication Administration Errors," American Medical Association, April 2010

¹⁰ Ritu Agarwal, "Quantifying the Economic Impact of Communication Inefficiencies in U.S. Hospitals," Research Briefing, Winter 2008

Voalté One

Redefining Point-of-Care Communications

VOICE INTEGRATION

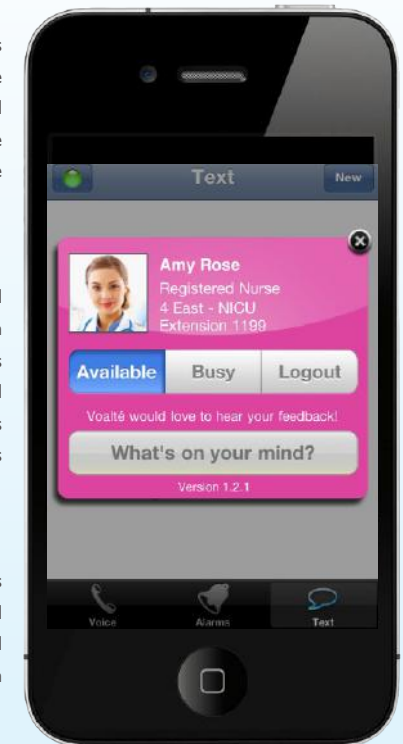
Integrated with your hospital's WiFi and PBX, caregivers have extension mobility and a visual directory to make and receive calls from one another, house phones or outside telephones.

ALARM MANAGEMENT

Working with industry standard alarm middleware, clinicians can receive and respond to alarms from nurse call, physiological monitoring and security systems thereby leveraging the hospital's investment.

SECURE TEXT

Secure text messaging eliminates noisy overhead paging, and enables caregivers to send and receive important information when and where they need it.





About Voalté

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).

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