

How Convergence Enhances Medical Information Sharing: What RHIO Leaders Need to Know

Executive Summary

The U.S. healthcare system is facing significant issues in such areas as total cost, efficiency and availability of information. Among many proposed remedies, there is common agreement that the cure must include integrated systems for gathering, storing and sharing medical information. The easy availability of current, accurate medical information has the potential to reduce medical error, cut duplicate tests and treatments and give practitioners a firmer basis for treatment decisions.

Momentum is gathering to create a standardized system for sharing medical records and information. Instead of being imposed from above, this National Health Information Infrastructure is being pioneered at the local and regional level. Encouraged by the U.S. Department of Health and Human Services (HHS), a new kind of organization, the Regional Health Information Organization (RHIO) is leading the way.

RHIOs are coalitions of healthcare providers, payers such as insurance companies, information technology companies and other stakeholders organized to develop methods for exchanging health information. RHIOs will serve as building blocks for the National Health Information Infrastructure (NHII).

In addition to the central question of improving patient care, RHIO participants are also focusing on information technology issues. What technologies are best suited to create, store, move and secure sensitive medical information, and what standards can best foster interoperability while maintaining security?

As decision makers consider these questions, a drive toward convergence is sweeping IT and networking and making it easier to imagine a world where converged systems deliver the value public policy leaders, healthcare providers, employers and patients are seeking.

Barriers are evaporating that once separated access methods from networks, divided voice networks from data networks and split applications from the underlying network infrastructure those applications depend on.

This convergence dynamic is creating new opportunities that RHIO participants need to

understand – opportunities to collect information and move it where it is needed easier, faster and more effectively than ever.

Convergence is taking place in four key areas:

- **Integrating Mobile and Fixed Access Options**
Wireless, broadband and other access methods extend information flow to the bedside, nursing station, physician's office and the patient's own home.
- **Moving to Internet Protocol (IP) MPLS Networks**
Today's multi-service networks communicate as securely as the old dedicated circuits and enable many functions to converge on a single network, far more flexibly.
- **Optimizing the Applications Infrastructure**
Health and business applications work best when applications and infrastructure are managed in unison to achieve a common performance objective.

• **Leveraging IP-based Services**

IP-based networks economically handle many communication services, such as Voice over Internet protocol (VoIP), IP television, conferencing, network-based security and IP-based telephony.

Convergence Effects in Health Care	
Integration of Mobile and Fixed Access	<ul style="list-style-type: none"> ▶ Better, more accurate and more timely information ▶ Improved communications thanks to a more accessible medical team
Deployment of MPLS-based Networks	<ul style="list-style-type: none"> ▶ Reduced costs and increased flexibility with software-defined routing ▶ More stable, dependable networks, with no loss of security
Optimization of Application Infrastructure	<ul style="list-style-type: none"> ▶ Improved performance, through “application-aware” network technology ▶ Reduced need for IT staff, with selected functions transferred to outside providers
Leveraging of IP-Based Services	<ul style="list-style-type: none"> ▶ Increased focus on core medical competencies ▶ Reduced capital costs, given the move to network-based services

RHIO IT leaders who view networking, access, applications and services in a holistic way will be prepared to capitalize on convergence, and help make the emerging NHII even more beneficial for patients, providers and the nation.

Network Convergence Improving Efficiency

The affordability and quality of American healthcare are under a microscope. Any solution will have to incorporate a multitude of elements, but there is little doubt that better health information will be an important part of the answer. The good news is that the trend toward convergence in networking technology is equipping healthcare leaders to develop solutions that are simpler, more powerful and more effective.

Healthcare Faces Challenges

Whether measuring itself by total cost, cost growth or breadth of coverage, the American healthcare system is focused on becoming more efficient and effective.

According to the non-partisan National Coalition on Health Care (NCHC), the U.S. spent 15.3 percent of gross domestic product (GDP) on healthcare in 2003, with spending expected to hit 18.7 percent of GDP in a decade. Total national health expenditures grew by 7.7 percent in 2003 – four times the rate of inflation.

That spending has not guaranteed uniform health care quality and service. A better system for storing and sharing medical information is seen as a major step forward. A study by the Journal of the American Medical Association found that laboratory and radiology results, letters and medical histories were missing during 13.6 percent of 1,614 patient visits. In 44 percent of these cases, doctors felt that the missing information had the potential to adversely affect a patient’s well-being.¹ Here too, better access to information is the answer.

Prescription for Reform: A Healthier Flow of Information

From the Oval Office to the doctor’s office, attention is focused on better health information as a key to improving health care quality and cost.

