

Improving Patient Care with UC Technologies

How Acute Care Hospitals Benefit from UC

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Executive Summary



Executive Summary

- There are over 23,800 hospitals in the world, and this number is growing rapidly with an aging population. The healthcare industry is the perfect target for unified communications technologies (UC). Not only does UC improve urgent care, but it also allows healthcare providers to be successful in implementing more effective electronic records systems and improving customer satisfaction. Clearly, there is great potential for UC vendors in the healthcare industry.
- Some of the most popular communications technologies that hospitals have been investing in include Wireless Local Area Network (WLAN) infrastructures, Electronic Health Records (EHR), mobile devices and mobile applications, and upgrades to more advanced enterprise communications solutions.
- Hospitals have been among the earliest adopters of Wireless Local Area Network (WLAN) architectures. This solution has now become a key investment priority, as it enables data access (such as mobile EHR, administration of drugs, and equipment monitoring) to be available anytime and anywhere. Today, Frost & Sullivan estimates that over 60 percent of the world hospitals have some sort of WLAN infrastructure in place. More than 20 percent of them have full coverage. Main drivers for deployment include:
 - Improved patient care (by increasing the point-of-care opportunities for information access)
 - Efficient caregiver-to-caregiver communications
 - Robust delivery of applications and information technologies
- While some healthcare institutions operate in poor conditions and have a limited budget to spend on IT or communications technologies, others can invest as much as five to seven percent of their total annual budget in IT and telecom projects. Technology investments may include hardware, software, and/or IT services.

Source: Frost & Sullivan analysis.

Executive Summary (continued)

- IT investments for EHR continue to grow. Regions such as Europe and the United States have set up concrete plans to create a national-level health information network, which will be extensively available to hospitals by 2015.
- In an effort to either comply with evolving government standards or enable more efficient access to patient information, more hospitals are investing in EHR technology than ever before:
 - The U.S. Federal Government's HITECH Act has provided billions of dollars in stimulus funding to help hospitals switch from paper records to digital, electronic records. HIMSS ([Healthcare Information and Management Systems Society](#)) Analytics estimates that in 2011, hospitals invested between 46.5 percent and 48.3 percent of their total IT budgets in IT applications such as EHR and RCM software.
 - According to Frost & Sullivan's research, penetration of EHR software is projected to increase dramatically over the forecast period, from about 12 percent to approximately 90 percent in 2016.
- Mobile devices maintain a good portion of IT spending among hospitals. Endpoints such as Voice Over WLAN (VoWLAN) single-mode devices and Digitally Enhanced Cordless Telephony (DECT) phones have been very popular choices because they allow effective communications in hospital corridors. Both VoWLAN single-mode devices and DECT phones are expected to enjoy double-digit growth rates in terms of shipments and revenues over the next few years for the following reasons:
 - Mobile applications have also been key for healthcare IT. Due to the increased use of personally owned advanced smartphones and tablets by physicians and patients, more hospitals are taking a closer look at employing mobile apps (applications).
 - Additionally, the popularity of healthcare-related mobile apps (which now surpasses 20,000) has forced hospitals to explore how to leverage them effectively. Options include self-owned apps, home-made apps, or acquired mobile apps for a specific task or purpose.

Source: Frost & Sullivan analysis.

Executive Summary (continued)

- There is a high demand for mobile apps in areas such as medical record tracking, nursing orders and calls, X-ray tracking, and patient ID management. They are key elements of information needed by mobile healthcare workers. Some benefits include better clinical processes, increased patient safety, and improved personal communications.
- HCA East Florida is a good example of an institution that has invested in a mobile smartphone application. It has partnered with AirStrip Technologies to supply the company's AirStrip Cardiology software to HCA doctors on iPhones and iPads. As the mobile device market continues to grow in the healthcare industry, more hospitals are expected to invest in mobile applications.
- Hospitals often lag behind industries such as financial services or retail with regard to implementing advanced IP communications and collaboration solutions. While more progressive hospitals already run IP telephony systems and integrate voice, data, and video applications into a single, streamlined IT infrastructure, other institutions still prefer to keep their legacy architectures in place. These hospitals prefer to run TDM PBX systems and self-contained communications solutions separately for a variety of reasons including security, QoS, limited budgets, compliance regulations, economic uncertainty and lack of confidence in advanced technologies. In fact, due to the mission-critical nature of the industry, a number of "IP-enabled" hospitals are taking gradual steps towards converged networking, rather than completely overhauling existing infrastructure.
- Frost & Sullivan estimates that IP telephony penetration in hospitals with over 100 beds will increase from 32 percent in 2011 to over 80 percent in 2017.

Source: Frost & Sullivan analysis.

Executive Summary (continued)

- WLAN infrastructures, EHRs, mobile devices, mobile applications, and advanced enterprise communications systems may all be considered the essential building blocks and enablers of a unified communications architecture. Some tech-savvy hospitals have gone a step further to improve communications between healthcare and non-healthcare members by deploying integrated UC architectures, rather than deploying individual elements of the UC stack in a TDM world.
- The following analysis will allow telephony providers and UC solution vendors to:
 - gain insight into the main drivers and challenges for the adoption of unified communications solutions in the healthcare sector
 - understand demand patterns
 - evaluate global expansion
 - analyze evolving competitive trends
 - determine major strategic considerations to take into account

Note: For the purpose of this study, Frost & Sullivan defines unified communications as including both:

- individual UC-related communications applications such as VoIP, videoconferencing, unified messaging, telepresence, Web conferencing, audio conferencing and IM/presence.
- fully integrated UC solutions (which is a unified client, deployed in conjunction with a presence server as part of the integration of a set of applications including VoIP, IM/chat, voice/unified messaging and conferencing).

Source: Frost & Sullivan analysis.

Executive Summary—CEO's Perspective

1

Communications and collaboration are at the heart of delivering quality healthcare and wellness.

2

In order to succeed, vendors must demonstrate a defined approach/capability for integrating UC with clinical systems.

3

Services must be offered to assist organizations with best practice change management and help them to align these technologies with workflow efficiencies.

4

Clear success factors must be demonstrated, whether measured in quantifiable ROI, or documented qualitative benefits such as patient safety and patient satisfaction.

5

To achieve higher growth rates, investments should be focused in areas such as care-at-a-distance, mobility and collaborative applications.



Source: Frost & Sullivan analysis.

Market Overview



Definitions

Exchange

An exchange is a switching matrix that runs intra-office telephone calls over a private network. There are two types of exchanges (also known as systems):

- **Traditional:** A traditional telephony system is defined by its use of legacy signals to communicate. These systems rely on a time-division multiplexing (TDM) mechanism and use signals/protocols such as Q/sig and DPNSS. The only other defining characteristic that sets it apart for the purpose of our research is that it does not support an IP-based protocol stack.
- **IP telephony system:** An IP telephony system is defined as one that supports an IP stack. Included in this category are the following: IP-enabled systems, converged systems, and native/pure-IP systems.

Key Telephony System (KTS) and Private Branch Exchange (PBX)

These systems connect analog, digital, DECT and other non-IP terminals to the PSTN. A “line” is used to denote an endpoint/station such as a telephone or a telephone extension.

Converged KTS or PBX

A converged system is an integrated exchange that supports both legacy technologies as well as IP. A “line” is used to denote an endpoint/station such as a telephone extension or a user license.

Native or Pure IP PBX

A native IP PBX can be either an exchange, a call router, or a client-server application. It does not support non-IP terminals natively. A “line” is used to denote the license to use an IP terminal - typically an IP desktop phone or a communications client.

Source: Frost & Sullivan analysis.

Definitions (continued)

Unified Communications

For the purpose of this study, Frost & Sullivan defines unified communications as including both:

- Individual UC-related communications applications such as VoIP, videoconferencing, unified messaging, telepresence, Web conferencing, audio conferencing and IM/presence.
- Fully integrated UC solutions (which is a unified client, deployed in conjunction with a presence server as part of the integration of a set of applications including VoIP, IM/chat, voice/unified messaging and conferencing).

UC solutions are meant to simplify communications for end users by giving them ubiquitous access to various tools. A complete UC solution must integrate capabilities such as PC-based presence, telephony presence, point-to-point voice calling, chat, audio conferencing, web conferencing, PC-based video, find-me/follow-me features and unified messaging into a single unified client. A UC solution may also include mobile clients, APIs for integration with other applications, social networking features, integration with room-based voice conferencing, contact center functionalities, location information and integration with business software.

WLAN and VoWLAN Architectures

A Wireless Local Area Network (WLAN) that is used in an enterprise setting helps transmit data and information through WLAN-enabled devices and endpoints. Typically, the WLAN uses switch-based architecture and consists of an integrated suite of access points, controllers, and other layer 2/3 components. In a VoWLAN implementation, voice over IP (VoIP) is also transmitted to VoWLAN-enabled devices. Typically, controllers are connected to the analog or digital station ports on the facility telephone switch. The controller sends calls to the VoWLAN device through a network of access points strategically located throughout the building. WLAN controllers centrally manage the access points and configure them. The security, service, and performance of the system are usually defined on the controller. WLAN access points provide the wireless communications channel between the VoWLAN device and the controller.

Source: Frost & Sullivan analysis.

Definitions (continued)

Healthcare-related Terminologies:

Nurse Call Systems: Electronically operated systems that allow patients or personnel to call or interact with a nurse from a bedside station or from a duty station.

Electronic Health Records: An electronic health record (EHR) is the digitized medical record of an individual patient that is created and maintained within a professional medical setting (e.g., hospital or physician's office that is used by physicians, nurses, and ancillary medical staff). An electronic health record (EHR) used in the hospital setting consists of various functionalities related to the documentation of patient care. Different terms are used to refer to these systems that offer an electronic version of a patient's information, including an electronic patient record (EPR), an electronic medical record (EMR), a computer-based patient record (CPR) and a medical records system (MRS).

Picture Archiving and Communications System: Picture archiving and communications systems (PACS) allow for the management of digital images for everything from archiving the data for patient records to allowing radiologists and physicians to access images to diagnose a patient or perform an image-based procedure.

Computerized Physician Order Entry: CPOE (Computerized Physician Order Entry) systems help to prevent medication-related adverse events (ADEs). Most countries have recognized the important role technologies such as CPOE are likely to play in bridging one of the largest gaps in healthcare priorities.

