



# Unified Communications: The Rx for Healthcare Operational Performance

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## WHITE PAPER

Sponsored by: Research In Motion

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## IDC HEALTH INSIGHTS OPINION

The highly collaborative and mobile nature of clinical teams makes unified communications (UC) an essential investment for healthcare organizations today. UC can help locate clinical staff and create real-time interaction on clinical decisions, providing opportunities to enhance communications, drive efficiencies, and improve operational performance and patient safety.

Some of the key findings from IDC Health Insights' research include:

- A combination of business issues, technology investment, and recognition of the synergies created by the integration of data, voice, messaging, location awareness, and event management is driving UC strategies. Healthcare's unique information-intensive environment, where decisions must be made quickly, makes unified communications a necessity.
- UC in healthcare, while sharing similarities with corporate UC, has notable differences. Data-intensive exchanges, such as diagnostic images and video, require wireless networks with large bandwidth. The information exchanged is privileged and covered under stringent privacy and security regulations imposed by the Health Insurance Portability and Accountability Act (HIPAA) and the American Recovery and Reinvestment Act (ARRA), which increased the penalties for HIPAA violations. Mission-critical clinical applications must be available 24 x 7.
- Changing reimbursement strategies from fee-for-service models to accountable care organizations will require improved coordination of care and collaboration among caregivers, especially for patients with multiple chronic conditions who are treated by various specialists. In short, medicine is now a team sport.
- Early adopters are discovering, and deploying, innovative applications of UC that validate its benefits — applications that are likely to drive significant adoption in the short term. These include applications that combine voice, video, data, and instant messaging to enable more efficient and more effective communications, improve staff productivity and care quality, and reduce costs.

- Healthcare organizations can, and should, leverage existing communications and healthcare IT infrastructure investments (e.g., paging, alerts/alarms/notifications, WiFi, PBX voice, electronic health records [EHRs], and other hospital information systems) to jump-start the execution of their UC strategies and demonstrate the value of UC to management and end users and the return on investment (ROI) of pilot projects to advance wider deployment of UC solutions across the enterprise.

## **IN THIS WHITE PAPER**

This White Paper is presented by IDC Health Insights and sponsored by Research In Motion (RIM). The objectives were to gain insights into:

- The need for communication, collaboration, and connectivity
- How mobile technology enables clinicians to securely access timely information about their patients from anywhere, anytime, and on any device to support quicker decision making and better patient care
- How a unified communications solution can help providers tackle these hurdles and improve operational performance
- Key considerations for healthcare providers thinking about unified communications and what can be done quickly to get started

## **SITUATION OVERVIEW**

### **What Is Unified Communications?**

Unified communications broadly defines a highly integrated communications environment that combines, or unifies, text, voice, video, and data communications in innovative ways to provide process and productivity improvement. It provides for real-time delivery of communications based on the preferred method and location of the recipient and facilitates the incorporation of all information sources pertinent to the communication. The technologies to support UC can include email, telephony, voicemail, instant messaging, video, Web conferencing, and short message service (SMS), which can be brought together in various combinations in real time and coordinated. The benefits of UC are amplified in healthcare organizations where the workers are highly mobile and communication between them is both critical and time sensitive.

*Unified communications broadly defines a highly integrated communications environment that combines, or unifies, text, voice, video, and data communications in innovative ways to provide process and productivity improvement.*

The terms *unified communications* and *unified messaging* (UM) are sometimes, but incorrectly, used interchangeably. UC refers to real-time delivery of communications based on the preferred method and location of the recipient, while UM is a component of a UC environment. UM collects messages from several sources (e.g., email, voicemail, and faxes) and holds the messages for retrieval at a later time via a user-designated (and user-modifiable), preferred delivery method.

The concept of presence is also a fundamental element of UC. Presence conveys, in real time, the knowledge to UC system users as to where the intended recipients of their communication currently are located and if they are available. If presence management is correlated to end-user profiles, then presence may also indicate which modality is best to reach the intended recipient. In effect, UC integrates (or "unifies") all the communication modalities that an individual might already be using and helps those systems work together in real time.

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### **What Is Mobile Unified Communications?**

UC is moving beyond just combining voice communications and corporate email to including mobile services. Mobile unified communications merges voice and data utilizing converged mobile devices (CMDs) or smartphones. IDC differentiates CMDs from traditional mobile phones, which share many of the same features (e.g., personal information management [PIM], multimedia, games, and office applications, built-in cameras), by the presence of a high-level operating system that differentiates these devices from all others. CMDs must include the ability to download data to local storage, run applications, and store user data beyond their required PIM capabilities. The BlackBerry smartphone is a notable example of a CMD, and RIM holds a strong position in the global enterprise market. Key mobile UC features include:

*Mobile unified communications merges voice and data utilizing converged mobile devices (CMDs) or smartphones.*

