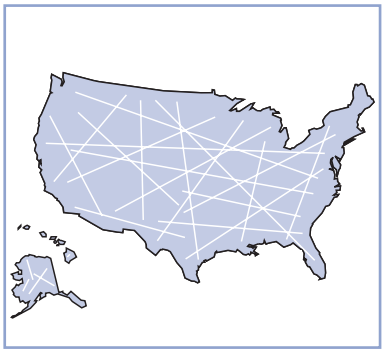
American Hospital Association

Health Information Exchange Projects

What Hospitals and Health Systems Need to Know



An Executive Brief

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MANATT HEALTH SOLUTIONS

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About Manatt Health Solutions

Manatt Health Solutions is a division of Manatt, Phelps & Phillips, LLP, which provides legal and consulting services to national and international clients. Manatt Health Solutions' interdisciplinary team provides strategic and business advice, policy analysis, project implementation, and coalition building and advocacy services to clients in the areas of health care access and coverage, health care financing and reimbursement and health information technology.

Executive Summary

Mounting evidence that health information technology (IT) can improve health care quality and patient safety — and reduce unnecessary expenditures — is spurring a flurry of activity in the public and private sectors, setting the stage for what some describe as a transformation of health care delivery. Increasingly, the focus of these efforts is on health information exchange (HIE). Over 150 HIE projects have been launched throughout the country, touching almost every state and many communities.

Health information exchange projects vary widely but generally involve diverse stakeholders joining together to plan, finance and implement systems to share electronic health information. Successful collaborations help resolve the complex technical, organizational, business, clinical and legal issues inherent in HIE. Defining characteristics of HIE collaborations include the mix and motives of stakeholders, the size of the collaboration and market characteristics, and the organizational and technical approaches of the projects. While these collaborations are known by many names, they are increasingly referred to as regional health information organizations (RHIOs).

This paper explores the risks, benefits and lessons learned for hospitals and health systems contemplating or engaging in RHIOs in their communities. The first two sections provide an introduction to recent public and private sector efforts to expand HIE nationwide, while the third describes the characteristics of RHIOs. The fourth section offers case studies of three diverse RHIOs and answers seven key questions often raised by hospital executives when contemplating participation in a RHIO:

- What are the benefits for patient care?
- What is the cost, and who provides financing?
- What is the return on investment?
- Who will have control of the project, and how will it impact the competitive marketplace?
- Is the technology ready?
- Can privacy and security be achieved?
- What legal barriers can be anticipated?

The final section explores and summarizes observations from hospital executives involved in RHIOs. These observations, summarized briefly below, provide guidance to executives as they contemplate whether to participate in health IT collaborations in their own communities, and how to structure them if they do.

• Be proactive. Hospital executives must evaluate RHIOs in the context of the federal agenda, evolving state policies, marketplace trends and their hospital's internal resources and goals. Ignoring this shift in the way we communicate health information is a strategy for failure.

• Assess your internal capacity. Hospital executives should analyze how the demands of a RHIO relate to the needs and abilities of their institution, including its internal technological readiness and business priorities, the availability of executive staff time to support the initiative, and the ability of the institution to contribute financial resources. For hospitals that do not have significant IT capacity, a RHIO may be the way to develop centrally such capabilities and share the cost with other similarly situated providers.

• Consider the risks and benefits of being a pioneer. Initiatives that seek to establish systems before emerging standards and architecture are in place risk finding their investments obsolete. On the other hand, those engaged in early efforts are best positioned to both form policy and take advantage of the benefits of new systems.

• Let clinical and care improvement priorities drive the project. Health information exchange collaborations are about the delivery of health care. Clinical and care improvement goals, supported by careful business planning, should drive the project, with technology serving as a means to support the clinical ends.

• **Recognize the need to build trust and good will.** Competitive concerns should be directly acknowledged at the outset. Developing a list of guiding principles endorsed by participating CEOs — such as a commitment to transparency and a pledge not to use data for competitive advantage — helps build the trust necessary to move ahead.

• **Create a platform for shared investment and financial sustainability.** While most early projects have had significant grant funding, successful initiatives require a sustainable business plan that reflects a clear understanding of who pays and who benefits in each stage of the project's rollout.

• **Build privacy and security into the business and technical infrastructures.** Health information exchange projects must ensure that legal requirements and public expectations related to privacy and security are met through developing systems that meet or exceed requirements of federal and state laws.

• **Develop a strategy for engaging public partners.** The state and federal government provide potential sources for funding and play important regulatory roles over many aspects of HIE.

• **Be realistic about timeframes.** Health information exchange projects are multi-year endeavors. Depending on the goals of the project, the first planning phase likely will take one to two years, while implementation will require an additional one to four years.