HIPAA: Health Insurance Portability and Accountability Act (HIPAA) was created in 1996 to protect patient records and promote national uniform security standards for the secure electronic transmission of health information.

Source: Frost & Sullivan analysis.

Definitions (continued)

Healthcare-related Terminologies:

HL7: Health Level Seven International (HL7) is a global non-profit organization that focuses on standards for interoperability of health information technology; it has members in over 55 countries. It is involved in the development of a framework for integration, sharing and retrieval of electronic information that supports clinical patient care and the management, delivery and evaluation of healthcare services. The main objective of this organization is to establish a flexible, cost-effective environment as well as create standards, guidelines, and methodologies to facilitate interoperability between various healthcare systems. To meet the requirements of the ICT and healthcare sectors, HL7 collaborates with other standards development organizations such as ISO, TC251 and Health Insurance Portability and Accountability Act (HIPAA).

IHE: Integrating the Healthcare Enterprise (IHE) is an international interoperability program that strives to offer continuity and integrity of patient Information, clinical workflow optimization, promotion of emerging standards, and communications among diverse healthcare information systems.

PPACA: The Patient Protection and Affordable Care Act (PPACA) is a United States federal statute that was passed by Congress and signed into law by President Barack Obama. PPACA changes private and public health insurance variables such as increasing insurance coverage, providing insurance access to over 30 million Americans, and raising total national medical expenditure.

HITECH Act: The Health Information Technology for Economic and Clinical Health Act (HITECH), part of the American Recovery and Reinvestment Act of 2009 (ARRA), aims to advance the use of health information technology tools like electronic health records (EHR) and electronic health information exchange (HIE). Through HITECH, the U.S. government plans to allocate about \$19 billion in federal stimulus funds over the next few years to hospitals, office-based doctors, and state entities such as HIE organizations.

Source: Frost & Sullivan analysis.

State of the Market

- Healthcare providers have been lagging behind other industries in the deployment of IP telephony and UC technologies.
- Past adoption of enterprise communications was limited to specific case scenarios related to the integration of communications with specific value-added solutions such as alarming, messaging, monitoring and nurse call systems.
- Challenges such as the economic downturn, complex security/certification requirements, strict regulations, lack of confidence in new technologies, limited budget, and prioritization of other healthcare-related technologies such as electronic medical records, have further limited the opportunity to deploy advanced enterprise communications.
- During the last two to three years, however, this picture has been considerably changing. Trends such as mobility, consumerization, improved in-patient experience, the integration of UC with communications enabled business processes (CEBP), and the increased recognition of productivity benefits granted by IP telephony and unified communications technologies, have been transforming the image of IP telephony and UC from nice-to-have technologies to becoming core elements of an overall health information technology solution.
- More hospitals are understanding and learning about the characteristics and benefits of the various elements of the UC stack, including conferencing solutions (audio-, video-, and Web conferencing), unified messaging, presence, IM, collaborative team spaces, and mobile UC. While the implementation of full-blown UC architectures is still very limited to acute care institutions, many hospitals have already implemented one or two components of the UC stack, forging the way to more advanced and fully-integrated UC solutions.
- Hospitals offer high growth opportunities for IP telephony and UC implementation. Frost & Sullivan estimates that more than 7,600 hospitals with over 100 beds have already implemented IP telephony and expects penetration to grow from 32 percent in 2011 to around 80 percent in 2017.

Source: Frost & Sullivan analysis.

State of the Market (continued)

Improving Patient Care with UC Technologies: General Characteristics of the Acute Care Vertical Related to the Implementation of UC and Advanced Communications (Global), 2011

Mobility	Mobility is key. Almost 100 percent of the acute care staff is mobile, composed of physicians, surgeons, and nurses.
Workflows	UC applications are much more aligned with clinical workflows and/or business process applications than in other verticals.
Mission-Critical	Advanced communications must comply with the mission-critical nature of the institution. Low tolerance makes for unique challenges.
Limited Budgets	Sales process is often lengthier and margins are usually small. Other technologies are likely to win the battle.
Government vs Private	Government vs. private funding is an important factor in the purchase decision.
Decision-Making Process	Due to the diverse nature of employees and decision influencers inside a hospital, many Healthcare CIOs gather internal consensus for solutions that address the larger organization's needs (as opposed to the demands of a single department).

Source: Frost & Sullivan analysis.

UC Opportunities

Improving Patient Care with UC Technologies: Benefits and Opportunities behind the Implementation of UC and Advanced Communications (Global), 2011



Source: Frost & Sullivan analysis.

Drivers and Restraints



Drivers—Impact and Duration

Drivers	1-2 Years	3-4 Years	5-7 Years
UC improves productivity; cost-related gains are critical for growth in a slow-to-adopt industry.	H	H	H
The proliferation of intelligent mobile devices generates demand in highly mobile facilities.	H	H	H
Consumerization and higher expectations of both patients and employees create demand for UC implementation in hospital environments.	H	H	H
The need for efficient workflow in urgent care environments drives demand for UC and CEBP.	M	M	M
IP telephony adoption accelerates the move to next-generation UC solutions and communications technologies.	M	M	M

Impact Ratings: H = High, M = Medium, L = Low

Source: Frost & Sullivan analysis.

Drivers—Impact and Duration (continued)

Drivers	1-2 Years	3-4 Years	5-7 Years
Increased popularity of remote care and consultation augment the adoption of conferencing solutions.	M	M	M
Growth of pervasive WLAN systems and the uptake of new voice-enabled WLAN standards.	M	M	M
Global growth of EMR system deployments.	L	M	H
Healthcare staffing shortage in different regions of the world generates a need for new technologies that improve employee utilization and efficiency.	L	L	L
Increased attention to outbreak preparedness inspires the industry to attain better technologies to respond to pandemic outbreaks or bioterrorist threats.	L	L	L

Impact Ratings: H = High, M = Medium, L = Low

Source: Frost & Sullivan analysis.

Drivers Explained

UC Improves Productivity; Cost-related Gains are Critical for Growth in a Slow-to-adopt Industry

Unified communications improves the utilization and productivity of hospital staff. IP telephony and UC technologies allow for the availability of information anywhere and anytime across multiple types of endpoints. By being able to reach each other using various means of communications (e.g., IM, conferencing, and e-mail), UC allows highly mobile and dispersed employees in the healthcare industry to be more efficient on a day-to-day basis. Technologies such as UC and IP communications reduce costs through the optimization of personnel, the integration of separate networks, the reduction in telecommunications expenses, the elimination of unnecessary steps, and the reduction of travel expenses.

Source: Frost & Sullivan analysis.

Drivers Explained (continued)

The Proliferation of Intelligent Mobile Devices Generates Demand in Highly Mobile Facilities

Mobility in the healthcare environment is more important than in any other industry. The main objective is to make better and faster decisions by using technology to bring all of the relevant information to the patient. Many hospital institutions are aggressively pursuing mobile technologies to deliver better care at the bedside.

While secure, standard hospital-owned devices (such as wireless phones, Computers on Wheels, DECT phones and laptops with a mobile broadband card) have been popular in the healthcare space, personally-owned devices (such as smartphones and tablets) have also been adopted by many healthcare practitioners. With smartphones becoming more powerful, personal monitors becoming more sophisticated, and a new generation of tablets exploding in the market, many acute care institutions are seeking ways to take advantage of these types of devices. Today, the lines between what physicians do on desktop computers and mobile devices continue to blur.

Mobile apps that integrate with healthcare-related systems, such as EHR, eRX (electronic prescribing), and CPOE, have been most common. Integration with UC capabilities through enterprise FMC (fixed-mobile convergence) and mobile UC clients is also expected to gain popularity. However, with FMC and mobile UC, different issues related to end-to-end security, reliability, corporate policies, and management, still have to be resolved.

Source: Frost & Sullivan analysis.

Drivers Explained (continued)

Consumerization and Higher Expectations of both Patients and Employees Create Demand for UC Implementation in Hospital Environments

In less than three years, the iPhone became mainstream in over 80 percent of the Fortune 500 companies. In less than two years, the number of Android business users reached three million. In under one year, tablets have gone from nice-to-have to must-have technologies among technology-savvy as well as mainstream buyers.

Today, an increasing number of healthcare employees are bringing their high-end smartphones and tablets to work to check email, receive healthcare alerts, access medical reference tools, use diagnostic apps, communicate with peer workers, or to stay on top of medical advances.

Likewise, patients are increasingly using these types of devices to research hospital institutions, diseases, and treatment options; to have access to their personal medical records; and to communicate with other individuals with similar conditions.

With consumerization, both healthcare employees and patients have access to information when and where they want it. Healthcare employees expect to have instant access to healthcare systems and colleagues. Patients, at the same time, expect healthcare institutions to be able to interact or integrate with their personal apps such as a Personal Health Records (PHR).

As a result, more hospitals will take advantage of the consumerization trend and embrace UC tools to meet new user expectations.

Source: Frost & Sullivan analysis.

Drivers Explained (continued)

The Need for an Efficient Workflow in Urgent Care Environments Drives Demand for UC and CEBP

The greatest benefits from UC are attained through advanced integration between commonly used clinical applications (such as patient charting, PACs, CPOE) and UC technologies. Many UC vendors are focusing on integrating UC technologies with communications enabled business processes. For example:

- Avaya is using its Agile Communications Environment (ACE) software to enable healthcare IP developers to integrate communications into their software offerings.
- Recently, Carefx, a healthcare IT provider, leveraged ACE to develop communications enabled business processes (CEBP) for the healthcare industry. The Carefx system allows healthcare employees to connect with the appropriate people in a timely manner improving consultations and information management, and reducing the time for patient discharge. The Carefx solution is just one example of how UC could integrate with CEBP to improve healthcare workflows.

These solutions inject communications into certain healthcare processes to help practitioners locate specialists and experts, accelerate decision making, streamline workflows, and improve patient care. The goal is to give a portal to practitioners at large hospitals and clinics so they can easily access information and expertise. By embedding presence and click-to-call capabilities within the portal and its various data systems, the solution makes it easy for clinicians to communicate with their colleagues.

Source: Frost & Sullivan analysis.

Drivers Explained (continued)

IP Telephony Adoption Accelerates the Move to Next-generation UC Solutions and Communications Technologies

Frost & Sullivan estimates that more than 7,600 hospitals with over 100 beds have already implemented IP telephony and expects penetration to grow from 32 percent in 2011 to around 80 percent in 2017. UC vendors indicate that every healthcare provider they worked with over the last few years replaced their TDM PBX infrastructure with an IP telephony one. In spite of multiple challenges, IP telephony adoption is expected to grow due to promotional bundles, price reductions, and the embracement of SIP architectures.

