



The Role of Unified Communications in Healthcare Service Improvement

WHITE PAPER

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HEALTH INDUSTRY INSIGHTS OPINION

Unified communications (UC) 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 (IM), 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 those organizations in which the workers are highly mobile and communication between them is both critical and time sensitive.

The highly collaborative and mobile nature of clinical teams makes UC an essential investment for healthcare organizations today. According to the *BMJ* (formerly known as the *British Medical Journal*), physicians walk six miles or more per day when they are on call, as they make their rounds through the hospital to see and treat patients. Nurses, although they typically treat patients only in their unit, still log an average of two to three miles per day, according to a study published by Kaiser Permanente ("A 36-Hospital Time and Motion Study: How Do Medical-Surgical Nurses Spend Their Time?" *The Permanente Journal*, Summer 2008). The mobility of clinicians presents inherent challenges to the effective and timely communication between them, yet timely and accurate communications can literally be a matter of life and death.

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This White Paper is presented by Health Industry Insights, an IDC company, and sponsored by Microsoft. The objectives were to gain insights into:

- The current overall market for unified communications technology and its anticipated future growth
- Factors driving growth in demand for unified communications among healthcare provider organizations
- Current applications of unified communications by healthcare provider organizations
- The unified communications features and functions of importance to healthcare providers
- The future outlook for unified communications technology adoption by healthcare providers

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

- The worldwide market for UC is growing dramatically. IDC estimates that UC spending will grow from nearly \$5 billion in 2007 to approximately \$17 billion by 2011. Growth is expected to be fastest among those organizations, such as healthcare providers, with the greatest proportions of mobile workers.
- For many hospitals, the implementation of an electronic medical record (EMR) is simply a foundation, a leverage point that has become a driver for the adoption of other technologies, such as UC, that create the synergies needed for real productivity gains and patient care process and workflow improvement.
- Improved communication among team members and between care teams at hand-off 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.
- Two significant trends will drive increased UC deployments in healthcare organizations: wireless LAN (WLAN) upgrades and upgrades of existing legacy telephony equipment, both of which are considered important companion technologies.

- Although UC is not yet widespread in healthcare provider organizations, 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 text messaging to enable more efficient and more effective communications, improve staff productivity and care quality, and reduce cost.

SITUATION OVERVIEW

Historically, hospitals, physician practices, and other healthcare provider organizations invested sparingly in IT compared with other industries. But competitive pressures, rising costs, revenue constraints, and increasingly stringent regulatory requirements have combined to drive major initiatives to improve service quality, process efficiency, and staff productivity. For many provider organizations, IT is recognized as a critical component of these initiatives and the adoption of IT has accelerated accordingly. Although the total industry IT spend in the United States remains well below that of other industries in which IT use is far more mature, IDC estimates that the current 7.4% compound annual growth rate (CAGR) for overall IT spending by U.S. healthcare providers ranks it as one of the fastest-growing vertical markets in the United States. Outside the United States, the CAGR in overall IT spending by healthcare providers also exceeds that of other industries and currently approaches 8% in Western Europe and Asia/Pacific (APAC). For packaged software products, the CAGR in all of these markets now approaches 9%.

The focus of these IT investments not only has increased but also has shifted. Until recently, the majority of IT investments by healthcare providers have been devoted to core financial and administrative transaction systems, but over the past five years, investments have shifted from these traditional "back of the house" applications to applications designed to support patient care. Despite this dramatic growth, healthcare IT is still in its infancy, with further, sustained growth predicted.

Current Trends in Healthcare IT

Arguably, the most prominent example of increased IT investment by healthcare providers is the deployment of EMRs. In one of the most comprehensive surveys of healthcare IT usage conducted to date, the American Hospital Association (AHA) reported in February 2007 that 23% of U.S. hospitals over 500 beds had fully featured EMR applications in place, while over 70% more had partial implementations. Since the time the AHA conducted its survey (late 2006), the pace of EMR activity has quickened, and it is expected that this number will double by the time the AHA releases its next survey early in 2009.

Robust EMR implementations are increasingly common in Western European and APAC hospitals as well, with the foundational clinical information systems and prerequisite and complementary infrastructure technologies, such as wireless networks and real-time location systems, representing some of the highest investment priorities for hospitals in these regions.