- Single phone number
- Single caller ID
- Single voicemail box
- Click to conference
- Click to call from corporate directory from mobile device
- Internal PBX extension dialing
- Dual-mode phones to leverage WiFi and cellular networks

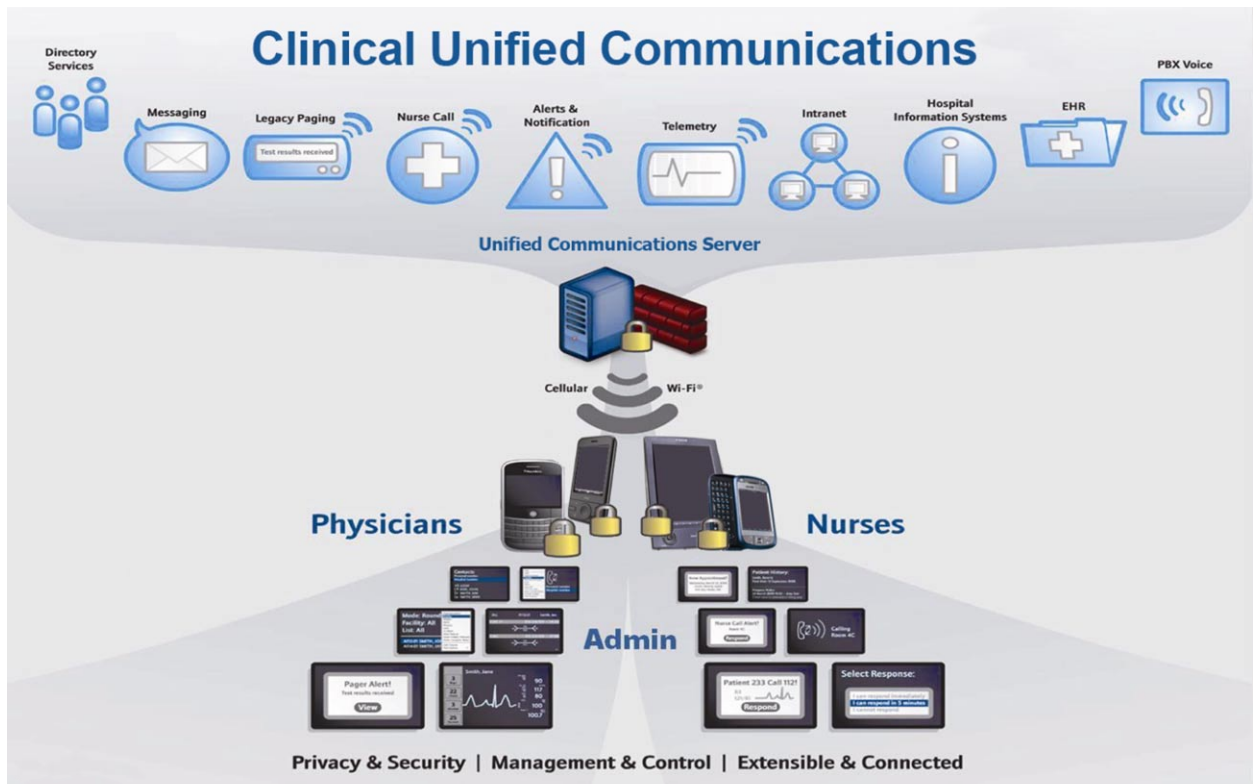
Increasingly, healthcare organizations are adding mobile services and communication-enabled applications — along with mobile access to content, such as patient data, diagnostic images, and video — to their UC deployments.

### **What Is the State of UC and Mobile UC Technology in Healthcare Today?**

Figure 1 depicts the many modes of communications ranging from legacy systems such as overhead paging, nurse call systems, audible alarms, and PBX voice to Internet-based systems such as voice over IP (VoIP), messaging, and connectivity to Web-based healthcare information systems and Bluetooth-enabled monitoring devices. Connectivity to mobile devices is provided through cellular and WiFi networks.

**FIGURE 1**

Clinical Unified Communications



Source: Research In Motion, 2010

The mobility of clinicians presents inherent challenges to effective communications between them, yet timely and accurate communications can be literally a matter of life and death. UC provides for real-time delivery of communications based on the preferred method and location of the recipient and facilitates the incorporation of all information sources pertinent to the communication.

Although adoption of UC in healthcare lags that in other industries, it is increasing. According to a 2009 Leading Indicators survey conducted by IDC Health Insights, 16.7% of respondents indicated that UC adoption is widespread at their hospital. More than a quarter (29.2%) reported that they are currently piloting UC. Healthcare organizations are also making the requisite investment in the underlying infrastructure to support UC. More than 30% of respondents reported that their organizations have widespread adoption of IP-based telephony. In addition, 90% stated that wireless networks are widespread and 45% are making further enhancements to those networks.