Software Advice, an Austin-based resource for software buyers, found that there are surprisingly few medical-specific IP PBX applications for healthcare organizations. The company decided to create a list of applications that could be developed by the Asterisk community such as:

- Patient screen-pops – when a patient calls, the caller ID feature recognizes his/her number and patient's data appears in the practice management system
- Appointment reminders – the system will automatically call the patient to remind them of an upcoming appointment
- Dunning voicemails – this module automatically calls and leaves a voice message to patients who have missed their payments
- Patient-centric recordings – when a patient calls, they hear a custom recording based on their billing or appointment status
- EMR combined with UC features – presence and IM can be included within an IP PBX platform

Source: Frost & Sullivan analysis.

Drivers Explained (continued)

Increased Popularity of Remote Care and Consultation Augment the Adoption of Conferencing Solutions

Healthcare practitioners are increasingly adopting interactive video or videoconferencing. The number of telemedicine programs around the world is growing. They are encompassing diverse medical fields. Until a few years ago, the costs of telemedicine videoconferencing systems and transmission services were too high, but prices have declined substantially. At the same time, there has been substantial improvement in endpoint functionality and video quality. Moreover, obtaining reimbursements for telehealth has become easier through regulatory changes.

Video and Web conferencing tools allow participants to deliver video images and documents to distant locations so they can collaborate and share information more efficiently. For example, a hospital-based radiologist can discuss an urgent case with a pulmonologist who is at home, sharing the patient's x-rays and other relevant exams.

Today, many hospitals use audio, video and Web conferencing tools in telemedicine to reduce travel time and costs, accelerate the exchange of patient information between hospitals, deliver medicine to remote areas, and conduct long-distance medical lectures, seminars and conferences.

Source: Frost & Sullivan analysis.

Drivers Explained (continued)

Growth of Pervasive WLAN Systems and the Uptake of New Voice-enabled WLAN Standards

The healthcare industry has been one of the earliest adopters of WLAN infrastructure, with over 60 percent of the world's hospitals having some WLAN implementation in place, and more than 20 percent having full-coverage. Some of the main drivers of WLAN include:

- Improved patient care (by increasing the point of care opportunities for information access)
- Efficient caregiver-to-caregiver voice and data communications
- Robust delivery of applications and information technologies

Hospitals have also been implementing Voice over WLAN (VoWLAN) endpoints as part of their mobility strategy. In fact, today, healthcare remains the dominant vertical in terms of VoWLAN single-mode endpoint implementation, with 61 percent of the world single-mode phone market units.

The growth of WLAN systems and voice-enabled WLAN standards enable the implementation of UC and advanced communications technologies as part of a hospital's mobility strategy. Technological breakthroughs for devices such as smartphones and tablets enhance the value of UC.

Source: Frost & Sullivan analysis.

Drivers Explained (continued)

Global Growth of EMR System Deployments

Some healthcare analysts believe that the adoption of EMR systems places a great deal of pressure on IT resources, and minimizes investments in UC and advanced communications technologies. However, Frost & Sullivan believes that the accelerated adoption of EMR may eventually persuade acute care institutions to upgrade to UC and other technologies.

One of the greatest challenges in EMR/EHR adoption has been the disruption it creates to the clinical workflow. A recent CDW survey, which interviewed 200 physicians, found that there could be a 10 percent loss in workflow and a 25 percent decline in patient visits during the first year of an EMR implementation. Training as well as adherence to government rules and guidelines are key to avoid productivity and workflow loss. The implementation of advanced UC technologies, along with or after the implementation of an EMR system, can also greatly improve staff collaboration and staff accessibility, allow anywhere/anytime access to information, and facilitate remote support and training.

Source: Frost & Sullivan analysis.

Drivers Explained (continued)

Healthcare Staffing Shortage in Different Regions of the World Generates a Need for New Technologies that Improve Employee Utilization and Efficiency

The number of patients and incidence rates are growing far faster than the influx of new caregivers. Hospitals and other healthcare institutions need to find tools such as UC to enable their existing staff to be more efficient. Advanced scheduling techniques and workforce management solutions are good examples.

Increased Attention to Outbreak Preparedness Inspires the Industry to Attain Better Technologies to Respond to Pandemic Outbreaks or Bioterrorist Threats

Human and non-human provoked threats such as terrorist attacks and pandemic outbreaks place pressure on acute care hospitals to quickly and efficiently respond to such catastrophic circumstances. UC can considerably improve the institution's workflow by allowing hospitals to quickly gather, organize and respond to the urgent requirements and influx of patients that emerge from such unexpected events. UC also makes it easier for healthcare facilities to adapt to the various circumstances of the incident. During the swine flu epidemic, for example, different conferencing solutions allowed various physicians, pharmacists, and other healthcare givers to assist and provide services to patients that required either evaluation or treatment; this prevented the possibility of getting an infection.

Source: Frost & Sullivan analysis.

Restraints—Impact and Duration

Restraints	1-2 Years	3-4 Years	5-7 Years
Policy and regulatory issues deter the adoption of UC and advanced communications	H	H	H
Privacy and security concerns prevent many hospitals from implementing new IT/Telecom solutions	H	H	H
Low tolerance for failure associated with potential downtime of communications systems or applications	H	H	H
Lack of awareness and fear of complex applications makes it difficult to gain traction in the healthcare industry	H	H	M
Other technologies, such as EMR systems, are often a higher priority and compete with UC for funding	H	M	L

Impact Ratings: H = High, M = Medium, L = Low

Source: Frost & Sullivan analysis.

Restraints—Impact and Duration (continued)

Restraints	1-2 Years	3-4 Years	5-7 Years
The effect of the economic downturn still lingers preventing technology investment	H	L	L
Limited budgets in healthcare institutions such as public hospitals negatively impact technology adoption	M	M	M
Interoperability and integration concerns diminish demand for UC technologies	M	M	M
Some UC vendors are unable to demonstrate solid understanding of services	M	M	M
Lack of skilled IT staff in hospital environments deters them from investing in UC	L	L	L

Impact Ratings: H = High, M = Medium, L = Low

Source: Frost & Sullivan analysis.

Restraints Explained (continued)

Policy and Regulatory Issues Deter the Adoption of UC and Advanced Communications

The healthcare sector continues to face several regulation compliance issues globally, keeping healthcare executives and IT departments always on the alert.

HIPAA regulations, adoption of ICD-10 (International Classification of Diseases) and implementation of certified electronic health records are just a few of the industry and government-imposed mandates that must be satisfied. Healthcare providers face multiple challenges in complying with these regulations. These requirements can be costly, disruptive to work flow, and may negatively impact patient care if not deployed properly.

The lack of uniform regulations around various UC technologies have resulted in issues related to connectivity, health insurance reimbursement, security and privacy problems. Today, any UC implementation in a hospital should be designed to comply with current government regulations as well as adapt to future policies.

Source: Frost & Sullivan analysis.

Restraints Explained (continued)

Privacy and Security Concerns Prevent Many Hospitals from Implementing New IT/Telecom Solutions

Government and industry regulations concerning the privacy and security of patient information dictate enterprise-level security mechanisms. To keep up with data security and privacy, many UC vendors are obligated to offer solutions that comply with the variety of healthcare-related ordinances present in each region. Failure to comply with these regulations can be subject to increased penalties for policy violations.

A recent study conducted by the Ponemon Institute, which is a research center dedicated to privacy, data protection and information security policy, revealed that data breaches could cost the healthcare facilities \$6 billion annually. The Massachusetts General Hospital has recently lost \$1 million to the U.S. Department of Health and Human Services because a hospital employee lost patient records on a train. Tools such as centralized management and encryption and authentication capabilities should be included as part of a UC solution.

Source: Frost & Sullivan analysis.

Restraints Explained (continued)

Low Tolerance for Failure Associated with Potential Downtime of Communications Systems or Applications

Potential downtime associated with technology migration delays the decision to acquire new communications technologies. The mission-critical nature of hospital environments further discourages the implementation of new technologies. Vendors face the challenge of providing UC and advanced communications solutions that ensure consistent uptime, efficient redundancy and disaster recovery options.

Lack of Awareness and Fear of Complex Applications Makes it Difficult to Gain Traction in the Healthcare Industry

Product complexity, lack of awareness of the benefits of advanced technologies, and unfamiliarity with the applications hampers mass deployments. While there is a whole new generation of tech-savvy clinicians who are more capable of quickly learning new applications, typical CxO titles (technical and clinical) do not view unified communications as a valuable investment.

Source: Frost & Sullivan analysis.

Restraints Explained (continued)

Other Technologies, such as EMR Systems, are Often a Higher Priority and Compete with UC for Funding

Competing for capital/IT investment that is primarily spent on healthcare-centric technologies (such as EMR, PACS and Radiology Information Systems (RIS) deployments) is a huge challenge for UC vendors. As awareness of the benefits of UC implementation along with EMR systems improves, this will become less of a market restraint.

The Effect of the Economic Downturn Still Lingers Preventing Technology Investment

In both developed and developing nations, governments have come forward to rescue the economic downturn with a bailout package. In spite of regional stimulus packages that encourage investments in IT around the globe, many hospitals still struggle to allocate the necessary budget for advanced communications deployments.

Source: Frost & Sullivan analysis.

Restraints Explained (continued)

Limited Budgets in Healthcare Institutions such as Public Hospitals Negatively Impact Technology Adoption

In most European economies, for example, healthcare is funded predominantly by public sources. For the past several years, the majority of European healthcare systems have been facing the challenge of guaranteeing high-quality healthcare services that is accessible to the entire population with limited public resources.

With an aging population in most countries, public health is going to face tremendous budget issues. Also, many public hospitals around the world are still dealing with pragmatic issues such as updating their old computer infrastructure or hiring more personnel. These institutions are far from considering investments in advanced communications systems.

Hospitals that face severe budget constraints are mainly found in Africa, Eastern Europe, Latin America and some specific regions of Asia.

Source: Frost & Sullivan analysis.

Restraints Explained (continued)

Interoperability and Integration Concerns Diminish Demand for UC Technologies

Interoperability and integration challenges slow down deployment of new telecom/IT solutions at acute care hospitals. The majority of hospitals in the world still run legacy TDM environments. Ripping and replacing the legacy telecommunications technology is not an option. Offering legacy customers an evolutionary path to IP and advanced communications solutions, thereby preserving features, endpoints, and other types of investments, becomes necessary.