Healthcare processes, and the IT applications that support them, are widely diverse and very complex, yet also highly interdependent. For many hospitals, the implementation of an EMR is simply the foundation, a leverage point that has become a driver for the adoption of other technologies that create the synergies needed for real productivity gains and patient care process improvement. For example, a June 2007 IDC/*InfoWorld* survey of voice and data networking technologies found that 82% of healthcare organizations surveyed had implemented WLANs. In two separate surveys of hospital CIOs conducted by Health Industry Insights in September 2007 and May 2008, over 85% of respondents indicated that they had deployed a wireless network in their organizations, with 47% and 52% of those CIOs indicating that they were actively expanding and enhancing those networks (see Table 1).

TABLE 1

Adoption of WLANs by Healthcare Organizations			
	IDC/ <i>InfoWorld</i> Survey, June 2007	Health Industry Insights Leading Indicators Survey, September 2007	Health Industry Insights Leading Indicators Survey, May 2008
% of healthcare respondents with operational WLAN	82	90	86
% of healthcare respondents actively enhancing/expanding existing WLAN	NA	47	52
n =	34	34	29

Source: Health Industry Insights, 2008

Three key drivers of these wireless network initiatives are to facilitate the collection and use of patient EMR data at the bedside and other point-of-care locations, to enable providers to replace their aging telephony and nurse call systems with modern IP telephony (e.g., voice over IP or VoIP) communications and dual-mode phones, and to enable real-time location systems (RTLS) for the tracking of patients, staff, equipment, and other assets. These technologies are essential

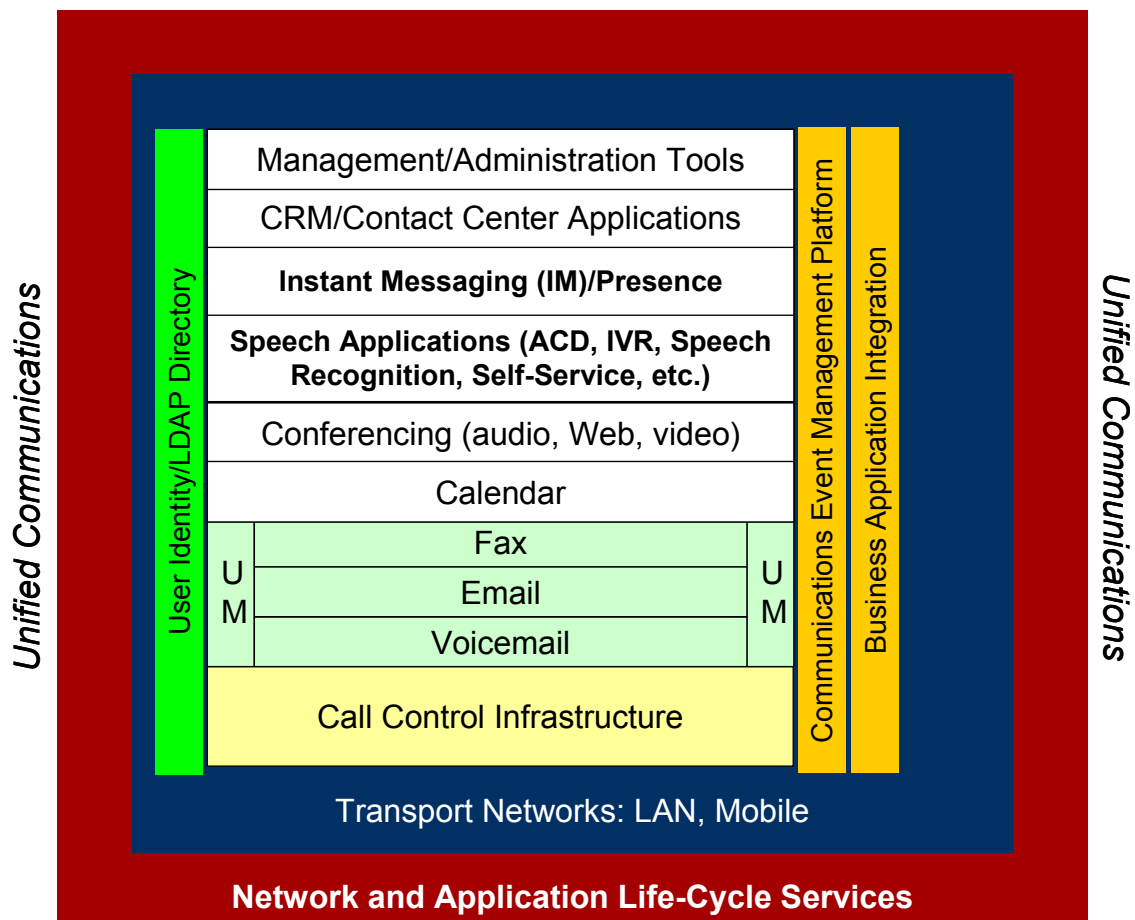
components for managing and improving the complex and interdependent workflows that characterize hospital operations. Unified communications is an important ingredient in the recipe for achieving these improvements.