## **FUTURE OUTLOOK**

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### **Challenges/Opportunities**

A combination of business issues, technology investment, and recognition of the synergies created by the integration of data, voice, messaging, location awareness, and event management is driving UC and mobile UC strategies. Forward-thinking hospitals are harnessing the capabilities of IT to achieve reductions in length of stay, improved patient safety and outcomes, workflow and process improvements, improved utilization and productivity of staff and other resources, and improved customer service experience. Healthcare's unique information-intensive environment, where decisions must be made quickly, makes unified communications a necessity.

Two significant technology trends will drive increased UC deployments in healthcare organizations: wireless LAN upgrades and upgrades of existing legacy telephony equipment, both of which are considered important companion technologies. Widespread adoption of UC in healthcare, however, is still limited. Outdated technology infrastructure, replacement costs, and availability of capital to make critical investments in new technology present significant barriers, especially in these economically challenging times. Lack of strategic thinking and the organization's culture can also impede efforts to successfully deploy UC.

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As more patient information is moved into EHRs and made accessible both inside and outside the organization via a range of devices, including mobile devices, the risk of a privacy breach rises. For

example, unencrypted SMS text messages sent directly from a mobile device are not secure enough to transmit protected health information. SMS text messages can be intercepted by hackers or easily read in clear text if the device is found by someone unscrupulous. ARRA's HITECH Act contains new provisions intended to strengthen the HIPAA privacy and security regulations. Under ARRA, privacy breach notification, minimum use, and disclosure reporting requirements become more stringent. The risks and liabilities associated with privacy breaches are greater under ARRA. Maximum annual penalties for violations can total up to \$1.5 million per provision, up from \$25,000. Security must consider the complex healthcare environment with its highly mobile and transitory workforce. Mobile communication solutions on the market today, such as RIM's BlackBerry Enterprise Server, address these privacy and security issues and provide a secure messaging platform.

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### **A Growing Role for UC in Healthcare**

Bringing together UC, IT, and real-time locating services (RTLS) will improve event management and workflow within a healthcare organization. IDC Health Insights sees a growing role for UC in the following broad areas:

- **Real-time voice and text communication.** The ability to communicate efficiently is central to providing optimal care to patients. The challenge is that care team members are in constant motion, moving from patient to patient, from one unit or department to the next, and between care settings (e.g., hospital, clinic, or office). Overhead and receive-only paging is still the norm in many institutions. This interrupt-driven process is time consuming and error prone and takes clinicians away from their patients.
- **Care team collaboration and care coordination.** Improved communication among team members and between care teams at handoff points can help to mitigate adverse medical events, achieve workflow and process improvements, improve staff utilization and productivity, as well as reduce patient length of stay and costs through efficiency gains.
- **Alerts, notifications, alarms, telemetry, and results reviewing.** Mobile UC provides instant communication of critical (sometimes also referred to as panic) values and changes in patient condition that require immediate clinician intervention. Timely access to lab results and other clinical indicators and mobile access to key elements of the patient's medical record (e.g., medication history, allergies, problem lists) enable clinicians to make better, faster decisions with more information at hand to guide their decision making.

*A 36-hospital workflow and time and motion study published by Kaiser Permanente showed that nurses spend 21% of their workday in communications-related activities compared with 19% for direct patient care. (Source: "A 36-Hospital Time and Motion Study: How Do Medical-Surgical Nurses Spend Their Time?" The Permanente Journal, Summer 2008). Instant and constant communication results in fewer intrusive interruptions, more efficient use of clinicians' time, faster decision making, and, consequently, better patient care.*

- **Mobile access to clinical applications.** Adoption of electronic medical records (EMRs) has steadily been on the rise and is expected to increase as a result of the incentives (and ultimately penalties) put into place under ARRA. One of the major barriers most frequently cited is that EMRs are disruptive to the clinician's workflow. Clinicians lack easy access to computers, including tablets, in the units. Moving computers between exam or patient rooms can be cumbersome even with laptops and computers on wheels (COWs). Mobile devices not only support bedside computing but also enable physicians to check patients' medical records when they are not at the hospital or in their office. Anywhere, anytime, secure mobile access provides a significant boost to physician productivity, especially for specialists who travel between multiple office locations or hospitals in the course of a day. A wide range of healthcare IT solutions offered by independent software vendors (ISVs) can now be accessed by mobile devices, such as the BlackBerry smartphone.
- **Improved decision support.** Clinical knowledge is estimated to double every 18 months, and it can take upwards of 17 years for best practices to be widely followed after publication of randomized controlled trials. Highly portable smartphones enable clinicians to instantly access peer-reviewed bodies of knowledge to guide decision making. Representative examples include Epocrates, Medscape from WebMD, Lexi-Comp, Johns Hopkins' ABX, and other medical reference guides. Wireless "push" technology incorporated into the BlackBerry smartphone platform automatically updates these reference guides, eliminating the need for clinicians to remember to download updates on a regular basis. Consequently, physicians have instant access to the latest clinical content and medical innovations, thus improving adherence to the most current evidence-based clinical guidelines.
- **Integration with business and clinical applications.** Integration of UC into a hospital's transaction-based applications represents another area that offers potential for process improvements by eliminating the manual initiation of telephone calls. The highly interdependent nature of hospital processes frequently requires that resources in one area respond in a timely manner to an event that has occurred in another. The need for such communications is often triggered by the attributes of a transaction processed by one of the hospital's applications. Integrating mobile UC into these applications enables required follow-up actions to be communicated automatically, without delay, at minimum cost and with a high degree of certainty that the communication is delivered to someone who can act on it in a timely manner. Figure 2 provides an example of such transactions and the benefits accrued by clinicians, patients, and allied staff.