Furthermore, UC vendors should always strive to improve the interoperability of their solutions with those of other vendors and embrace the open systems and industry-standards (e.g., SIP) that provide customers with the ability to leverage existing investments. Today, not all vendors handle all aspects of required interoperability and integration. This situation deters many acute care hospitals from purchasing advanced communications technologies and will continue to restrain growth until vendors' solutions truly integrate with each other and manufacturers embrace openness.

Source: Frost & Sullivan analysis.

Restraints Explained (continued)

Some UC Vendors are unable to Demonstrate Solid Understanding of Services

Due to the complex nature of the healthcare industry, an advanced communications deployment typically involves rigorous requirements for application integration and continuous monitoring of the solution. Solid knowledge of enterprise communications services is required. The healthcare industry is one of the strongest adopters of professional and managed services for advanced communications solutions. Due to their service-oriented business nature (24/7 or “round the clock”), hospitals need a vendor that shows excellence in the management and implementation of the solution.

Lack of Skilled IT Staff in Hospital Environments Deters them from Investing in UC

Whereas large hospitals are likely to have fully staffed IT organizations, smaller ones may have limited IT resources. Because of the nature of their tighter IT budgets, some hospitals tend to allow the lifecycle of old telephony systems to run its course.

Source: Frost & Sullivan analysis.

Demand Analysis



Demand Analysis—Customer Survey

In 2011, Frost & Sullivan surveyed 205 North American C-level executives and IT professionals across different industries to evaluate opinions on various enterprise communications topics. The Healthcare sector represented 17 percent of the survey sample, consisting of 35 healthcare C-level executives. Although the sample size is small, Frost & Sullivan considers the results to be a good indicator of demand.

Below is a summary of the most notable findings of UC awareness, adoption and demand among the healthcare participants.

- Despite the challenges and complexities present in the healthcare environment, awareness of the various unified communications components is improving.
- There is a high level of familiarity with communications and collaboration tools among healthcare executives and IT staff.
- There is a high level of awareness of video conferencing, instant messaging, and basic softphones. This comes as no surprise because:
 - Videoconferencing has enormous value in the healthcare industry; it has the potential to change patient care and transform the business model.
 - Today, IM is popular, with various healthcare firms acknowledging the value of instant communications among staff members, as well as, between patients and caregivers.
 - The high awareness of basic softphones is very likely related to the popularity of the consumer-based solutions such as Skype.
- Unified communications clients have the lowest awareness score.

Source: Frost & Sullivan analysis.

Demand Analysis—Customer Survey (continued)

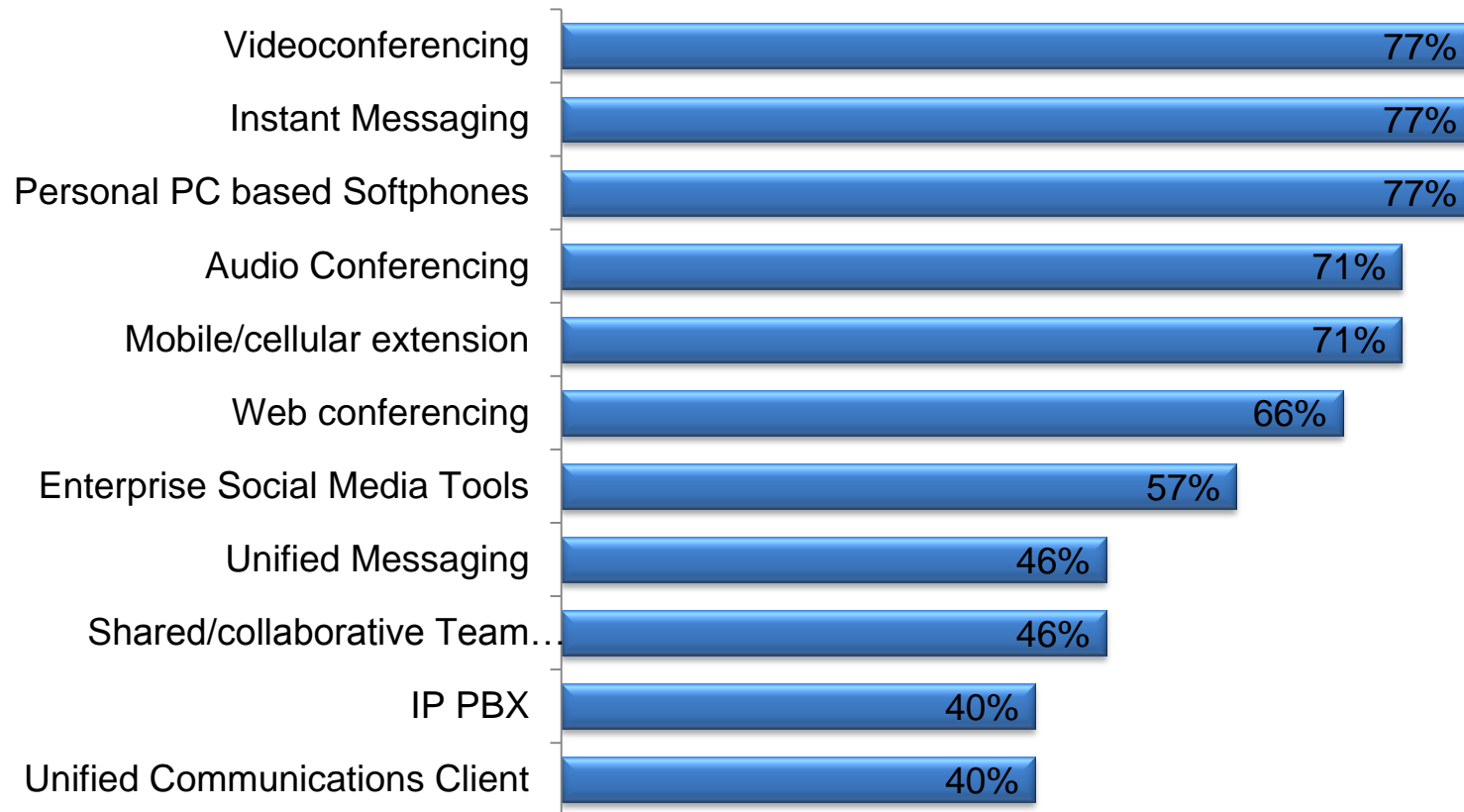
- Another important finding is that mobile/cellular phones were the highest utilized endpoints in healthcare organizations. Moreover, 57 percent of the healthcare participants indicated that they allow their staff to bring their own devices to work. They also revealed that they provided them with some level of IT support.
- While 37 percent of the participants indicated that they have already deployed a unified communications solution, another 36 percent of the participants indicated that they are either currently in the process of deploying one or have future plans to deploy it. This leaves only 27 percent of the respondents who are still hesitant or have no intention to deploy a UC solution.
- In comparison with other verticals, the healthcare sector scored the highest with regard to integrating unified communications and collaboration capabilities into business process applications. This confirms the importance of integrating UC with healthcare workflow. In fact, 48 percent of the participants that indicated that they have deployed UC, say that they have either completed or are in the process of integrating UC capabilities into business process applications. Other verticals that have completed this level of integration include: 45 percent in IT/Telecom, 42 percent in financial services, 24 percent in hospitality, 18 percent in public sector, and 17 percent in retail.
- When asked about the three most important benefits that UC brings to healthcare institutions, the following had the highest results:
 - Enhanced employee mobility
 - Improved employee work/life balance and general welfare
 - Improved collaboration and productivity across dispersed teams
 - Acceleration in decision making
 - Reduced costs

Source: Frost & Sullivan analysis.

Demand Analysis—Customer Survey (continued)

Improving Patient Care with UC Technologies: Awareness of Communications and Collaboration Tools (Global), 2011

Q1. Of which of the following communications and collaboration tools are you aware? Please select all that apply.



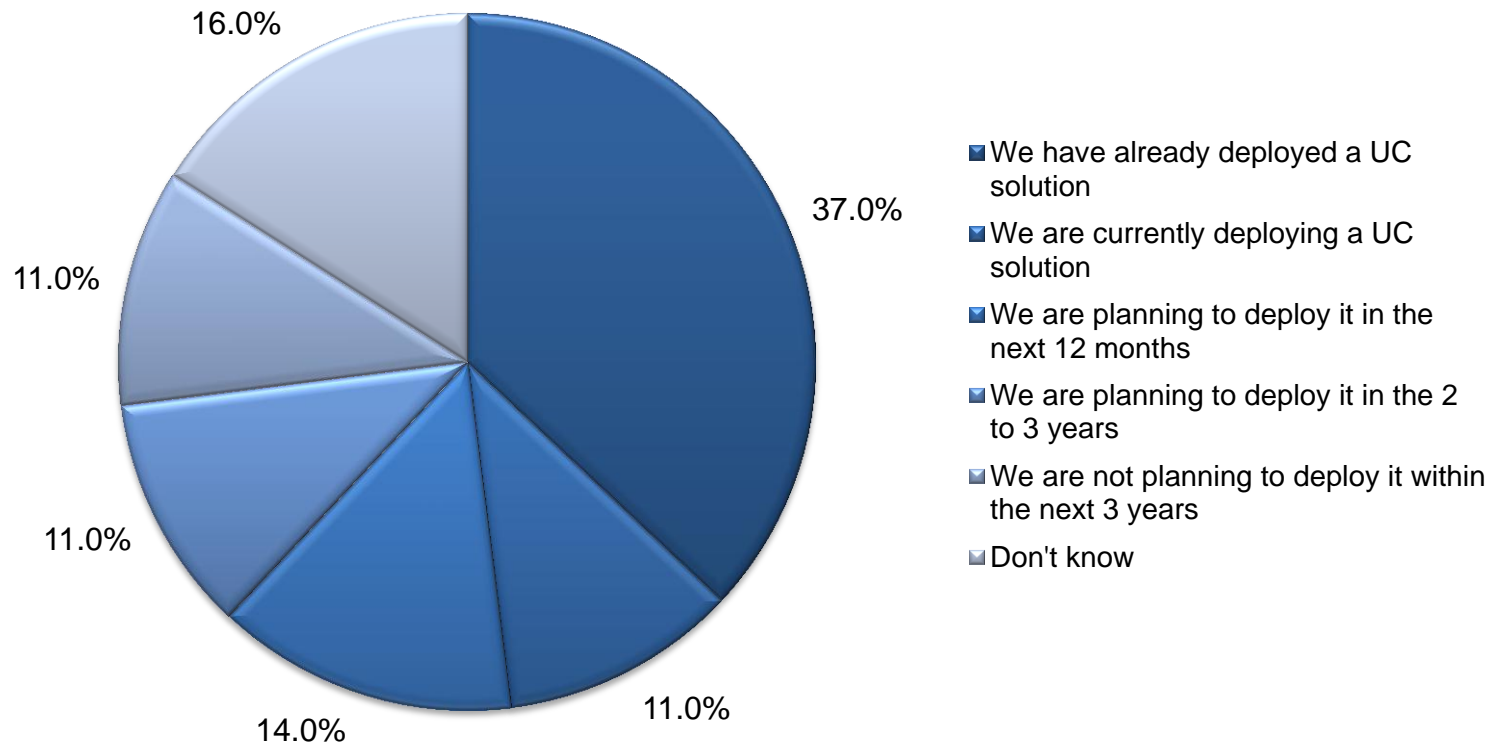
Note: N = 35 C-level Healthcare Executives

Source: Frost & Sullivan analysis.