What Is Unified Communications?

Unified communications broadly defines a communications environment that comprises several different elements. These elements can include email, telephony, voicemail, instant messaging, video, Web conferencing, and SMS, which can be brought together in various combinations in real time and coordinated. An overview of UC architecture is shown in Figure 1.

FIGURE 1

IDC's Unified Communications Ecosystem



Source: IDC, 2008

IDC defines UC as:

A software infrastructure platform that consolidates directory, routing, and management of communications across a growing set of applications (including advanced IP telephony calling and management; Web, audio- and videoconferencing; instant messaging; and pervasive presence management and awareness — all accessible through desktop and mobile devices and as functions available to business applications developers (see IDC's Definition of the Unified Communications Ecosystem, IDC #204737, January 2007).

The terms *unified communications* and *unified messaging* (UM) are sometimes, but incorrectly, used interchangeably. While similar, they are not the same. 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 a UC system user as to where the intended recipients of their communication 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. IDC suggests that the use of presence and identity should also be closely aligned with existing LDAP directories and authentication and security policies to ensure the most effective use of the communications infrastructure.

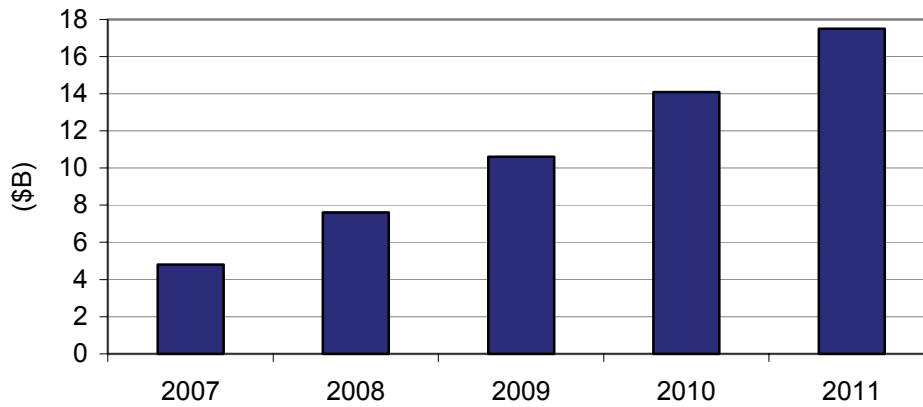
In effect, UC integrates (or "unifies") all the communications modalities that an individual might already be using and helps those systems work together in real time.

The Global Market and Projected Growth for UC, 2007–2011

The market for UC is growing dramatically worldwide. IDC estimates that worldwide spending on UC technology approached \$5 billion in 2007 and expects that spending to grow to about \$17 billion by 2011, a CAGR of 38% (see Figure 2). During this period, adoption of UC across all industries is expected to grow sixfold, from about 4% of organizations in 2007 to 25% in 2012 and 75% in 2020. Growth is expected to be fastest among those organizations, such as healthcare providers, with the greatest proportions of mobile workers.

FIGURE 2

Worldwide UC Ecosystem Revenue Forecast, 2007–2011



Source: *Worldwide Unified Communications Ecosystem 2007–2011 Forecast: The Road Ahead for UC* (IDC #208043, August 2007)

What Is the State of UC Technology in Healthcare Today?

While adoption of UC by healthcare providers currently lags that in other industries, evidence suggests that both awareness and adoption are on the rise. In a 2007 survey conducted by IDC and *InfoWorld* magazine that focused on UC and telephony technology adoption and buying plans, 64% of healthcare respondents indicated an awareness compared with 75% of the total respondents.

Health Industry Insights predicts that two significant trends will drive increased UC deployments in healthcare organizations: WLAN upgrades and upgrades of existing legacy telephony equipment, both of which are considered important complementary technologies. Over the past three years, there has been a dramatic increase in the adoption of EMR technology by hospitals. Wireless point-of-care access to EMR software has led to the increase in the adoption of WLANs discussed earlier.