The creation of electronic medical records, together with a mechanism to interchange medical information quickly, easily and securely (the proposed National Health Information Infrastructure, or NHII as an example), is seen as a way to both reduce costs and improve medical outcomes for patients. The drive for a better system began long ago but picked up speed in this decade.

The National Committee on Vital and Health Statistics reported in 2001 that “The heart of the vision for the NHII is sharing information and knowledge appropriately so it is available to people when they need it to make the best possible health decisions.”² The committee urged HHS to take a leadership role to help accelerate and coordinate the effort to create the NHII, and also called for a “dynamic, nationwide, collaborative venture” extending beyond the government.

In October 2003, the Government Accountability Office said an electronic health care information system would improve quality of care, reduce costs associated with medication errors, provide more accurate and complete medical documentation, enable more accurate capture of codes and charges and improve communication among providers so they could respond more quickly to patients' needs.³

In his January 2004 State of the Union address, President Bush said that “by computerizing health records, we can avoid dangerous medical mistakes, reduce costs and improve care” and outlined a plan to ensure that most Americans have electronic health records within the next 10 years.

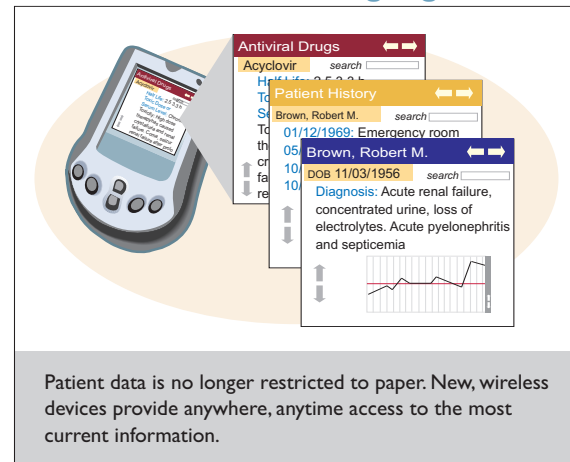
RHIOs Lead the Way

Four months later, HHS Secretary Tommy Thompson named Dr. David Brailer, M.D., Ph.D., as National Health Information Technology Coordinator. A pioneer in California RHIO development, Brailer made RHIOs a key element of the U.S. health information strategy and a stepping stone toward a national network.

The goal: “To foster regional collaborations among health care entities so that a patient's information can be securely stored in the local

community but is electronically accessible to those involved with providing their care in that community.”⁴

The Patient Chart is Going Digital



“The simple vision is that we want to see every American covered by one or more regional health information organizations,” Brailer said in the Wall Street Journal.⁵

The information sharing made possible by RHIOs will help improve patient care and cut health care costs. The list of potential benefits is long, according to HHS:

- Making the patient's up-to-date medical record instantly available
- Avoiding duplicate tests and unnecessary hospitalizations
- Providing health professionals with the best and latest treatment options
- Helping eliminate medical errors
- Streamlining the reporting of public health information
- Creating opportunities to research the most effective treatments

- Providing better, more current medical records at lower costs
- Protecting privacy⁶

Many RHIOs are still in the developmental stage, dealing with questions of how to govern and fund such an organization. Yet they are not starting from zero. The RHIOs can draw on the resources of hospitals, doctors, insurance companies and others stakeholders within their territories.

Convergence Creates New Opportunities for Healthcare Information Sharing

As they pursue the gains made possible by an electronic system for storing and transmitting medical information, healthcare providers, payers and patients will benefit from the increasing ability of networks and devices to work together or interoperate.

Interoperability, made possible through the use of standards-based products and operating protocols, is leading to the convergence of networking technologies that in the past were walled off from one another.

Convergence is creating new opportunities for the healthcare industry to achieve what might appear to be conflicting goals: to improve patient care while at the same time, reducing the cost of treatment and administration.

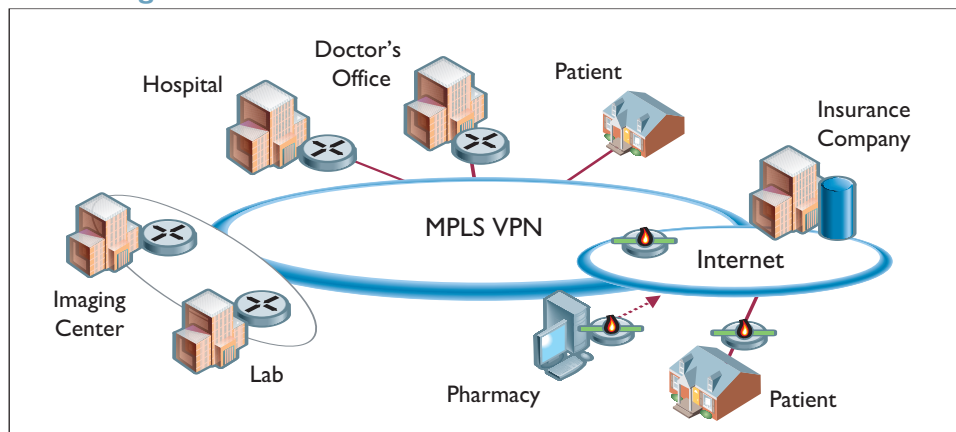
Four areas of communications convergence show great promise for enabling and encouraging the interchange of healthcare information.

