Meeting 21st-Century Healthcare Challenges: A Smart+Connected Health Approach

The Cisco Connected Insight Series.
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# Meeting 21st-Century Healthcare Challenges: A Smart+Connected Health Approach

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Executive Summary

Today’s escalating cost of healthcare is one of the world’s greatest challenges. The United States spent $2.38 trillion on healthcare in 2008, while 45.7 million citizens remained uninsured. From the rapidly increasing cost of healthcare delivery, to critical staff shortages, to patient demand for more and better services, healthcare organizations are challenged to increase access to quality care while reducing costs. As costs continue to increase, so does the demand for higher quality, personalized healthcare services. Given these challenges, healthcare providers must find new and different ways to deliver quality care and scale healthcare system delivery.

Healthcare’s Challenging Environment

Challenges facing healthcare organizations vary widely around the globe. In the developing world, a lack of facilities, equipment, and trained personnel mean that many people do not have convenient access to care providers or medical facilities. This is especially true for those in remote rural areas. In these nations, healthcare providers and governments are focused on creating a healthcare infrastructure that will expand access and improve the quality of care available to citizens.
In the developed world there is sophisticated healthcare infrastructure in place, but it’s not ubiquitous, and there is an increasing focus on rational consumption of both primary and specialty services. A growing population of aging citizens strains existing facilities and resources.

Today’s shortages of primary care and nursing providers are expected to become more acute in the United States as the nation’s population continues to grow and age. The U.S. Census Bureau predicts a U.S. population of 392 million by 2050. According to the U.S. Department of Health and Human Services, there was a 6 percent shortage of nurses in 2000. That shortage will double by 2010, resulting in a shortage of 275,000 full-time registered nurses. Although the current economic climate has driven many retired nurses back into the workforce, this is viewed to be a temporary surge. By 2015, the shortage is expected to more than triple to 20 percent and will escalate to 29 percent by 2020.

At the same time, the Journal of the American Medical Association has reported a steady decline in the number of U.S. medical student graduates choosing primary care. When combined with aging populations in developed countries, the decline in skilled staff will quickly reach crisis levels. To offset the widening gap between the number of patients and the number of skilled staff, healthcare organizations must increase their productivity while maintaining or decreasing costs.

In addition, as costs rise for labor, supplies, medications, medical devices, and other essentials, healthcare organizations are under increasing budget pressure. Provider pressure also exists on revenue, as organizations seek to modify reimbursements. Revenue shortfalls and rising operating costs make it difficult to deliver high-quality care and compete effectively for increasingly scarce specialists and skilled caregivers. Hospitals and clinics are also under pressure to provide the latest medical technology, equipment, and treatment protocols to attract and retain patients. Improving staff efficiency is an important strategy for healthcare organizations, and many are seeking to improve communication and collaboration as a way to streamline workflow.

Helping People Choose to Live Life Better

The purpose of healthcare organizations is to help people live healthy, more fulfilling, and longer lives. Cisco understands the mission as well as the complexity of healthcare organizations, and uses innovative technology to connect communities and people, thereby helping people improve their lives. We call this the Human Network.
When technology meets humanity on the human network, the way we work changes, and the way we live our lives changes. This is the Human Network Effect, and it is real. As the company that built the Internet, Cisco has delivered networks and networked services that help healthcare organizations connect caregivers, patients, and staff with information and each other in new and innovative ways.

The Human Network links the world’s regions, transforming communities, businesses, and lives everywhere. Our public-private partnerships have made significant, positive strides in healthcare, education, socioeconomic development, and crisis relief. Today, Cisco touches approximately 67 percent of the world’s population, or 4.6 billion people. And as that company we can offer our experience, technology, people, and reach to help healthcare organizations use the power of the network to address the challenges faced by healthcare providers within the system today.

Smart+Connected Communities

We envision that the same principles of openness that have made the Internet thrive for the past 20 years can be applied to help healthcare thrive as well. Through our global Smart+Connected Communities initiative, healthcare organizations can connect people to each other, to information, and to new diagnostic and treatment capabilities. The Smart+Connected Communities initiative employs next-level infrastructure, technology, services, and platforms to create intelligent, enduring solutions for healthcare.