Simultaneously, healthcare providers are actively engaged in either replacing or augmenting their legacy PBX voice networks with IP-based telephony and dual-mode phones. When asked to identify their current use of traditional PBX technology versus IP-based PBXs or hosted IP-based voice services, and to contrast this against their environments 12 months into the future, healthcare respondents indicated a clear trend toward IP-based telephony: 62% reported that they currently utilize traditional PBX technology,

a number that was expected to decline to 44% by the end of 2008; 38% reported having IP-based PBXs deployed today, a number that was expected to grow to 50% by the end of 2008; and 18% reported using hosted IP telephony services, a number that was expected to increase to 27% by the end of 2008. Because organizations utilize multiple technologies across the enterprise, the total of the three categories exceeds 100% (see Table 2).

TABLE 2

Voice Communication Architectures Utilized, 2007–2008 (% of Respondents)

Telephony Architectures Operational	Operational as of June 2007	Expected to be Operational as of December 2008
Traditional PBX	62	44
IP-based PBX	38	50
Hosted IP telephony	18	27

n = 34

Source: *Key Trends in Enterprise VoIP 2007: Vendor Selection in the Installed Base* (IDC #210331, February 2008)

UM is perceived to be the principal attraction of UC technology for healthcare IT executives, 57% of whom rated it as the number 1 application that is driving (or will drive) their investment in UC. The remaining top 5 drivers cited include remote/teleworker solutions (50%), videoconferencing (50%), directory services (39%), and dual-mode phones (32%) (see Table 3). In our view, this somewhat limited view of UC is likely the result of limited exposure to UC products and a lack of awareness of its capabilities rather than the perception of its value.

TABLE 3

Priorities for Application of UC Technology by Healthcare Organizations

Q. Which UC applications do you think will most likely drive future investment in your company's telephony budget?
(Check all that apply.)

Application	% of Healthcare Respondents	% of All Respondents
Unified messaging	57	60
Remote/teleworker solutions	50	52
Videoconferencing	50	49
Dual-mode phones (WLAN and mobile)	32	35
Single-number dial to mobile	25	29
Directory services	39	26
Presence management	29	24
Audio services	21	24
Custom applications (in-house developed)	25	24
Click to dial	25	21
Other	0	3
Don't know	24	2
n =	28	383

Source: *Key Trends in Enterprise VoIP 2007: Customer Perspectives on Unified Communications* (IDC #208643, September 2007)

FUTURE OUTLOOK

Challenges/Opportunities

Despite chronic budgetary constraints, IT investments by healthcare providers will continue to rise as they seek to harness the capabilities of IT to achieve:

- Reductions in patient length of stay
- Improved patient safety and outcomes
- Workflow and process improvements
- Improved utilization and productivity of staff and other resources
- Improved customer service experience

As an architecture that provides a unified, integrated approach to the communication of voice, data, and images, UC is a common thread in many evolving solutions in these areas and can be expected to play a key role in achieving these goals. Health Industry Insights sees a growing role for UC in the following broad areas:

- Care team collaboration
- Medical training and education
- Caregiver-to-patient and caregiver-to-caregiver communication
- Integration with business and clinical applications

Care Team Collaboration

Given the mobile nature of healthcare workers and the highly collaborative nature of patient care services, particularly in the inpatient setting, communication between members of a care team is of vital importance.

Several years ago, in a landmark study of business telephone usage conducted by AT&T, researchers found that upwards of 75% of all business calls do not reach the intended party on the first attempt. In hospitals, with their highly mobile workforce, this percentage is even higher, yet communication is essential to effective collaboration. Numerous published workflow studies indicate that nurses often spend more time communicating with other staff than they do at the bedside. The results of the Kaiser Permanente study quoted earlier indicate that almost 21% of nursing time is spent in the communications necessary for care coordination. Surprisingly, this is slightly more than the 19% devoted to direct patient care. Much of this communication is via telephone, yet those initiating the calls are frequently unable to reach the party they are trying to contact on the first attempt.

Effective and timely communications between patient care team members can be, very literally, a matter of life and death. The stereotypical image of the clinician carrying multiple communications devices, including cell phones, PDAs, smart phones, or pagers, is, all too often, a reality of a caregiver's workday. The frenetic pace of daily life in a hospital, and the frequency of unplanned events and the disruption of planned workflows, is another reality for healthcare professionals. Here, too, timely communications can make the difference in how effectively resources can be redeployed in the face of unanticipated delays and other unexpected events. And although email has become as pervasive in hospitals as it has in other industries, the mobile nature of most clinicians makes email a far less efficient communication method. For most patient-related communication, real-time contact is essential.