Demand Analysis—Customer Survey (continued)

Improving Patient Care with UC Technologies: Status of Unified Communications Solution Deployment (Global), 2011

Q2. What is the status of deploying a unified communications solution in your organization?



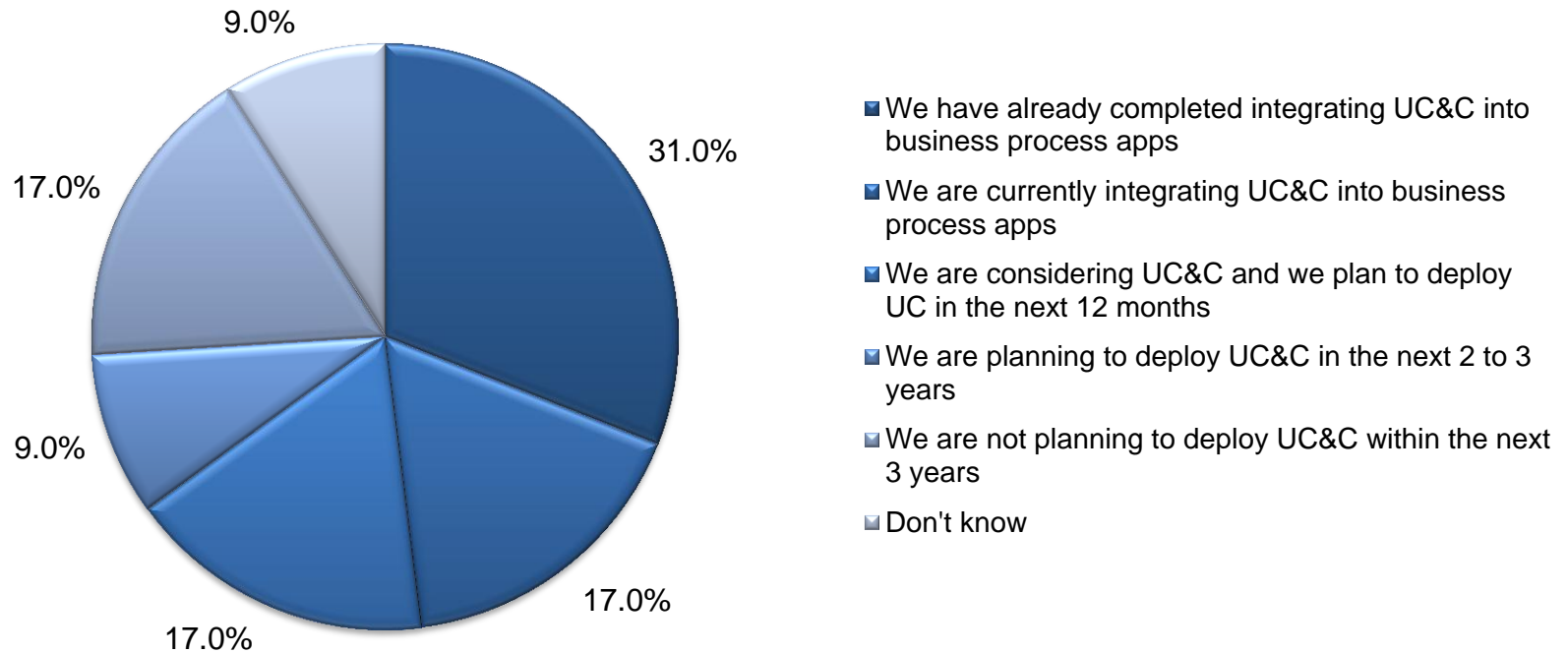
Note: N = 35 C-level Healthcare Executives

Source: Frost & Sullivan analysis.

Demand Analysis—Customer Survey (continued)

Improving Patient Care with UC Technologies: Status of UC Integration with Business Process Applications (Global), 2011

Q3. What is the status of integrating unified communications and collaboration (UC) capabilities into business process applications?



Note: N = 35 C-level Healthcare Executives

Source: Frost & Sullivan analysis.



















Demand Analysis—Vendor Perspective

- Frost & Sullivan also conducted interviews with UC vendors including Avaya, Alcatel-Lucent, Cisco, NEC, Polycom, Siemens Enterprise Communications, ShoreTel, Vertical and Vocera.
- These 10 vendors were asked to rank 12 different UC applications with regard to which ones they believe are deployed most in hospitals. They cited VoIP, Audio conferencing, unified messaging, Web conferencing, and video conferencing as the top five applications being used today.
- Applications that they believe are used least in healthcare include telepresence, social networking tools, unified communications clients, and softphones.
- UC capabilities such as IM/presence, FMC/Mobile UC, and shared/collaborative team spaces are gaining traction in the healthcare space.
- Vendors expect a significant increase in adoption of IM/presence, FMC/Mobile UC clients, and shared/collaborative team spaces over the next few years.
- Moderate to high increase in adoption of VoIP, audio conferencing, video conferencing, Web conferencing, UC clients and social networking tools is expected.
- Adoption of unified messaging and basic softphones is expected to remain stable or decline over the next few years.

Source: Frost & Sullivan analysis.

Demand Analysis—Vendor Perspective (continued)

Improving Patient Care with UC Technologies: Status of UC Integration with Business Process Applications (Global), 2011

UC Applications	Current Adoption Rate (1-lowest, 5-highest)	Expected Future Adoption			
		Low	Medium	High	CAGR (2010-2017)
VoIP	Low  High 1 2 3 4 5				
Audio Conferencing	Low  High 1 2 3 4 5				
Unified Messaging	Low  High 1 2 3 4 5				
Web Conferencing	Low  High 1 2 3 4 5				
IM/Presence	Low  High 1 2 3 4 5				
FMC/Mobile UC	Low  High 1 2 3 4 5				



Denotes the expected growth



Denotes high CAGR
(More than 15 percent)



Denotes medium CAGR
(10-15 percent)

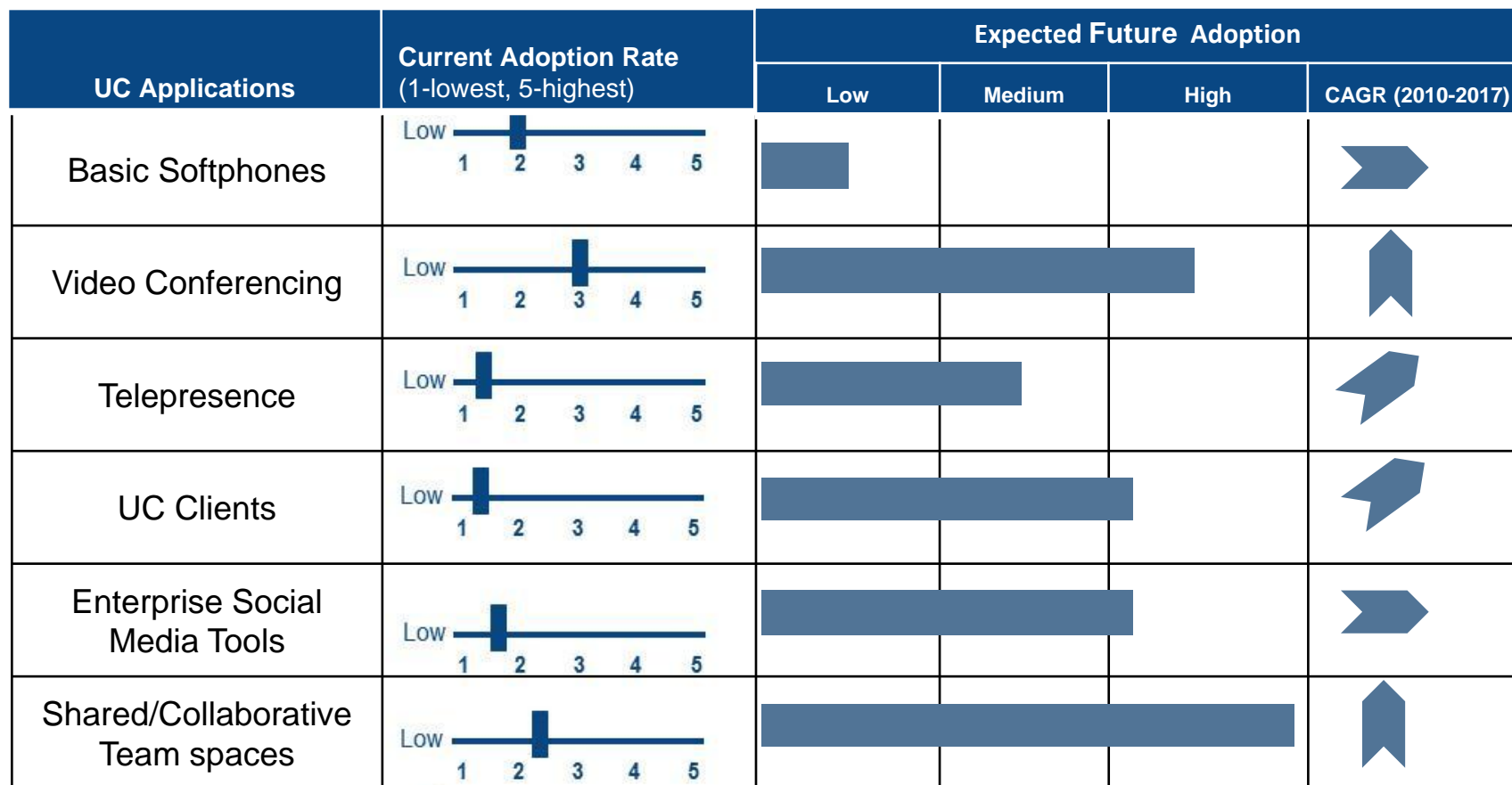


Denotes low CAGR
(Less than 10 percent)

Source: Frost & Sullivan analysis.