Cisco Smart+Connected solutions are based on technology and architectures that include:

- **Collaboration:** These solutions facilitate inclusiveness and encourage collaborative decision-making among care teams, primary and specialist physicians, patients and their families, and public/private partners. And they help effectively harness the efforts of talented caregivers to unify the care delivery methodology that solves problems, prevents disease, and creates positive healthcare case outcomes.

- **Virtualization:** These solutions enable resources such as information, workspaces, and expertise to be shared and dynamically delivered to applications and individuals on demand. Virtualization today is occurring within hospital data centers, IT-as-a-Service solutions, and specialized expertise.


• **Borderless organizations:** Today, healthcare organizations interact with referring physicians, outside specialists, patients, and patient families beyond the four walls of their hospitals. A “borderless network” provides the security, flexibility, and reach that enables care organizations to execute positive case outcomes anywhere, at any time, using a wide range of devices.

**The Collaboration Effect:**
Solutions for Improved Access, Affordability, and Quality

Today Cisco sees three guiding principles in our healthcare mission: we are helping healthcare organizations and providers improve access, drive affordability, and enhance the quality of care. Cisco’s healthcare solutions for collaboration provide:

• Increased caregiver teamwork and productivity to meet the challenges of an aging population and an increase in chronic disease

• Better patient experiences by delivering increasingly sophisticated and costly treatments more efficiently and in new ways

• Patient-centered care that is safe, effective, and efficient, emphasizing prevention and health, rather than dealing only with illness

For the future, care will not always depend on physical proximity. Patients will be able to maintain relationships with doctors who know them best, no matter where they live. At the same time, caregiving frequently includes participants who are not at the patient location, such as referring physicians, outside specialists, and patient families. Increasingly it will become easier for multiple caregivers such as primary care physicians and specialists to care for patients and their families at the same time.

Cisco® collaboration solutions can also help healthcare organizations improve internal efficiency, enhance administrative and clinical staff productivity, and extend resources to new locations more affordably. In the 2009 Cisco Nurse Survey, 84 percent of nurses said that they spend up to 60 minutes per shift searching for supplies. Efficiency and productivity improvements can help reduce cost pressures by freeing skilled staff for more appropriate tasks such as direct administration of medications and care.
Figure 1. Excerpt from 2009 Cisco Nurse Survey

Question: Nurses often use mobile devices such as a smart phone, tablet PC, walkie talkie or pager, to communicate and relay information about patients. What information do you need to access on a nurse’s communication device at the point-of-care?

<table>
<thead>
<tr>
<th>Information Needed</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient location and status</td>
<td>56</td>
</tr>
<tr>
<td>Care team availability and location</td>
<td>48</td>
</tr>
<tr>
<td>Patient lists (coverage)</td>
<td>39</td>
</tr>
<tr>
<td>Room availability</td>
<td>32</td>
</tr>
<tr>
<td>On-call directory</td>
<td>29</td>
</tr>
<tr>
<td>Map showing location of equipment</td>
<td>13</td>
</tr>
<tr>
<td>Other*</td>
<td>13</td>
</tr>
<tr>
<td>Not sure</td>
<td>17</td>
</tr>
</tbody>
</table>

*Four each: Lab results; Medication info  
Two each: Drug reference; medical records; patient status  
One each: Calendar function; reports; emergency code; home computer database; physician status; plan of care; new admissions; treatment schedule  
none/don’t use (10)

Finally, collaboration technology can help providers and caregivers reduce the amount of time spent tracking down peers, waiting for lab results, and finding patient information. In the 2009 Cisco Nurse Survey, 86 percent of responders said that chasing other people to get answers can take as long as 2 hours per shift. And 74 percent said that improved communication could have a high impact on the patient experience. With communication and collaboration solutions, more time can be spent with patients and improving the quality of the patient experience.
Several decades ago, a single physician treated all of a patient’s various illnesses. Today, a patient often receives treatment from multiple physicians at multiple locations. This creates the need for medical and clinical information to be securely shared among many healthcare entities. To provide the framework for this new healthcare world, a connected healthcare ecosystem is needed. A connected healthcare system includes networked resources of medical information, knowledge support, and process optimization.