The response of the industry has been to provide multiple, parallel, but all too often, independent communication pathways. This strategy provides only a marginal improvement in the communication success rate, despite a significant increase in cost, and still does not guarantee a real-time connection.

Conversely, in a UC environment, users can set and update their "presence" status in an ad hoc manner through a variety of desktop or mobile devices. Users' "presence" status can also be automatically linked to their calendar so that their availability becomes a function of their schedule. During periods when they are available, users can specify how they can best be reached so that incoming messages or voice calls are routed to an appropriate device, enterprise extension, external landline, mobile number, or pager. Other users wishing to contact them have multiple options, depending upon the devices available to them. For example, an initial contact could be in the form of an instant message. If necessary, the IM dialog could be escalated to a voice contact with a simple "click to call," which would be automatically routed directly to the preferred phone number.

This not only facilitates a user's ability to contact another party on the first attempt, but if the call's recipient has access to the corporate network, the voice dialog can be augmented with text, data, or video components as well. Recent advances in wireless point-of-care technology have led to the introduction of devices equipped with digital cameras, which, for example, can allow a caregiver at a patient's bedside to take and transmit a real-time view of a patient to a remote physician, which can be an important aspect of wound care.

On-call lists can also be maintained as a coherent hunt group (based on Active Directory/LDAP), which can facilitate identifying and contacting consulting physicians. This is of particular importance to emergency department and inpatient nursing unit personnel, especially during weekends and off-hours. Eliminating the delays associated with the need to call a third party, typically the paging service, to identify and contact the appropriate consultant can have significant implications on the patient's outcome.

Care Team Collaboration at University Hospitals Bristol NHS Foundation Trust

University Hospitals Bristol NHS Foundation Trust (UH Bristol) is the U.K. Health Trust that serves the metropolitan Bristol area in southwest England. UH Bristol is in the early stages of deploying UC, using Microsoft's Office Communications Server 2007 (OCS 2007). Three of its earliest applications have targeted workgroup communications. To test the concept in a real-life setting, UH Bristol deployed the first pilot within IT itself. UC was adopted to facilitate broadcast communications of system or network outages and other emergency events affecting its computing environment. A subsequent deployment was in the radiology

department, where imaging technicians use the Office Communicator feature to send messages to the patient waiting area and reception staff to request their next patient. Currently, OCS 2007 has been deployed on about 800 of UHBristol's more than 5,000 desktops, with the balance due to come online by late 2008. UHBristol has adopted a "viral" approach to its implementation by simply providing the tool and the encouragement to individual workgroups to adopt the technology in a manner best suited to their individual workgroup dynamics. Feedback from the early adopters has been very positive.

Medical Training and Education

In-service education is fundamental to the professional development and licensure maintenance requirements of healthcare professionals at every level of training. Published estimates vary as to the rate at which medical knowledge is increasing, but whether one believes that it doubles every 18 months as some have estimated or every 5–7 years as others have estimated, experts agree that ongoing education for healthcare professionals of every discipline has never been more important. Technologies that facilitate the dissemination of that knowledge are fundamental to achieving improvements in the quality of patient care. Technology-enabled remote learning provides a means to bring high-quality, low-cost in-service education to healthcare professionals no matter where in the world they may be located.

UC-enabled functions, such as Web-based presentations, real-time videoconferencing, live and recorded videoconferencing with mixed media, and various types of two-way interactive sessions, enhance the learning experience and expand the reach and quality of in-service medical education programming.

Two-Way, Panoramic Videoconferencing at St. Luke's Health System

St. Luke's Health System (SLHS), headquartered in Boise, Idaho, is another early adopter of Microsoft's Office Communications Server 2007 (OCS 2007). SLHS is the only not-for-profit health system based in Idaho. Its anchor institution, St. Luke's Boise Medical Center, is known for its centers of excellence in cancer, heart, and women's and children's care. SLHS' services include St. Luke's Center for Heart and Vascular Health; St. Luke's Mountain States Tumor Institute, SLHS' largest clinic; St. Luke's Center for Minimally Invasive Surgery; and St. Luke's Children's Hospital, the only children's hospital in Idaho.

The UC deployment at SLHS is notable for the unique nature of one of its first pilot applications. Two-way, panoramic, Web-based videoconferencing was the first UC component installed at SLHS. Its initial application was at St. Luke's Children's Hospital, where an 11-year-old cancer patient, confined to an extended stay in the hospital, was connected to his classroom and his classmates through a two-way,

Web-enabled, panoramic videoconference link. Enabled through a combination of Microsoft Roundtable and Microsoft Live Meeting, this two-way conference link provided both the patient and his classmates with a panoramic view of the opposite end of the video link.