**FIGURE 2**

Use Cases and Benefits of Mobile Unified Communications



Source: Research In Motion, 2010

Numerous mobile communications touch points can improve the coordination and delivery of patient care across the continuum of care that can ultimately improve organizational performance and patient outcomes. By way of example, consider a patient being admitted to the hospital for a surgical procedure that will require several postoperative days in the hospital. Table 1 highlights a few examples of opportunities for clinicians and allied staff to use mobile UC to deliver care more efficiently and provides examples of how BlackBerry smartphones have been effectively employed by major healthcare organizations. Additional use cases that follow the patient from pre-admission testing to recovery are presented in the Appendix.

**TABLE 1**

## RIM Use Cases: Patient Scenarios Presenting Mobile UC Opportunities

Activity/Before UC	After Mobile UC/Benefits	RIM Example
<p><b>Surgery</b>  <i>Surgery will be delayed by one hour because the preceding case took longer than expected.</i></p> <p>The surgical unit coordinator attempts to page the surgeon, then calls office and mobile phone numbers listed in the hospital's telephone directory, which she discovers is out of date.</p> <p>The coordinator reaches the surgeon only after multiple calls to a number of different phone numbers, including paging devices.</p>	<p>The single phone number and voicemail feature, combined with presence, enables the coordinator to call one number to reach the surgeon directly.</p> <p>A similar call is made to the family member accompanying the patient to alleviate any concern while waiting in pre-op.</p> <p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>• More efficient communications</li> <li>• More productive use of staff and clinical resources</li> <li>• Better communication improves patient and employee satisfaction</li> </ul>	<p><b>UPMC</b></p> <p>University of Pittsburgh Medical Center (UPMC) Mercy Hospital has replaced the typical BlackBerry home screen with a wide range of applications with a clinical dashboard customized for UPMC Mercy Hospital, one of UPMC's first pilot sites for rolling out BlackBerry smartphones for clinician and allied professional use. The hospital's telephone directory is readily available by clicking the address book icon.</p>
<p><b>Post-surgery Recovery</b>  <i>The patient is moved to the post-anesthesia care unit (PACU) for post-surgery monitoring. When the patient is ready to be transferred to the medical/surgical floor, a PACU coordinator calls for transport.</i></p> <p>The PACU coordinator calls the transport department and is put on musical hold. After a few minutes, the coordinator puts the call on speaker to attend to other tasks elsewhere in the unit. It might take a transporter upwards of an hour to arrive in the PACU.</p>	<p>The coordinator clicks on the phone number for transport in her smartphone's telephone directory.</p> <p>The first available transporter is alerted that transport is required by a notification text message to his smartphone. Using it to access a tracking system, the transporter indicates that the assignment has been accepted and when it is completed. An alert is also sent to the coordinator prior to the transporter's arrival to ensure the patient is ready to go when the transporter arrives.</p> <p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>• More efficient workflow to call for transport</li> <li>• Clinical and allied staff more productive</li> </ul>	<p><b>UPMC</b></p> <p>After UPMC provided transporters with BlackBerry smartphones and mobile access to the Teletracking Interface, transporters were able to nearly double the number of transports provided in the pilot project at UPMC Mercy.</p>
<p><b>Post-operative Care on Medical-Surgical Unit</b>  <i>The patient experiences significant pain; the nurse would like to increase the pain medication dosage.</i></p> <p>The patient uses the call button to alert the nurse on duty that she needs assistance. The nurse responds to the call. However, until she arrives at the patient's bedside, she will not know what the patient wants. Thus, the nurse may need to return to the nurses station to retrieve something she could have brought with her the first time or locate appropriate personnel to respond to her patient's needs.</p>	<p>The nurse checks to see who's on call for the floor for the night and sends a secure message alerting that physician that the patient's condition has changed and asks if she would like to change the medication.</p> <p>The physician on call checks the patient's allergies and medication history using her smartphone and the mobile interface to the hospital's EMR. She then responds with the order in near real time.</p> <p>The patient can begin taking the new medication within minutes, and the physician can continue treating other patients.</p>	<p><b>Trillium Health Centre</b></p> <p>At Trillium Health Centre in Mississauga, Ontario, nurses write messages according to a SBAR (situation, background, assessment, and recommendation) format, providing the critical information physicians need to respond quickly. An audit trail of these email messages is then kept for quality improvement purposes.</p> <p>Trillium has been able to eliminate overhead and one-way paging, which in turn means quieter floors and more effective communication.</p>