Technology has matured to become a difference-maker for healthcare providers, administrators, and patients. For many healthcare organizations, the first step in achieving a connected healthcare environment is to create an IP infrastructure that supports the rapid exchange of data between people, institutions, regions, applications. At Cisco, we believe that the network is critical to support those advanced technologies that will meet healthcare’s most pressing challenges. The network provides:

- The common element that enables organizations to empower caregivers, administrators, and patients, deliver real-time information, and meet the needs of a secure, yet empowering borderless service model.
- The platform that truly integrates technology architecture with the architecture of an organization’s unique mission and constituents.
- The ability to enable collaboration, use Web 2.0 capabilities, increase productivity, and deliver a personalized patient experience anytime, anywhere, on any device.
The network provides the foundation for delivering communication and collaboration solutions that improve people-to-people connections across care teams for the greatest potential impact. Today, Cisco is putting the principles of Smart+Connected Health into practice with numerous healthcare projects around the globe.

**Improving Responsiveness to Emergency Needs**

Mercy Regional Medical Center (MRMC) in Durango, Colorado, ranks in the top 10 percent of U.S. hospitals in a range of care processes, including delivering care for heart attack, heart failure, and surgical site infection prevention. Until recently MRMC used manual procedures for locating specialists and on-call physicians. When a critical patient arrives in MRMC’s Emergency Department, on-call doctors may require immediate consultations with specialists, such as orthopedic surgeons and anesthesiologists. Technicians located these people using manual phone calls, pages, and paper schedules written daily by charge nurses. If the first doctor did not respond, they used other contact sheets to find additional names and phone numbers. This process took time and required a technician to leave other important tasks until an available specialist was found. Using a Cisco Connected Health solution, the hospital now locates vital on-call resources up to 50 percent faster, with significantly fewer interdepartmental calls.

**Enabling Clinical Collaboration**

Kaiser Permanente Healthcare system is faced with many of the challenges described above, including a nursing shortage and staff retention. To help improve the efficiency of its healthcare teams, Kaiser implemented Cisco WebEx™ Meeting and Collaboration Tools and WebEx® Training Center. These solutions are used for delivering nurse training and advanced professional development,
increasing collaboration among the nursing team available to prepare nurses for leadership. Cisco WebEx is also used by the Optical Services Group within Kaiser Permanente to improve communication with staff and patients. This solution reduces the amount of travel required between facilities to optimize staff productivity and reduce costs.

**Map of Medicine**
A good example of how critical connectivity is in solving healthcare problems is the Map of Medicine product. This is a web-based visual representation of patient care “pathways” that represent best practices for dealing with various diseases and conditions. Originally developed in cooperation with the National Health Service in the United Kingdom, Map of Medicine helps drive a collaborative, evidence-based means of delivering health services.

A pilot program in Kijabe, Kenya, has demonstrated its particular value in extending the reach of healthcare in the developing world by allowing healthcare workers to treat conditions otherwise beyond their ability, and by serving as an on-the-job educational resource that’s equivalent to full-time access to the most up-to-date textbooks. This collaborative model is critical to the success of efforts like those in India to support the healthcare system by enhancing knowledge transfer from urban to rural regions. A further value to the developing world is the product’s ability to be regionalized tuned to deal with the diseases or conditions endemic to a given area.

The collaborative model of Map of Medicine is important in the developed world as well. This and similar case management efforts can help move treatment away from the expensive, acute-care end of the system (hospitals), to the less expensive, primary-care arena, where most healthcare happens anyway: family physicians, local clinics, elder-care facilities, physical therapy centers, and the like. In Australia, for instance, approximately 60 percent of emergency room visits are unnecessary. How much money could be saved by equipping primary-care facilities with the knowledge needed to treat conditions that really don’t require a hospital visit? The same is true for managing chronic disease and elder health: improved collaboration through efficient communications is the only way to train the healthcare workforce rapidly enough to address these increasingly costly issues.

**Rebuilding in Post-Earthquake China**
Cisco is supporting rebuilding efforts in China's earthquake-affected Sichuan Province, working with public-private partnerships to help develop healthcare models that are supported by collaborative networked information technology and communications. These initiatives have been developed to help bridge the gap
between urban and rural areas and more broadly share the best education and healthcare resources available. These 21st century healthcare models are being designed with the potential for replication and scaling in countries around the world. As a part of Sichuan’s Health 2020 initiative, Cisco is working in collaboration with healthcare officials to develop a network of connected hospitals and healthcare solutions. Healthcare providers will be able to collaborate across the province, with access to online patient health records and other key innovative solutions that will help deliver higher quality care.