Introduction

In the 20th Century, brick and mortar constituted the basic infrastructure of the health care delivery system. To deliver care in the 21st Century, the system must have a health information and communications technology infrastructure that is accessible to all patients and providers.[1]

There is mounting and substantial evidence that intelligent investment in health information technology (IT) — investment that will allow the health care field to transform from the largely paper-based system of today to an electronic or digital system — can lead to improvements in health care quality and patient safety, and help avoid unnecessary spending. Increasingly, this interest has focused on health information exchange (HIE) projects that facilitate the sharing of information, thereby allowing personal health information to securely follow the patient. Yet, many questions exist regarding the costs, benefits, feasibility and financing of such initiatives.

Drawing on the experiences of hospital executives involved in three diverse HIE projects, recent literature and the authors' experience working with exisiting HIE efforts, this paper explores the risks, benefits and lessons learned for hospitals and health systems contemplating or engaging in HIE initiatives in their communities.

The Evolving Landscape

The following section provides a brief overview of notable developments in the public and private sectors with respect to the use of health IT and information exchange.

NATIONAL COORDINATION EFFORTS

Since 1998, the National Committee on Vital and Health Statistics (NCVHS) and the Institute of Medicine (IOM) have published multiple sentinel reports citing the need for action to prevent medical errors and improve the quality of health care, including developing the nation's health IT infrastructure.[2] These studies have received considerable attention from leaders in the industry and government and helped launch a national dialogue related to health IT adoption and use.

In 2004, the president called for interoperable electronic health records (EHRs) for every American by 2014 and established the Office of the National Coordinator for Health Information Technology (ONC) to spearhead federal efforts to achieve this goal.[3] Soon thereafter, the ONC released its *Framework for Strategic Action*, which laid out four goals for broad-scale adoption of interoperable health information systems: to inform clinical practice, interconnect clinicians, personalize care and improve population health.[4] The ONC has awarded seven

contracts that together provide the building blocks for the development of a national health information network (NHIN) architecture (see Appendix A for a thorough discussion of national efforts).

Multiple federal agencies also have undertaken initiatives to support health IT adoption and exchange. Together, the Agency for Health Research and Quality (AHRQ) and the Health Resources and Services Administration (HRSA) have funded community-based IT projects in 43 states; at least half of the recipients are located in rural or underserved areas. Furthermore, many observers expect the government to propose changes to Medicare payments to incentivize HIE use and quality improvements.[5]

The Administration's interest in health IT is matched by a strong and growing interest in Congress. In 2005 alone, nine bills related to health IT — including proposals to develop standards, enhance privacy and appropriate federal funds for HIE — were introduced.[6] While Congress has yet to unite around a specific proposal, the *Wired for Health Care Quality Act of 2005* — introduced by Sens. Frist, Clinton, Enzi and Kennedy — passed the Senate unanimously in November 2005.[7]

STATE COORDINATION EFFORTS

State legislatures and local governments also are becoming increasingly important players in supporting health IT and HIE. At least 29 states have implemented gubernatorial executive orders, proposed budget appropriations, commissioned planning efforts or introduced legislation. Thirty-one states have formal efforts under way to develop one or more health IT initiatives (see Appendix B for a listing of current state initiatives and actions).

States play a critical regulatory role in HIE, controlling local privacy and security requirements. States also can support investment in health IT by offering financial support to emerging efforts or establishing incentives for adoption through their Medicaid programs. New York, for example, has launched an initiative that is offering $53 million in grants to support the development of clinical information exchange projects, the creation of e-prescribing capabilities and the use of EHRs.[8] In 2006, the governor of Rhode Island proposed earmarking $20 million of an existing state bond fund for the development of a real-time statewide health information technology network.[9]

PRIVATE SECTOR INITIATIVES

The private sector is helping shape the emerging health IT marketplace through thought leadership, the establishment of multiple health information initiatives (described in the next section), and financial incentive programs designed to pay for HIE and use, as well as quality improvements.

The California HealthCare Foundation has funded significant research and analysis of health care privacy and IT and, along with the California Endowment and the Tides

Collaborative Network: Santa Barbara County Care Data Exchange

The Santa Barbara County Care Data Exchange (SBCCDE) was formed in 1998 to implement an HIE in the community. Initially, the collaborative worked through the various governance, technical and clinical issues by using a loose confederation of committees. In 2004, the SBCCDE formed a nonprofit organization with a board of directors with one representative from each participating organization. Today, SBCCDE is operational and acts as a facilitator of HIE, using a peer-to-peer technological approach with a central, "smart index" to access clinical results from multiple data providers and IT systems within participating health care organizations. SBCCDE was originally funded with a $10 million grant from the California HealthCare Foundation, and, since then, has secured funding from the federal government.