**TABLE 1**

## RIM Use Cases: Patient Scenarios Presenting Mobile UC Opportunities

Activity/Before UC	After Mobile UC/Benefits	RIM Example
<p>In this case, she needs to contact the patient's attending physician. The nurse pages the hospitalist using the hospital's one-way paging system. The hospitalist searches out a house phone to return the page. In most cases, the person who initiated the page must be tracked down because she has been called away from the phone to attend to another patient or task. Paging is time consuming and very interrupt driven, taking clinicians away from patients they are treating.</p>	<p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>• Stronger care team collaboration</li> <li>• Faster decision making</li> <li>• Improved patient satisfaction</li> <li>• Secure email and text messages enable clinicians to track requests and ensure that nothing is overlooked</li> </ul>	<p><b>UPMC</b></p> <p>UPMC has piloted the use of BlackBerry smartphones to access dbMotion Solution, its SOA-based interoperability platform, at one of its 20 hospitals and is beginning to roll it out to its other hospitals. Using their BlackBerry smartphones, clinicians can access key clinical information — such as the patient's medication history, chief complaints, allergies, and lab orders and results — that originates from multiple source systems and is aggregated by dbMotion Solution.</p>
<p><b>Adverse Drug Event Intervention</b>  <i>The patient has an allergic reaction to the new medication. Her blood pressure changes by 20%, which will prompt the nurse to seek out the attending physician for guidance.</i></p> <p>The bedside monitoring device sounds an alarm, which is also relayed to the nurses station. However, the patient's nurse is attending to another patient and does not hear the alarm immediately.</p>	<p>A critical value alert is sent by the bedside monitoring device to the mobile devices of the patient's nurse and the hospitalist. The nurse quickly arrives at the patient's bedside, followed by the hospitalist and a resident, to assess the situation.</p> <p>The resident uses his smartphone to consult the hospital's decision support database for information about the medication causing the allergic reaction.</p> <p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>• Improve clinician response time and collaboration</li> <li>• Avert adverse medical event/"never event" (i.e., a serious medical error that should not have happened); increasingly, payers will not reimburse for care related to never events</li> </ul>	<p><b>UPMC</b></p> <p>UPMC has implemented a Nursing Alert Dashboard for the Mercy pilot, which presents color-coded alerts (red, yellow, green for high, medium, and low, respectively) on the nurses' BlackBerrys. Nurses click on the Update link to see more detail about the alert and, depending upon the nature of the alert, follow up using their smartphones.</p> <p><b>Duke Medical School</b></p> <p>Duke Medical School recently ran a pilot with its medical and nursing students using secure instant messaging, paging, Epocrates, PEPID, and Skyscape on BlackBerry smartphones. Clinical teams were able to communicate securely and effectively about their patients and check for best practices via decision support tools on their smartphones.</p>

Source: IDC Health Insights, 2010

**THE TIME TO INVEST IS NOW**

The forces of health reform are placing healthcare organizations under increasing pressure to become more productive and efficient and to reduce costs, all while improving the quality of care, level of service, patient outcomes, and patient safety. Mobile UC improves clinician communication by reducing the time it takes to reach a decision maker and eliminates time-intensive, interrupt-driven, and error-prone forms of communications such as paging and "phone tag." Research shows that poor communication and poor patient handoffs (lack of coordination) between shifts are among the leading causes of medical errors.

The highly mobile and collaborative nature of today's healthcare is highly conducive to deploying mobile UC. Physicians admit to multiple hospitals and practice from multiple office locations. Nursing shortages will require hospitals to seek creative staffing solutions. Presence, a single telephone number and voicemailbox, and secure mobile email and messaging simplify reaching far-flung colleagues for consultation or assembling on-demand care teams.

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Mobile technology is becoming increasingly ubiquitous among clinicians. As clinicians and allied staff become accustomed to using mobile devices outside of work, they are taking matters into their own hands and are increasingly using their personal mobile devices to communicate with their colleagues to facilitate care delivery despite the risk of using less than secure communication channels. Healthcare IT executives are strongly advised to curb this practice by deploying enterprise mobile UC strategies that meet the needs of clinicians and allied staff while complying with the organization's privacy and security policies. Greater familiarity with mobile technology will enhance clinician adoption of enterprise-provided mobile UC solutions. However, clinicians will want these services to work with the mobile devices they already use. Simply put, they do not want to carry multiple pagers or mobile devices.