The patient's social reconnection to familiar surroundings and the emotional support provided by his classmates and teacher were seen by his physicians as major influences on his recuperation and, in the words of the IT manager who led the implementation, are "why a career in health IT is such a personally as well as professionally rewarding experience."

SLHS implemented Live Meeting on a hosted basis to meet the needs of St. Luke's Children's Hospital while the migration from a competitive platform to Microsoft's enterprise UC platform was under way. SLHS views Live Meeting as a stepping-stone for its long-term strategy of enterprise collaboration achieved by implementing OCS 2007, Exchange 2007, and SharePoint 2007.

Caregiver-to-Patient and Caregiver-to-Caregiver Communication

The healthcare industry is struggling to satisfy dramatic global increases in both the demand for and control of the cost of healthcare services. The factors are many — increased economic affluence, increased life expectancy, and a higher incidence of chronic disease conditions that consume a disproportionate share of healthcare costs. For many clinical disciplines, educational programs are not producing enough trained professionals to keep up with this demand. And in many countries, these disparities are further exacerbated by imbalances in supply and demand between urban and rural regions. Technology-enabled remote care delivery processes (collectively referred to as telemedicine), as well as technology-enabled remote consultations between treating physicians and remote experts, are seen as an important tool for leveraging scarce resources. Videoconferencing is an essential component for many forms of telemedicine. It can facilitate examination, diagnosis, and treatment of a patient by a specialist connected over a videoconference link to a caregiver present with the patient in a remote location that combines the live video with other media, which might include patient medical record data.

Remote patient monitoring, a subset of telemedicine, is another emerging model of care delivery. Although still in its infancy, remote patient monitoring holds the promise of improving the quality and simultaneously reducing the cost of managing many chronic diseases. Diabetes is a prime example. The treatment of diabetes — and its related impact on other aspects of patient health — represents a significant portion of total health costs. For example, in the United States alone,

20.8 million people, or 7% of the total population, have diabetes. The treatment of diabetes-related complications accounts for about 55% of the nearly \$100 billion associated with diabetes management, the remainder being direct treatment expenses. Although confirmed diabetics make up only about 11% of the population over the age of 65, elderly diabetics consume 40% of skilled nursing days, 29% of home-health visits, 26% of emergency room visits, and 21% of office consultations. Diabetics of all ages have a 1.5 times greater risk of being hospitalized and remain in the hospital an average of 2.8 days longer than nondiabetics with the same conditions (source: American Diabetes Association).

Timely intervention is the key to effective diabetes management from both outcome and cost perspectives. Intervention can be facilitated by remotely monitoring the glucose levels of diabetics in the course of their daily lives. Should the patient's level exceed a threshold value, automated communication of that information to the patient's case manager, coupled with timely communication by a caregiver to the patient, can result in improved management of the patient's condition, potentially avoiding a visit to the physician's office or the local hospital emergency room. For example, business rules could be established that triggered follow-up actions that were dependent on the level of urgency: from scheduling a screening appointment (nonurgent) to a real instant message or time-sensitive outbound call to the first available specialist. If UC-enabled through "presence," the calling process would be able to determine, in real time, which caregiver was available, a key differentiator to blind outbound calls that might simply result in one or more rounds of voicemail/phone tag.

Communications technology not only can "eNable" improved clinical processes but also can facilitate routine business communications between patients and caregivers. Healthcare is just beginning to embrace the principles of customer service that other industries have already adopted. Patients and their families have become accustomed to the benefits of online banking, stock trading, and shopping and are demanding similar ubiquitous and asynchronous access to their healthcare providers to schedule appointments, obtain test results, renew prescriptions, and even consult with their physician electronically rather than tolerate a seemingly endless string of telephone calls. Providers, mindful of the increasingly competitive environment, are seeking ways to meet these demands, improve customer service, and enhance customer loyalty. As evidenced by the next customer experience, digital connectivity is one strategy that is high on many providers' agendas, and UC can be an integral party of such a strategy.

Ensuring Preventive Care and Follow-Up at Care1st

Preventive care scheduling and follow-up is another area in which UC can create value to enhance communication between patients, caregivers, and health plans. One organization that has successfully used UC to effect better patient management is Care1st, a Monterey Park, California-based health maintenance organization (HMO). Care1st provides healthcare benefits to more than 200,000 low income and disabled members with coverage through Medi-Cal, California's state Medicaid program, through its affiliated network of 3,000 physicians, 50 medical groups, and 60 hospitals.