Demand Analysis—Vendor Perspective (continued)

Improving Patient Care with UC Technologies: Status of UC Integration with Business Process Applications (Global), 2011



Denotes the expected growth



Denotes high CAGR
(More than 15 percent)



Denotes medium CAGR
(10-15 percent)



Denotes low CAGR
(Less than 10 percent)

Source: Frost & Sullivan analysis.

Regional Findings



North America Findings

- Over 100 hospitals have VoIP and various components of the UC stack.
- The investment that local vendors made to raise awareness of UC in the healthcare industry makes this region promising for the adoption of UC.
- While only 15 percent of the U.S. hospitals use EHR systems today, approximately 90 percent of U.S. hospitals have implemented clinical IT systems to perform many of the same functionalities.
- The federal government is paying up to \$44,000 per doctor for certified EMR use in Medicare over five years, and up to \$63,750 per doctor for Medicaid.
- Almost all of the major UC vendors recognize that every new healthcare customer is moving to IP telephony.
- With regard to their legacy PBX installed base, the vendors claim that almost half of their acute care customers have already moved to an IP telephony environment.
- While penetration of full-fledged UC clients is still very low, adoption of the various components of UC is high, especially for conferencing and advanced mobility solutions.



Source: Frost & Sullivan analysis.

North America Findings (continued)

- North America has been one of the leading regions in the mobility space.
- Penetration of WLAN is the highest in this region, reaching almost 100 percent of adoption non-pervasively and 40 percent pervasively throughout the enterprise. VoWLAN single-mode devices have been very popular among corridor employees such as nurses and administrative staff. Vendors such as Vocera have deployed badges in 700 hospitals.
- Frost & Sullivan calculates smartphone penetration in the general population to be 39.7 percent. According to a number of different industry surveys, smartphone penetration among U.S. physicians ranges from 60 to 80 percent.
- The U.S. healthcare industry is showing a particular interest in tablets. Devices such as the iPad are becoming a very powerful tool that support the daily activities of doctors.
- Skyscape, Unbound Medicine, Epocrates, and QXMD are some of the most well known names for medical apps for tablets and smartphones.
- The Healthcare Information and Management System Society conducted a Webinar on iPads, attracting 1,000 participants (70 percent represented hospitals). About 25 percent of them planned to use an iPad immediately and 70 percent within a year.



Source: Frost & Sullivan analysis.

EMEA Findings

- The EMEA region is quite heterogeneous and dissimilar in their deployment of new technologies. While some regional pockets are advanced with regard to enterprise communications adoption (such as Northern/central European countries), others face stark challenges (such as Eastern Europe, the Middle East and Africa).
- Some of the greatest challenges affecting ICT expenditure in the healthcare sector include the:
 - aging population
 - rising cost of healthcare
 - fact that 75 percent of the EU healthcare expenditure is funded by limited public sources
 - shortage of healthcare professionals
 - tough economical conditions
- Still, many European governments strive to ensure that these negative challenges do not impinge on fundamental European values such as universal healthcare coverage and equitable financing and access.
- The advancements in medical technology and the development of more personalized services allow more European patients to expect high-quality treatment, especially in Western Europe.



Source: Frost & Sullivan analysis.

EMEA Findings (continued)

- Available ICT solutions in the healthcare industry have been designed with the objective to maximize the use of these limited resources and budgets.
- Countries such as France, Germany, Austria, Finland, Netherlands, Denmark, Sweden, Switzerland, and the U.K, rank at the top of ICT adoption in hospitals, while Lithuania, Albania, Latvia, Romania and Bulgaria hold the last five spots.
- France and Germany are considered to be the primary growth markets for IP telephony and unified communications. This is because these countries have many hospitals, high GDP healthcare-related expenditures, and high expectations. Furthermore, two of the major world IP telephony and UC vendors, Alcatel-Lucent and Siemens Enterprise communications, are based in these countries.
- Frost & Sullivan estimates that 35 percent of hospitals with over 100 beds in France and Germany have already implemented IP telephony and some UC elements. Examples of such hospitals include The Klinikum Stuttgart, KRAGES Hospital, Pius Hospital, Klimikum Bremen Nord gGmbH, The General Hospital of Annecy, Arras Hospital, and The Albert Schweitzer Hospital.



Source: Frost & Sullivan analysis.

EMEA Findings (continued)

- The European Commission has recently released an e-health benchmarking report that surveyed over 900 European hospitals randomly sampled in 30 countries.
- The European Commission report indicates that wireless communications is still not widespread in European hospitals. Approximately 53 percent of the European acute care facilities use wireless communications systems. Also, only 35 percent of the institutions have a single, unified wireless infrastructure. According to the report, WLAN adoption is directly related to the size of the hospital. While over half of the small hospitals with a broadband connection do not have a wireless infrastructure, only one-third of large hospitals (i.e., over 750 beds) with broadband do not have it.
- There are more pervasive wireless communications solutions implemented in countries such as Sweden, Austria, Denmark, Belgium, Finland, and the U.K.
- WLAN is least utilized in countries such as Croatia, Cyprus, Greece, Poland, and Romania.



Source: Frost & Sullivan analysis.

EMEA Findings (continued)

- While the report indicates that 81 percent of hospitals have a common electronic patient record system, many have still have not reached the level of sophistication desired for a transformation in their communications networks. Laggards include Italy, Greece and Poland – among others.
- While smartphones and tablets are gaining traction in different regions of this market, corridor endpoints such as DECT and IP DECT handsets are still the more popular choices among different healthcare employees such as nurses and field staff. However, similar to the North American market, more doctors and physicians are beginning to require some level of communications integration with their personally-owned devices.
- Africa and the Middle East offer pockets of ICT opportunity (e.g., South Africa, Kenya and the Arabic Gulf region), these regions have limited potential due to poor economic conditions. While some of the top hospitals have already implemented advanced technologies such as IP telephony and UC, the vast majority of hospitals operate under very poor conditions. Nonetheless, different governments in Africa have launched various telemedicine initiatives aimed at extending health services provisions. This has expanded the opportunity to implement advanced communications technologies such as UC.



Source: Frost & Sullivan analysis.

Asia Pacific Findings

- Although most hospitals in the Asia Pacific region still have legacy communications systems in place, they are beginning to adopt advanced communications technologies.
- Some of the greatest challenges affecting ICT expenditure include:
 - limited budgets
 - limited skilled resources
 - weak methodologies for patient admissions and discharges
 - the lack of general standards and regulations
 - general confusion about the benefits of UC
- In spite of these challenges, different forces are gradually leading to the implementation of advanced communications technologies such as IP telephony and unified communications. Frost & Sullivan research indicates that approximately 20 percent of the hospitals with over 100 beds in the region have implemented IP telephony and some UC elements. The main drivers for moving to UC include:
 - increased government attention to primary and community-based healthcare
 - the need to move from existing silo communications to more integrated workflows
 - the growing emphasis on cutting costs
 - the rising interest in medical tourism
 - the increased use of mobile technology in healthcare service



Source: Frost & Sullivan analysis.

Asia Pacific Findings (continued)

- In 2010, federal governments demonstrated increased spending in the healthcare vertical (e.g., Australia's funding for EMR adoption).
- State governments are responsible for the operations and financing of public hospitals, but rely on funding from the federal governments.
- Medical tourism is rising in places such as Thailand, India, Malaysia, and Singapore. This is creating an incentive to develop a regional "healthcare hub" with advanced technologies.
- Today, many telephony and UC vendors (such as Alcatel-Lucent, Cisco and NEC) have tailored their solutions to tap the Asian healthcare vertical market.
- Developed markets such as Australia, New Zealand, Japan, and Southeast Asian countries have been leaders in the implementation and adoption of various technologies such as clinical information systems, EMRs, WLAN, IP communications systems, and UC.



Source: Frost & Sullivan analysis.

Asia Pacific Findings (continued)

- Some of the APAC hospitals that have already implemented IP telephony and UC solutions are: Macquarie University Hospital, Eastern Health and Master Health Services in Australia; Apollo Hospitals Group and SevenHills Hospitals in India; Teikyo University Hospital, Kyushu University Hospital and Shizuoka Hospital in Japan; Queen Elizabeth and Wong Tai Sin Hospital in Hong Kong; and Alexandra Hospital in Singapore.
- The region has been one of the early adopters of mobility solutions, including corridor solutions as well as smartphones and consumer-based handhelds owned by doctors and practitioners. Mobility applications are being used in areas such as medical record tracking, nursing orders and calls, X-ray tracking, and patient ID management. Demand for tablet personal computers is expected to be strong over the next few years.



Source: Frost & Sullivan analysis.

CALA Findings

- The CALA region is still considered a laggard with regard to adopting new technology in hospitals.
- The penetration of IP telephony and UC applications is still in its infancy stages; only about 10 percent of the hospitals that have over 100 beds have implemented IP telephony and different elements of the UC stack.
- The majority of these institutions are the “Class A” hospitals (or luxury institutions) followed by large private hospitals.
- Most of the public or governmental hospitals still rely on legacy systems with few technological advancements.
- Low penetration of communications-related technologies is the result of very limited budgets that need to first cover urgent needs such as provisioning of the healthcare service itself.
- Nevertheless, more hospitals are gradually moving to advanced IP communications technologies as they understand the productivity-related benefits.
- Mexico is the more advanced country in terms of technology adoption, followed by Brazil and Chile.
- The enthusiasm around mobility and video is expected to be one of the major catalysts for future IP telephony and UC growth.



Source: Frost & Sullivan analysis.