**Current Solutions for Healthcare**
Cisco Smart+Connected Health solutions help healthcare organizations address access, affordability, and quality issues throughout their organizations.

**Healthcare Technology Foundations**
Cisco Healthcare Technology Foundations create the framework for the Cisco Medical Grade Network (MGN). The basis for the MGN architecture is focused on redundancy, high availability, scalability and security for both wired and wireless access to the network. With this foundation in place organizations can prepare themselves not only for current infrastructure requirements but also for future solutions down the road.

The security framework embedded within MGN enables healthcare organizations to promote security best practices that meet regulatory compliance goals such as HIPAA, thereby improving patient care and response times, as well as operational efficiency. Technologies included within this solution include Cisco Digital Media System, Medical Data Exchange Solution, Cisco Data Center for Healthcare, Cisco Secure Wireless, and Cisco Image Architecture.

**Cisco Clinical Workflow Solutions**
Cisco Clinical Workflow Solutions help enable patients, clinicians, administrators, and families communicate through the innovative use of data, voice, and video. By having accurate, timely information, these groups can collaborate more effectively to make better, faster decisions. Cisco Context-Aware Healthcare integrates location and sensor information to respond quickly to patients, coordinate and reduce over-procurement of assets, and streamline workflow. Cisco Nurse Connect integrates nurse call systems with Cisco wireless phones, enabling nurses and patients to communicate with each other in a quiet and secure manner regardless of where the nurse may be on the floor. Cisco Mobile Collaboration enhances collaboration and exchange of information at the point of care by providing secure and robust network access from tablet PCs.
Cisco Care-at-a-Distance Solutions
Cisco Care-at-a-Distance Solutions provide a new access model for healthcare, connecting care providers and patients over distances while also directly addressing affordability and quality as they pertain to healthcare delivery. The new Cisco HealthPresence system creates an immersive environment similar to what most people experience when they visit their Doctor or specialist. Cisco TelePresence™ for Healthcare makes it easier and more convenient for clinicians to collaborate using high definition video and audio, regardless of location. Cisco Collaboration and Reporting promotes effective, efficient image consultations with radiologists and physicians in any location. Cisco Expert on Demand establishes real-time communication with on-demand audio and video conferencing enabling language interpretation better serving our growing and global diverse communities. Lastly, utilizing Cisco WebEx in healthcare provides an easy-to-use collaboration tool for administrators, clinicians, technologists, and caregivers.

Connected Imaging Solutions
Cisco Connected Imaging combines technologies from Cisco and its healthcare partners to deliver imaging as a service from the foundation of the Cisco Medical Grade Network. Images are virtualized and optimized in a medical archive, making them available anywhere across a healthcare enterprise, significantly reducing the overhead for extra storage in standalone imaging applications. Clinicians can quickly access data for accelerating diagnosis and treatment. Solutions within the Connected Imaging suite include Cisco Medical Data Exchange, Collaboration and Reporting, Horizon Medical Imaging Collaboration, and Image Architecture solutions.

Smart Healthcare Facility Solutions
With Cisco Smart Healthcare Facility solutions, developers and builders can replace disparate networks with one simplified, flexible, and scalable IP network. Unified communications converge voice, video, and data capabilities over building information networks with videoconferencing, telemedicine, wireless and remote access, and other collaboration and productivity tools. Converging security applications over the building information network allows organizations to use their existing IP infrastructures for video surveillance, access control, visitor management, and fire safety.

The IP infrastructure can even support the monitoring, control, and visibility of varied building systems, such as HVAC, lighting, transportation, and energy management.
Converging these systems over a single information network allows healthcare organizations to reduce operational, energy, and maintenance costs. In addition, the hospital IT group can deliver innovative services that improve caregiver productivity and enhance patient care.

Summary

Although healthcare organizations face a range of challenges as they strive to improve outcomes for patients, they can look to Cisco as a partner with the reach, technology, sustainability, and concern to help. The Cisco Smart+Connected initiative is helping many healthcare organizations meet their objectives by using the network as a platform for next-generation communication, collaboration, and service delivery.

For more information about the Cisco Smart+Connected initiative and other public-sector solutions, visit www.cisco.com/go/healthcare, where numerous resources are available.

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