Medi-Cal program requirements mandate that providers proactively contact newly enrolled health plan members to ensure that they schedule an appointment for an initial health assessment with their primary care physician. Adults must be seen within 120 days of their enrollment. Those under the age of 18 are mandated to be seen within 60 days. Compliance with this mandate traditionally relied on phone calls and paper mailings. This method was difficult, time-consuming, expensive, and only minimally successful, yet essential for the health plan to comply with regulatory requirements. More important than simply demonstrating to Medi-Cal its "good faith" attempts to contact new members, Care1st was seeking a way to increase its ability to successfully schedule the appointments.

In 2007, Care1st engaged 4PatientCare, a Long Beach, California-based systems integrator that specializes in multimodal, intelligent, interactive communications solutions for healthcare clientele. Together, Care1st and 4PatientCare deployed an interactive, speech-enabled application based on Microsoft's Office Communications Server 2007 and Microsoft Speech Server 2007. The application is designed to communicate with the patient, describe advantages of seeking preventive care, confirm the selection of primary care provider, and provide a patient-selected specific date and time for the appointment. The automated system not only ensures compliance with the Medi-Cal mandate, but the automated appointment scheduling further reduced its clerical overhead costs as well. If the call is answered by another member of the household, the system also has the intelligence to reschedule the follow-up call at a time specified by the call recipient via natural language voice dialog.

Since Care1st implemented these capabilities, its compliance rates have soared from 22% to 60% in the San Diego region and 53% in the Los Angeles region. Yet despite this marked increase, follow-up costs have dropped dramatically. Compliance reporting mandated by Medi-Cal is now fully automated as well. Care1st executives estimate that the associated labor savings represent the equivalent of two full-time clerical staff.

Integration with Business and Clinical Applications

As exemplified by the Care1st and UHBristol radiology 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 UC into these applications enables the 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.

Some examples of such transactions include:

- **Availability of critical diagnostic results.** Physician decisions and actions are often contingent on the results of previously ordered diagnostic tests. The physician awaiting the outcome of the test, however, may not be online when the result is communicated. With UC, the physician's presence could be determined and the test result communicated through the most appropriate method.
- **Communication of "panic values."** A specialized case of the above occurs when an abnormal test result is of such an exceptional value that it may require immediate intervention by the physician. Such out-of-range results are often referred to as "panic values" and were first implemented as digital messages sent to pagers by laboratory information systems. UC offers another, more targeted, two-way communication option for the notification of such events.
- **Patient transportation requests.** In a hospital setting, many diagnostic and therapeutic procedures, such as radiology and physical therapy, require that patients be transported to the ancillary department providing the service. Unplanned and other schedule changes often result in adjustments to planned pickup times. Real-time communications emanating from scheduling systems to transport personnel can minimize delays, ensure the most productive use of the personnel, and eliminate unnecessary travel (or wait) time.
- **Resupply notifications.** Many inpatient units stock small amounts of medications and medical supplies whose administration cannot be delayed while an order for one of those items is delivered. To ensure that the inventory is replenished in a timely manner,

hospitals can utilize UC to trigger a replenishment request to central supply or the pharmacy immediately upon the withdrawal of such items from "floor stock," minimizing both inventory costs and the risk of subsequent "stock-outs."

- **Emergency blood draws.** When stat lab tests are ordered for a hospital patient, a telephone call must often be initiated to the laboratory to page a phlebotomist to the patient unit to draw the specimen and transport it to the laboratory. The integration of UC into the order entry process, with its combination of presence and location services, can be used to trigger a text message to the appropriate resource, eliminating the need to initiate a separate telephone call or page.
- **Schedule changes.** Delays in one department may have a cascading impact on resources not only in that department but in others as well. In conjunction with the definition of clear business rules, UC can be employed to send update notifications to impacted parties, specifying the nature of the change and information such as the rescheduled time. Using predefined business rules that minimize the impact of schedule changes, such notifications can allow impacted resources to rearrange their workflows to make the most effective use of their time in light of the change.
- **Mass notifications.** Many hospital departments maintain call or paging lists related to group notifications for specific events, such as a major disaster in the community that would require the mobilization of resources to the emergency department. UC could be employed to facilitate the initiation of such mass notifications. Applying UC technologies similar to those in the Care1st application described earlier can enrich the content of such notifications. In addition, the capabilities of the technology can more effectively manage the response process and subsequent rounds of follow-up communications.
- **Consultation requests.** In many hospitals, particularly academic medical centers, each clinical specialty maintains a schedule of attending physicians from the department who are "on call" to other physicians seeking a consultation from a specialist. Such consultation requests are typically made through the page operator, who maintains the lists created by each clinical department. With UC, call lists can be created and maintained electronically by each clinical department and consultation requests can be made directly by the requestor through any UC-enabled device, eliminating the need and time required to contact the page operator.