Another benefit of mobile UC, which is often underestimated, is improving the patient experience. Increased patient satisfaction through better communication is critical to increasing patient loyalty, repeat visits, and the likelihood of positive recommendations of the institution to friends and families. As consumer adoption of smartphones increases and as consumers become more familiar with their capabilities and the convenience they provide in other aspects of their lives, individuals will want a similar experience within a healthcare setting and will begin to seek out healthcare organizations that provide such high-touch services. In a highly competitive market, retaining mindshare and market share is critical to ongoing financial viability.

## **WHAT TO DO TODAY TO GET STARTED**

A fully integrated UC strategy may seem daunting at first, but a healthcare organization should take incremental steps to get started on improving communications and overcoming some of the historical impediments to utilizing new technology in healthcare:

- **Identify the communication problem the organization seeks to solve.** Before organizations seek a new mobile UC solution portfolio, it is important to identify the communications problem they are trying to solve and understand how administrative and clinical staff currently communicate with each other. For example, identify the heavy phone users and ask why they use this channel over other channels. The same is true for email, instant messaging, and mobile phone users.

- **Identify quick wins to demonstrate value and gain user acceptance.** The next step in the UC journey is to identify immediate opportunities for a quick return on investment for UC. Table 2 identifies four key UC ROI opportunities and UC solutions that can be deployed today.

<b>TABLE 2</b>	
Solutions That Can Be Deployed Now	
<b>Business Issue</b>	<b>Possible UC Solution</b>
Observed friction in functional handoffs	Enhanced presence or instant messaging
Need for enhanced team collaboration	Team workspace environments
Customer engagement problems	Videoconferencing
Need for enhanced mobile devices	Single number dial, mobile PBX extensions, dual-mode devices

Source: IDC Health Insights, 2010

- **Assess current UC technologies and leverage them when possible.** Inventory your current IT and telecom equipment environment as well as service provider contracts and objectively assess their deficiencies, age, and capacity. UC and the technologies that enable it are quickly becoming a vital component of a healthcare organization's IT infrastructure. Healthcare organizations must consider the impact of rolling out new UC technologies not only on administrative and clinical staff but also on telecom and IT staff, as well as their existing telecom infrastructure.

Key considerations include investment protection, vendor standardization or multi-vendor environment, and use of common IT standards (SIP, XML, etc.). Healthcare organizations simply cannot afford "rip and replace" strategies. Consequently, and where practicable, they need to leverage existing infrastructure. Most organizations start with identity to lay the foundation for email and calendaring, and then mobile messaging. With these core UC applications in place, healthcare organizations can add presence and instant messaging. Unified messaging capabilities coordinate the aggregation and dissemination of messages to staff according to their preferred channel (e.g., email, fax, and phone). Lastly, conferencing and VoIP are deployed to complete the UC stack. It should be noted that once identity is established, deployment of the UC components can occur in any order depending upon the organization's unique business and system requirements.

- **Identify those communications processes that are highly inefficient.** These might include processes where the first attempt success rates are lowest, where the time required to successfully complete the contact is greatest, and where the response delays are the longest and the consequences of those delays pose the greatest potential patient risks or represent significant avoidable costs or revenue opportunities. Be sure to involve the end users in conceptualizing and executing technology-based process improvement. An informed user community will often use technology to solve its own challenges in ways that may surprise the "experts" but that can be very much effective.
- **Engage physician and nurse champions for clinical communication processes.** Identify clinical leaders who are well respected among their peers not only for their clinical expertise but also for their thought leadership on matters where IT intersects with medicine. These clinical leaders will be instrumental in identifying clinical communication processes that would benefit from applying UC technologies and encouraging their peers to adopt new strategies to entrenched, but broken, processes.
- **Look to early adopters both inside and outside the healthcare industry for lessons learned and best practices.** Early adopters of mobile UC in healthcare are discovering, and deploying, innovative applications of UC that validate its benefits — applications that are likely to drive significant adoption in the short term. These include applications and mobile devices that combine voice, video, data, and text messaging to enable more efficient and more effective communications, improve staff productivity and care quality, and reduce cost.

Forward-thinking healthcare organizations have been using mobile UC in clinical practice for several years now. For example, Trillium Health Centre in Mississauga, Ontario, Canada, has deployed BlackBerry smartphones to 40 clinicians in its 26-bed intensive care unit (ICU) since 2005 to enable instant communication. Other service-intensive industries with mobile workforces, such as hospitality, have successfully deployed proven mobile UC technologies. By deploying commercially available, industry-standard mobile technology and leveraging existing IT and communications infrastructure (e.g., WiFi, PBX, paging, and alerts gateways), healthcare organizations can increase the speed to value for mobile UC strategies at a potentially much lower price point compared with pursuing highly specialized or customized solutions.