Channel Findings



Channel Findings

- UC vendors utilize various sales approaches to reach acute care hospitals.
 - Companies such as NEC, Siemens Enterprise Communications, and Vocera incur about 80 percent of their sales via direct selling.
 - Others, such as Avaya, Alcatel-Lucent, Cisco, Mitel, Polycom, and ShoreTel, are more inclined to sell indirectly through a network of channel partners.
 - Some vendors, such as Alcatel-Lucent, use a mixed approach – they primarily sell directly in North America and through channel partners in APAC and EMEA.
- Although some vendors greatly rely on the experience of their channel partners to target the healthcare vertical, others are actively involved during the sales process. Large UC vendors assign account managers to join forces and work with channel partners. While the UC vendor provides the necessary marketing material, training, promotional packages and other resources to the partner, the channel partner works on closing the deal and implementing the solution.
- Channel partners can be composed of two or more of the following participants: telecom distributors, dealers, value added resellers (VARs), independent software vendors (ISPs), middleware vendors, systems integrators (SIs), healthcare resellers, and service providers.
- These channel partners are typically selected based on their sales success, local presence, and their understanding of the clinical workflow.

Source: Frost & Sullivan analysis.

Channel Findings (continued)

- Independent software and middleware vendors (which sell EMRs, clinical devices, alerting systems, nurse call systems, and other healthcare middleware solutions) are sometimes the most appropriate go-to-market channel partners. They have deep knowledge of the healthcare industry, and understand the opportunity to integrate UC solutions with specific healthcare-related technologies. The basic premise here is that it is difficult for one vendor or partner to offer everything that is needed.
- UC vendors, such as Avaya, Cisco, Microsoft, and Polycom, have been partnering with Hospital Information System (HIS) vendors such as Epic Systems, Allscripts, Cerner, and McKesson to integrate real-time communications such as IM, voice, and SMS with EMR systems. Services such as patient reminders, virtual consultations, telehealth, messaging, and intelligent routing, which are being integrated into EMR systems, can be offered as a joint effort solution from both companies.
- Partnering with large systems integrators, such as IBM and HP, which have extensive experience in the healthcare field, is also becoming important. These SIs are generally experts in tying different applications and solutions together. They can help UC vendors to integrate with healthcare-specific technology vendors by leveraging their open environments or frameworks.
- Open standards such as SOA and SOAP are quickly becoming adopted by UC participants and channel members to integrate medical applications with advanced communications services and solutions.

Source: Frost & Sullivan analysis.

Competitive Analysis



Competitive Strategies

- Almost all major UC companies have dedicated resources to address the healthcare vertical. They allocate dedicated resources in R&D, marketing, direct sales, channels, and business developments for the healthcare industry.
- Most UC vendors consider healthcare one of the top five verticals for their business; thus, this vertical is a key part of their business focus and strategy.
- Different strategies used to aggressively pursue acute care hospitals include increasingly personalizing and tailoring UC solutions, recruiting and allocating highly-qualified experts in the area, offering specific vertical solutions (non-tailored, but new), partnering with multiple vendors and providers focusing on this specific vertical, and engaging in multiple vertical-related activities such as promotion, education and social responsibility.

Source: Frost & Sullivan analysis.

Competitive Analysis

Competition is very intensive, with no true leader in everything that unified communications encompasses.

While Avaya, Cisco, Siemens Enterprise Communications, and Microsoft have been described by some vendors as the leading participants in this space, Frost & Sullivan believes that leadership depends on multiple criteria such as the geography covered, the UC technology referenced, the size of the business covered, and the type of UC participant (e.g., UC vendors, resellers, or system integrators).

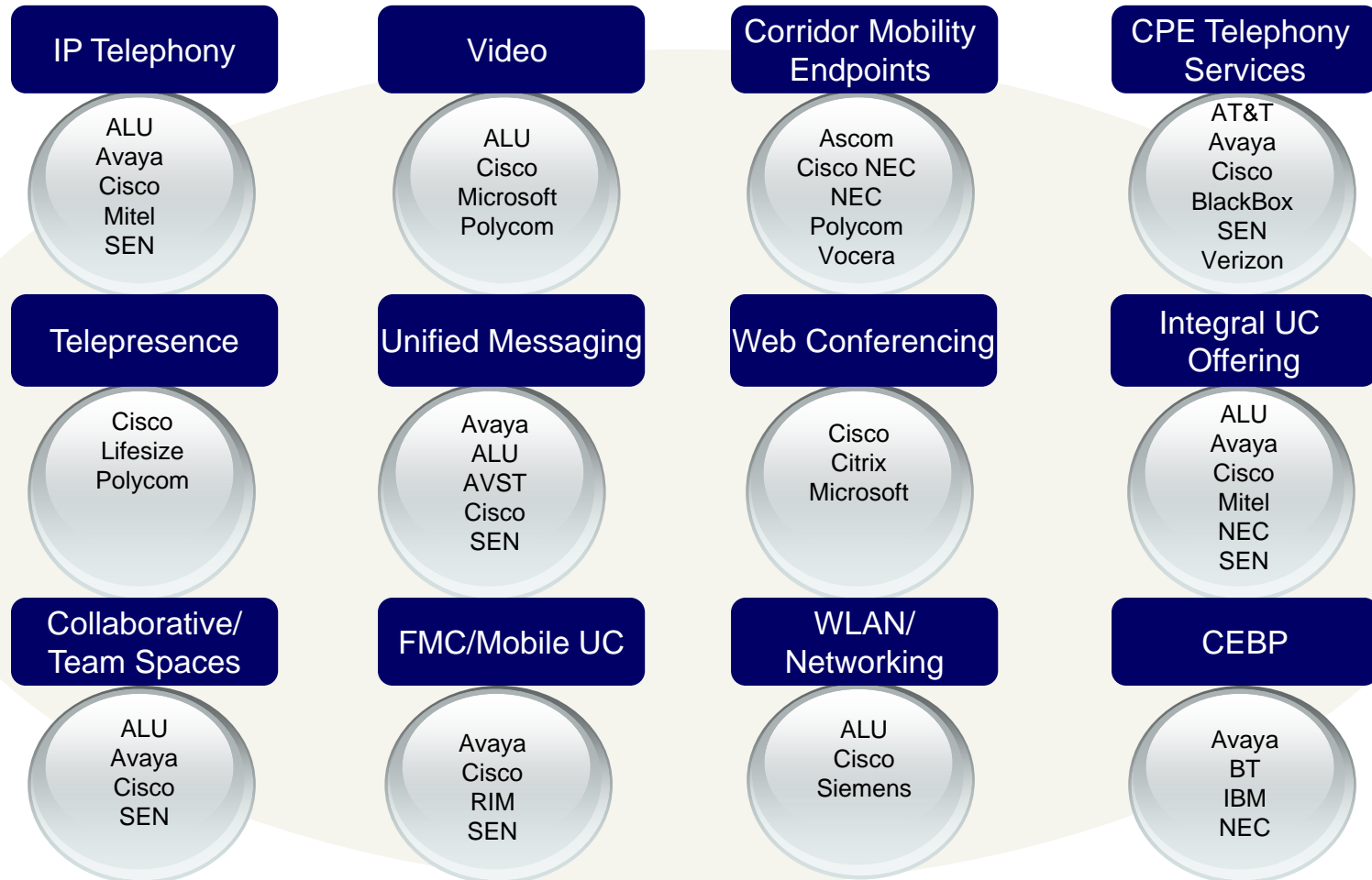
The following two charts describe the competitive positioning of different UC participants in this space.

- The first chart describes what Frost & Sullivan believes are the most prominent representatives in each type of UC technology solution; it is based on both, reputation and estimated revenue market share.
- The second is a positioning table that compares specific criteria that are important when targeting this vertical market for the following companies:
 - Alcatel–Lucent
 - Avaya
 - Cisco
 - Microsoft
 - Mitel
 - NEC
 - Siemens Enterprise Communications

Source: Frost & Sullivan analysis.

Competitive Analysis (continued)

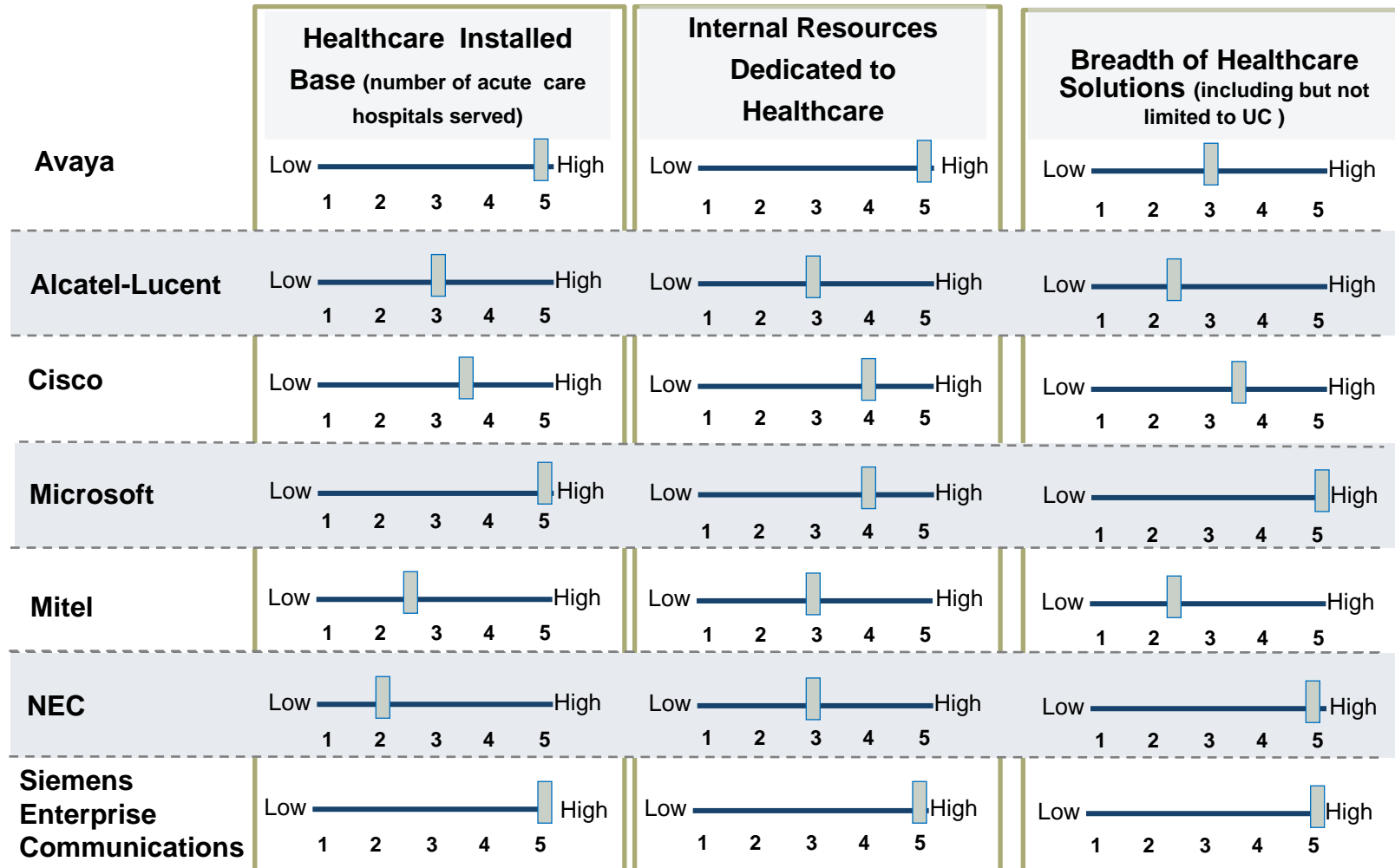
Improving Patient Care with UC Technologies: Key Market Participants in Acute Care Hospitals by Type of Technology (Global), 2011



Source: Frost & Sullivan analysis.