Integrating Mobile and Fixed Access Options

No longer treated as “add-ons” to the network, access methods such as cellular, 802.11 WiFi, digital subscriber line (DSL) and WiMAX fixed wireless are now integral elements of the organization’s communications infrastructure. In the dynamic and fast-paced healthcare setting, integrated access can extend information flow to the bedside, corridor, nursing station and physician’s office.

Wireless access, for instance, is playing a significant role in hospital settings. Some applications, such as wireless and cellular telephones and WiFi connections for physicians’ laptop computers, are important but expected. But today even some hospital equipment, such

A Converged Medical Network



as EKG systems and IV pumps, report information through wireless connections to a central patient records database.

The patient chart is going digital, the data made available to medical staff on a hand-held personal digital assistant (PDA) device instead of on paper. Patient information is uploaded to a central database, then downloaded to refresh the chart data on the PDA. Access to the information is no longer restricted to those in possession of a paper copy.

High-speed Internet access helps patients and doctors conduct research into medical conditions, and makes it easier for them to communicate by e-mail, improving doctor-patient relations. As healthcare reimbursement accounts gain popularity, broadband access through DSL and cable will help consumers search for those healthcare providers who offer the best combination of quality and cost.

Instead of considering access as connecting to their networks, health care providers are managing access as part of their networks. In this way, they can achieve the price-performance levels they need to succeed.

At one Indiana-based hospital chain, physicians read patient chart information from PDAs. Some EKG and IV equipment reports data over the wireless network. The wireless network also provides access to voice and data communications.

This health care organization is implementing a computerized medication administration system that will enable nurses at the ultimate “access

point” – the patient’s bedside – to scan pill bottles and patient wrist bands before providing medication. A central database will ensure that it’s the right dose, right medication, right patient, right time and right route of administration.

Access today integrates every user and every end-point into the heart of the networking environment, delivering consistent performance and a uniform user experience across the organization. Emerging capabilities such as “presence awareness” let the network and its users know if other users are available, and the best access method to reach them.

Among the benefits of integrated network access:

- **Better Data**

Medical staffers have quicker access to patient data from almost anywhere in the health care facility. Patient records can be updated in real time.

- **Improved Communications**

Medical staff members are more readily accessible; patients and doctors can supplement office visits with e-mail.

Moving to Internet Protocol (IP) MPLS Networks

In the past, enterprises set up multiple special-purpose networks to provide data transport, voice communication, video communication, data storage and other services. Often these disparate networks were incompatible, making it impossible to integrate the applications and services they supported. The networks did their jobs, but were not optimized.

Today those networks are being replaced by Internet protocol (IP)-enabled multi-service networks that use multiprotocol label switching (MPLS) technology. These networks are far more flexible and cost effective than the old private line networks. They use special coding to restrict access to data packets, so they communicate as securely as the old dedicated circuits. At the same time, they enable many kinds of traffic to travel over a single network.

MPLS networks make it possible to manage end-to-end quality of service (QoS) levels required for high performance video and voice. Virtual private networks (VPNs) set up on an MPLS core network enable remote sites, such as clinics and doctors' offices, to connect securely and cost effectively to a central location like a hospital, administrative office or payer organization.

To ensure privacy, MPLS networks are based on standardized mechanisms that keep traffic on individual VPNs entirely separate, even as the data travels over a shared infrastructure.

Future MPLS networks will use "traffic shaping" technologies to dynamically adjust capacity and prioritize specific applications, as demands on the network change. Network-based application intelligence will make the network itself "aware" of the kinds of applications moving across the network. The network will then automatically adjust its behavior to optimize application performance.

The benefits of MPLS multiservice networks:

- **Cost and Flexibility**

VPNs running on IP-enabled MPLS networks reduce costs and increase flexibility, compared to old-style private lines and separate networks. Networks can be reconfigured easily because they are defined by software, not by physical connections. And MPLS networks can handle data, voice, video and other services, all on the same network.

- **Security**

VPNs on MPLS networks maintain security equivalent to that of old-style private line circuits. In addition, because MPLS VPNs do not depend on a single physical connection, they are less subject to disruption or outage.