## **PARTING THOUGHTS**

The healthcare working environment is fast paced and communication intensive. Mobile UC solutions will drive many process improvements in healthcare; most notably, improving patient safety and patient outcomes while reducing costs through productivity and efficiency gains. The potential benefits of mobile UC deployment are many and far broader than merely those associated with conventional UC deployments. Although healthcare providers are very early in the UC and mobile UC adoption cycle, a confluence of factors, including the relentless drive to improve operational efficiency and care quality, along with increased adoption of EMR, wireless networks, and IP telephony technologies, can be expected to raise both awareness of and investment in mobile UC technologies by healthcare providers over the next several years.

# APPENDIX

Table 3 presents additional use cases that follow the patient from pre-admission testing to recovery.

<b>TABLE 3</b>			
Use Cases: Patient Scenarios Presenting Mobile UC Opportunities			
<b>Activity</b>	<b>Before Mobile UC</b>	<b>After Mobile UC</b>	<b>Benefits</b>
<p><b>Pre-admission</b> Remind patient three days before surgery to go to the hospital for the pre-op admission tests (e.g., lab work, x-rays), when to arrive for surgery, and not to eat after midnight the night before surgery.</p>	<p>A surgical unit coordinator from the hospital or a nurse from the surgeon's office calls the patient at home. If the patient does not answer, a generic voicemail message is left advising the patient to call back. If the patient lacks voicemail, additional calls must be placed until the patient is reached.</p>	<p>An automated voice message is sent to the patient's mobile phone, which the patient indicated during registration was the preferred means of communication, to advise the patient to schedule the pre-op tests. The day before surgery, the patient is called and reminded when to come in and not to eat after midnight.</p>	<ul style="list-style-type: none"> <li>• Increased patient compliance rates</li> <li>• Fewer canceled surgeries lead to more productive use of OR resources and improved revenue stream</li> <li>• Comply with ARRA meaningful use requirement to communicate with patients according to their preferences</li> </ul>
<p><b>Surgery</b> The surgery will be delayed by one hour because the preceding case took longer than expected.</p>	<p>The surgical unit coordinator attempts to page the surgeon and then calls office and mobile phone numbers listed in the hospital's telephone directory, which she discovers is out of date. The coordinator reaches the surgeon only after multiple calls to a number of different phone numbers, including paging devices.</p>	<p>The single phone number and voicemailbox feature, combined with presence, enables the coordinator to call one number to reach the surgeon directly. A similar call is made to the family member accompanying the patient to alleviate any concern while waiting in pre-op.</p>	<ul style="list-style-type: none"> <li>• More efficient communications</li> <li>• More productive use of staff and clinical resources</li> <li>• Better communication that improves patient and employee satisfaction</li> </ul>
<p><b>Post-surgery Recovery</b> The patient is moved to the post-anesthesia care unit (PACU) for post-surgery monitoring. When the patient is ready to be transferred to the medical/surgical floor, a PACU coordinator calls for transport.</p>	<p>The PACU coordinator calls the transport department and is put on musical hold. After a few minutes, the coordinator puts the call on speaker to attend to other tasks elsewhere in the unit. It might take a transporter upwards of an hour to arrive in the PACU.</p>	<p>The coordinator clicks on the phone number for transport in her smartphone's telephone directory. The first available transporter is alerted that transport is required by a notification text message to his smartphone. Using it to access a tracking system, the transporter indicates that the assignment has been accepted and when it is completed. An alert is also sent to the coordinator prior to the transporter's arrival to ensure the patient is ready to go when the transporter arrives.</p>	<ul style="list-style-type: none"> <li>• More efficient workflow to call for transport</li> <li>• Clinical and allied staff more productive</li> </ul>