- **Discharge facilitation.** The discharge of an inpatient sets into motion a series of events that must be carefully orchestrated to ensure that the patient is transported from his or her room in a timely manner and that nursing, housekeeping, admitting, and the patient's attending and consulting physicians coordinate their efforts to ensure that the patient is discharged in a timely manner, the vacated room is prepared for the next admission, and all parties involved are aware of the current status of the vacated room. Minimizing "bed turnaround time" is critical to the efficient admission of the next patient and has significant revenue implications for the hospital. Incorporating UC into this process can assist in sending out the requisite status update notifications with minimal manual interventions.

In each of these examples, and many more like them, UC can enhance process quality and improve productivity by automatically initiating the communication based on predefined business rules. Further, by exploiting the "presence" capabilities and business rules inherent in UC, hospitals can structure these communications processes to maximize the certainty that the intended party or an appropriate alternate can be reached in real time; thus, they can avoid simply leaving a message.

ESSENTIAL GUIDANCE

UC and the technologies that enable it are quickly becoming vital components 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:

- **Transition telecom to IT.** The first challenge will be migrating telecom staff and functions to the IT department. Certain processes such as help desk functions should be integrated; telecom help should be combined with the IT help desk function, although handled by staff with the appropriate skill set. Healthcare organizations need to establish and maintain a business focus, a step that is often, unfortunately, skipped by many organizations. A senior-level individual should be assigned to the task of managing enterprise communications and collaborative tools to improve not only business processes but also clinical processes.
- **Expose "boring applications" that drive the healthcare organization.** Before seeking a new UC solution portfolio, healthcare organizations must understand how both administrative and clinical staff currently communicate with each other. For example, healthcare organizations need to 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 inefficient processes that have a high human latency factor.** Healthcare organizations should seek to identify communications processes that are highly inefficient, such as those for which the first-attempt success rates are lowest, the time required to successfully complete the contact is greatest, and the response delays are the longest and the consequences of those delays pose the greatest potential patient risks or represent significant avoidable costs. Healthcare organizations should involve the user community to help identify these processes. Engaging end users to help identify "broken" processes will help garner support for staff participation in pilot projects and help achieve a "quick win." Both actions will encourage the requisite process change required for rolling out UC technology more widely.
- **Engage physician and nurse champions for clinical communication processes.** Healthcare organizations need to identify clinical leaders who are well respected among their peers not only for their clinical expertise but also for their thought leadership on matters in which 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.
- **Assess current IT infrastructure, telecom equipment, and service provider contracts.** Key considerations include investment protection, vendor standardization or multivendor environment, and use of common IT standards (e.g., SIP, XML). Healthcare organizations simply cannot afford "rip and replace" strategies. Consequently, and where practicable, they should extend 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, 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.
- **Educate the user community about how UC can positively impact communications.** 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. Several of the organizations interviewed as part of our research reported that the more successful pilot projects were those in which users described to IT how they envisioned the technology could be used to solve their communication challenges. St. Luke's use of

Web conferencing to connect a young cancer patient to his classmates is one such example. Healthcare organizations should identify case studies highlighting innovative UC applications at other provider organizations. Once the various UC components are in place, end-user teams can often devise their own communication processes and through viral, internal marketing of the solution encourage other colleagues to adopt the solution for their own purposes.

- **Require vendors to provide ROI and other empirical studies.** As with any other major IT investment, healthcare organizations are encouraged to ask vendors to provide objective studies that show how their solution will yield a positive ROI. In addition, clinicians respect empirical data and will respond favorably to peer-reviewed studies that demonstrate the clinical efficacy of using UC in clinical settings.

PARTING THOUGHTS

The healthcare working environment is fast paced and communication intensive. UC deployment 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 UC deployment are many and far broader than merely those associated with UM. Although healthcare providers are very early in the 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 UC technologies by healthcare providers over the next several years.

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