Optimizing the Applications Infrastructure

Health and business applications are only as effective as the infrastructure – the underlying servers, networks and support teams – enable them to be. Organizations are improving application performance by managing applications and infrastructure together toward a single performance objective. For some the best solution is to let someone else handle the job with a hosted or outsourced solution.

Networks will soon deliver such features as application-sensitive performance levels, location-awareness for mobile applications and personalized applications customized for the needs of each end-user. Intelligence built into the network will respond automatically to changing conditions and needs.

Consider the example of a physician who uses IPTV several times each day to conduct conferences with patients in a neighboring city. When the high-bandwidth, high-quality IPTV application is requested, the network will automatically allocate the needed bandwidth and apply Class of Service controls to ensure quality. When the conference is over, the network will return to business as usual.

Benefits of an optimized applications infrastructure:

- **Improved Applications Performance**
Planning and managing applications and their supporting infrastructure as one helps ensure that network resources are designed and sized to meet each application's unique requirements.
- **Focus on Core Competencies**
Healthcare organizations can reduce the need for in-house technical staff by assigning some or all IT responsibilities to an outside provider. Information technology is essential for health care providers, but maintaining a large IT staff may not be.
- **Dynamic Responsiveness**
"Application-aware" networks will make adjustments as needed to maintain application performance. The network might adjust quality of service parameters to ensure top voice quality during a critical quarterly report conference, then return to normal after the conference ends. Such adjustments could be automatic, or controlled by the health care firm.

Leveraging VoIP and Other Services Over Internet Protocol

Today's IP-based networks can handle many different communication services, such as Voice over Internet Protocol (VoIP), IP television, conferencing and network-based security. IP services are economical because they use a single network infrastructure and make optimum use of networking resources.

VoIP, the best known IP-based service today, is revolutionizing the telecommunications market and challenging traditional circuit-switched services that travel over the public network. But other IP services are emerging.

For example, instead of purchasing and maintaining a PBX on site, health care organizations can buy IP-based telephony services, which are sophisticated call processing capabilities sold as an end-to-end managed service.

Network-based security services can replace much of the security apparatus most health care organizations maintain today on their own premises. The service provider scrubs incoming traffic to rid it of viruses, worms, spam and denial of service attacks.

Benefits of IP-based services:

- **Reduced Complexity**
Multiple services, including voice, data and video, run on a single IP-enabled network. Network-based security and telephony services reduce the need for in-house staffing and management.

- **Focus**

Turning network responsibilities over to a network provider enables the health care provider to focus on health care, and on how the network operator is performing in meeting established service-level agreements. Providing services such as security firewall protections in the network can reduce the need for premises firewalls and site-based security provisions.

- **Reduced Capital and Operating Costs**

Network-based services such as IP telephony and network-based firewalls are purchased on an as-needed or “by the drink” basis. There’s no need to build, maintain and pay for an oversized network just to handle occasional peak demands.

Conclusion

Convergence is a fundamental strategic concept for healthcare executives who are helping create RHIOs. From the access “fingertips” of the network to the IP-enabled core network and the applications and services that the network delivers, convergence is helping organizations boost their performance, enhance their agility, improve management control and strengthen security.

The Benefits of an Electronic Healthcare Information System

Higher Quality of Care

- ▶ Provide more accurate and complete documentation
- ▶ Allow for instant availability of up-to-date medical records
- ▶ Improve communication among healthcare providers
- ▶ Keep professionals informed of latest treatment options

Streamlined Public Health Reporting

- ▶ Support more accurate capture of codes and charges
- ▶ Create opportunities for research
- ▶ Protect the privacy of individual patients

Lower Costs

- ▶ Improve information efficiency
- ▶ Reduce the number of medical errors
- ▶ Avoid duplicate tests and unnecessary hospitalizations

As they plan IT strategies for their organizations, healthcare executives should consider how they can take advantage of the growing potential of network convergence.

References

1. “Findings” section of H.R. 2234, the 21st Century Health Information Act of 2005
2. INFORMATION FOR HEALTH, A STRATEGY FOR BUILDING THE NATIONAL HEALTH INFORMATION INFRASTRUCTURE, Report and Recommendations From the National Committee on Vital and Health Statistics Washington, D.C., November 15, 2001, p. 1
3. Ibid.
4. Goals of Strategic Framework, Office of the National Coordinator for Health Information Technology
5. The Wall Street Journal, Sept. 22, 2004
6. HHS Fact Sheet dated May 6, 2004

● **For more information, contact your AT&T Representative, or visit www.att.com/fourpoints.**