Statewide Approach: CalRHIO

The California Regional Health Information Organization (CalRHIO) is a collaborative, statewide effort to support the use of information technology and the creation of a secure health information data exchange system. Launched in early 2005 by the Health Technology Center with initial funding from the California HealthCare Foundation, CalRHIO has raised $4.7 million to date, much of it from the state's major payers and hospital systems.[11] CalRHIO is a non-profit corporation, with an independent and diverse board of directors. Its initial projects include linking hospital emergency departments across the state; defining the infrastructure necessary for statewide health data exchange; supporting enhanced safety in medication management; improving the efficiency of administrative functions for plans and providers; and giving consumers more direct access to health information in a personal health record.

Foundation, multiple projects for safety net providers to adopt EHRs. The Markle Foundation's Connecting for Health initiative, a large, multi-stakeholder collaborative including many hospital leaders, also has provided leadership and direction.[10]

In the private marketplace, considerable growth in pay-for-performance initiatives nationally has included programs that target financial incentives to health IT adoption.[12] While no agreement exists regarding how to best structure incentive programs, various payer consortia — like Bridges to Excellence, the LeapFrog Group and the Integrated Healthcare Association — are experimenting with different payment models.[13]

Payer interest in incentivizing health IT exchange likely is motivated by a belief that it will produce significant savings for the health care system as a whole. A recent RAND study estimated that savings from national implementation of fully standardized interoperable HIE between providers and other health care organizations could yield $77.8 billion in annual savings, or approximately 5 percent of the projected $1.7 trillion spent on U.S. health care in 2003. But the study also questioned how much of this financial benefit would accrue directly to providers.[14] For this reason, a question for hospital executives is whether, and to what extent, payer organizations will cover their share of the enormous costs of transitioning from a paper to a digital system.

Overview of Health Information Exchange Collaborations

Health information exchange collaborations have been launched by private sector participants in over 150 communities across the country,[15] providing real world laboratories for analyzing the technology, governance, clinical, business and legal issues raised by HIE.

Two of the early efforts often examined are the Santa Barbara County Care Data Exchange, funded with $10 million from the California HealthCare Foundation,[16] and the Indiana Network for Patient Care, launched by the Regenstrief Institute with support from the National Library of Medicine and the National Cancer Institute.[17] Examples of other projects are listed in Table 1.

Table 1: Examples of Health Information Exchange Projects

California Regional Health Information Organization	www.calrhio.org
CareSpark	www.carespark.com
Colorado Community Health Network	www.cchn.org
HealthBridge	www.healthbridge.org
Indiana Health Information Exchange	www.ihie.org
Inland Northwest Health Services	www.inhs.info
Mass E-Health Collaborative	www.maehc.org
Rhode Island Quality Institute	www.riqi.org
Santa Barbara County Care Data Exchange	www.sbccde.org
Taconic Health Information Network and Community	www.taconicipa.com
Utah Health Information Network	www.uhin.com

Health information exchange collaborations are extremely varied. Generally, projects involve a group of diverse stakeholders joined together for the purpose of planning, financing and implementing a collaboration that supports the exchange and use of electronic health information. Participants may include hospitals, clinicians, laboratories, pharmacies, safety net providers, payers, employers, public health departments, quality improvement organizations and consumers, among others.

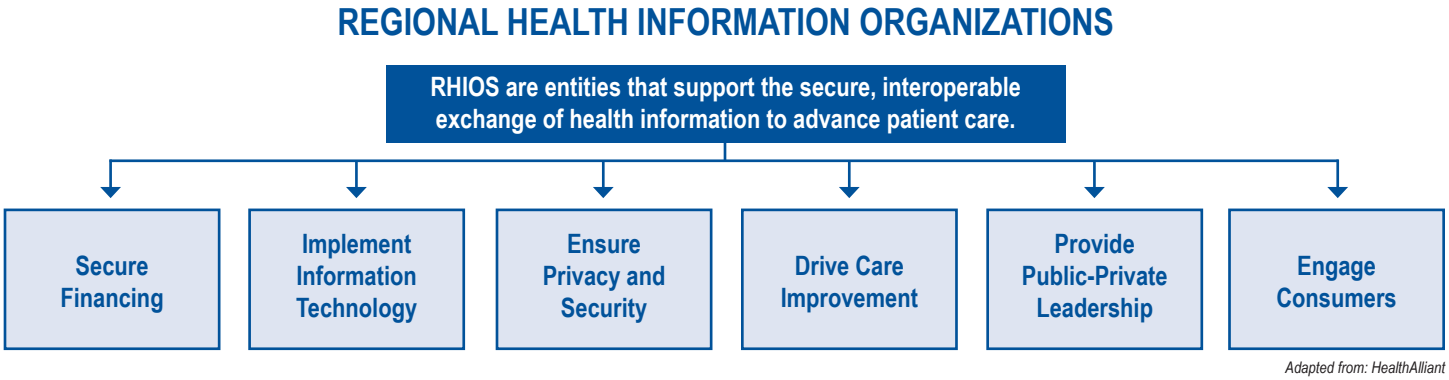
Health information exchange collaborations are known by many names, including local health information infrastructures and community-wide health information exchange projects. More recently, a large number of projects began identifying themselves as regional health information organizations (RHIOs). This term was first coined by the ONC to describe entities that resolve operational issues of HIE (governance, business practices, financing, privacy and security) at the regional level.