Competitive Analysis (continued)

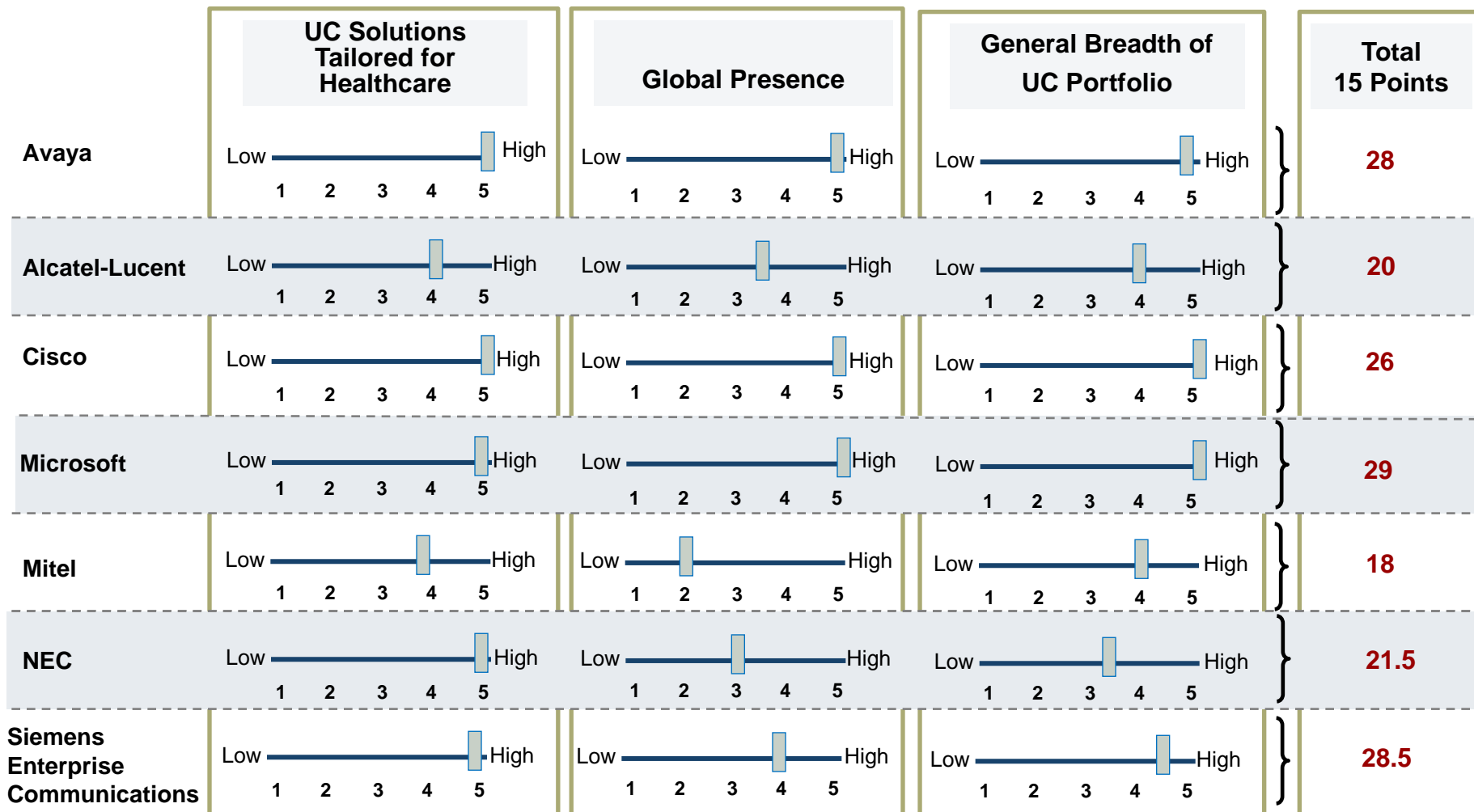
Improving Patient Care with UC Technologies: UC Vendor Comparison in Healthcare (Global), 2011



Source: Frost & Sullivan analysis.

Competitive Analysis (continued)

Improving Patient Care with UC Technologies: UC Vendor Comparison in Healthcare (Global), 2011



Source: Frost & Sullivan analysis.

Strategic Recommendations



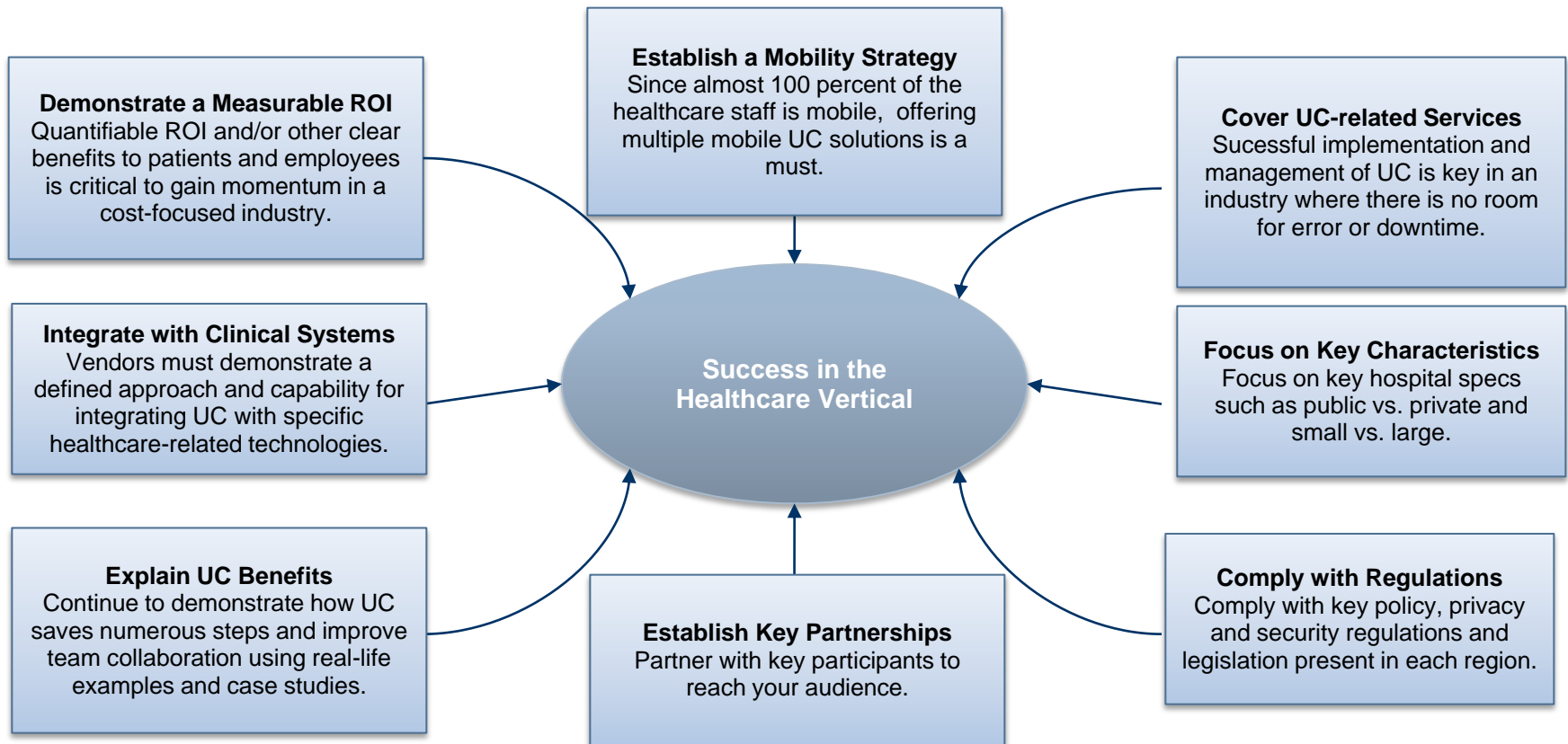
Strategic Recommendations

- Frost & Sullivan has identified key success factors that may enable vendors to be more effective in gaining traction in this challenging industry.
- The degree of company's success in this market is tied to the ability of the vendor to understand the complex needs and conditions of each individual user, and then, successfully implement a solution that meets these requirements.

Source: Frost & Sullivan analysis.

Strategic Recommendations (continued)

Improving Patient Care with UC Technologies: Strategic Recommendations For Enterprise Communications Vendors (Global), 2011



Note: Besides the above mentioned recommendations, UC vendors could also strive to embrace open standards, offer smooth communications migration strategies, educate and train channel partners and offer multiple deployment options (e.g., on premise vs. hosted).

Source: Frost & Sullivan analysis.

The Last Word



The Last Word—Three Big Predictions

1

IP Telephony and UC technologies will considerably grow in acute care hospitals within the next four to five years.

2

Mobile UC solutions, along with IM/presence, video and shared/collaborative team spaces will see the highest growth.

3

Governmental regulations across different regions of the world will ultimately encourage the deployment of advanced communications technologies.

Source: Frost & Sullivan analysis.

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