**TABLE 3**

Use Cases: Patient Scenarios Presenting Mobile UC Opportunities

Activity	Before Mobile UC	After Mobile UC	Benefits
<p><b>Post-operative Care on Medical-Surgical Unit</b></p> <p>The patient experiences significant pain; the nurse would like to increase the pain medication dosage.</p>	<p>The patient uses the call button to alert the nurse on duty that she needs assistance. The nurse responds to the call. However, until she arrives at the patient's bedside, she will not know what the patient wants. Thus, the nurse may need to return to the nursing station to retrieve something she could have brought with her the first time or locate appropriate personnel to respond to her patient's needs. In this case, she needs to contact the patient's attending physician. The nurse pages the hospitalist using the hospital's one-way paging system. The hospitalist searches out a house phone to return the page. In most cases, the person who initiated the page must be tracked down because she has been called away from the phone to attend to another patient or task. Paging is time consuming and very interrupt driven, taking clinicians away from the patients they are treating.</p>	<p>The nurse checks to see who's on call for the floor for the night and sends a secure message alerting that physician that the patient's condition has changed and asks if she would like to change the medication.</p> <p>The physician on call checks the patient's allergies and medication history using her smartphone and the mobile interface to the hospital's EMR. She then responds with the order in near real time.</p> <p>The patient can begin taking the new medication within minutes, and the physician can continue treating other patients.</p>	<ul style="list-style-type: none"> <li>• Stronger care team collaboration</li> <li>• Faster decision making</li> <li>• Improved patient satisfaction</li> <li>• Secure email and text messages enable clinicians to track requests and ensure that nothing is overlooked</li> </ul>
<p><b>Adverse Drug Event Intervention</b></p> <p>The patient has an allergic reaction to the new medication. Her blood pressure changes by 20%, which will prompt the nurse to seek out the attending physician for guidance.</p>	<p>The bedside monitoring device sounds an alarm, which is also relayed to the nurses station. However, the patient's nurse is attending to another patient and does not hear the alarm immediately.</p>	<p>A critical value alert is sent by the bedside monitoring device to the mobile devices of the patient's nurse and the hospitalist. The nurse quickly arrives at the patient's bedside, followed by the hospitalist and a resident, to assess the situation.</p> <p>The resident uses his smartphone to consult the hospital's decision support database for information about the medication causing the allergic reaction.</p>	<ul style="list-style-type: none"> <li>• Improve clinician response time and collaboration</li> <li>• Avert adverse medical event/"never event" (i.e., a serious medical error that should not have happened); increasingly, payers will not reimburse for care related to never events</li> </ul>

**TABLE 3**

## Use Cases: Patient Scenarios Presenting Mobile UC Opportunities

Activity	Before Mobile UC	After Mobile UC	Benefits
<p><b>Discharge Planning</b></p> <p>The tentative discharge date is three days after surgery. The patient is now ready to be discharged to the home.</p>	<p>The discharge nurse places numerous calls to the patient's attending physician to obtain approval to begin the process of discharging the patient. Calls must also be placed to arrange for nursing care from the hospital's home health agency.</p>	<p>Using the single phone number, presence, and click-to-dial feature, the discharge nurse reaches the attending physician in one call. The physician accesses the patient's latest lab results, medication history, and other key information using the EHR's mobile interface.</p> <p>The attending physician initiates a three-way conference call with the surgeon and another specialist who was consulted on the case. The physicians agree that the patient can be discharged and authorize the discharge nurse to coordinate discharging the patient.</p>	<ul style="list-style-type: none"> <li>• More efficient discharge workflow</li> <li>• Improved care coordination, specifically post-discharge care</li> <li>• Faster bed turnover enables hospitals to avoid ED diversion and create open bed days</li> <li>• Increased bed capacity translates into more patient admissions without having to build or significantly add resources</li> <li>• Improved revenue opportunities</li> <li>• Improved patient satisfaction</li> </ul>
<p><b>Discharge Day</b></p> <p>A physical therapist will show the patient recommended exercises to do at home to facilitate recovery.</p>	<p>The physical therapist demonstrates how to do the exercises, and before leaving the patient's room, he hands a family member a copy of the instructions with line drawings illustrating the steps in the exercises.</p>	<p>The physical therapist uses his smartphone's camera to film the patient doing the exercises correctly and sends the clip to the patient's phone so that she can replay it later if she needs a visual reminder of the recommended exercise sequence, along with the written instructions.</p>	<ul style="list-style-type: none"> <li>• Increased patient compliance rates lead to potentially better patient outcomes</li> <li>• Reduced risk of readmission within 30 days, which may not be reimbursed by Medicare</li> <li>• Ability to accommodate new reimbursement models (e.g., accountable care organizations and bundled rates), which will require better discharge planning and post-discharge care coordination</li> </ul>
<p><b>Recovering at Home</b></p> <p>A nurse will visit the patient at home every other day for two weeks to assess how the patient's surgical wound is healing, general health, and progress and to change dressings as necessary.</p>	<p>The patient's wound appears inflamed. Concerned, the nurse attempts to reach the patient's primary care physician (PCP). Multiple phone calls later, after the nurse has left the patient's home, the physician returns her call after her shift has ended.</p>	<p>The nurse takes several photos of the wound using her smartphone and emails them to the patient's PCP. Between patients, the PCP answers in near real time and recommends a course of antibiotics. Using a mobile e-prescribing application, the PCP sends a prescription to the patient's local pharmacy.</p>	<ul style="list-style-type: none"> <li>• Improved communication among remote caregivers</li> <li>• Instant communication and in near real time</li> <li>• Avert adverse medical event</li> </ul>

Source: IDC Health Insights, 2010

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