While the term RHIO has become part of the standard health care lexicon, there is no legal definition in either federal or state law, and there is broad variation in the marketplace as to what RHIOs are and what role they are expected to play. For example, one cannot say with any certainty whether RHIOs must be organized as not-for-profit or for-profit entities, cover any minimum or maximum geographic area, or provide any specific type or minimum level of services. To help clarify some of these issues, the ONC recently awarded a contract to study state-level RHIOs, including best practices and models. Figure 1 depicts the wide range of activities in which RHIOs can engage.

Collaborations range from the relatively simple to more structured and complex efforts. They are generally defined by the following characteristics:

- **Mix and motives of stakeholders.** Efforts involve multiple stakeholders from the private and public sectors serving broad community interests, such as improving patient care or public health. Some efforts are dominated by one or a few stakeholders, such as a payer or health system, and are designed to serve more narrow business interests. Still others involve hybrid models that seek to serve the community's interests, while simultaneously aligning with key business interests.

Figure 1: Possible RHIO Activities



Adapted from: HealthAlliant

- **Size of the collaboration and market characteristics.** The geographic community may be a city, region or entire state. Many projects span multiple states and must navigate overlapping and conflicting state laws. Projects also can involve stakeholders who are not located in the same geographic area but desire to share information for other reasons, such as developing treatment protocols or pursuing research. Generally, the size of a collaboration must be large enough to provide a business rationale for providers, consumers and payers to participate and to absorb costs.

- **Organizational approach.** Some initiatives are led by a loose confederacy of stakeholders, perhaps governed by contractual agreements. However, collaborations increasingly involve the creation of new business entities, with carefully defined board and committee structures and cooperative financing agreements setting forth the roles and responsibilities of participants.

- **Technology approach.** The technology approaches employed by HIE projects vary widely and may include:

  ◊ building an infrastructure to support stakeholders' patient care improvement programs and activities, such as medication management or public health reporting;

  ◊ deploying point-of-care systems in provider offices;

  ◊ creating a portal for patients to access their own health information;

  ◊ engaging in "technical readiness" activities with the objective of buying and deploying a more standardized health IT infrastructure once the information exchange market matures; or

  ◊ establishing a community cooperative whereby hospital participants purchase the same underlying hospital information systems as a group.

Technical approaches logically are defined by the business objectives of the initiative and are highly dependent on the amount of available financing.

Cooperative Approach: Inland Northwest Health Services

Inland Northwest Health Services (INHS) is a network of 32 hospitals in Idaho and Washington that securely stores 2.4 million electronic patient records and facilitates the sharing of these records throughout its network. INHS has developed a unique technology platform used by every hospital stakeholder allowing an integrated database containing all data associated with hospital inpatient and emergency room visits, including physician orders, medication information, laboratory data and radiological images. Medical records are available to the provider, regardless of where in the system the patient is admitted. The network also contains public health reporting for disease surveillance, engages technologies to support clinical procedures and decision-making, and provides technology security for the protection of privacy in patient records.

Hospital Participation in RHIOs: Findings from Case Studies

The growing interest in RHIOs has left many hospital and health system executives contemplating whether they should be involved with such projects for the benefit of their patients, communities and facilities. The authors interviewed 10 hospital executives involved in the following three regional exchange efforts about their motives, experiences and considerations:

- Nebraska Health Information Initiative;
- CareSpark (serving Northeast Tennessee and Southwest Virginia); and
- Indiana Health Information Exchange.

Two of the three efforts are not yet exchanging data, while the third is among the most established and researched efforts in the nation. One is a statewide initiative, one is a regional effort focused on a geographic region encompassing parts of three different states, and one started with a local effort and is currently transitioning statewide. The Nebraska and Indiana projects blend rural, suburban and urban centers, while CareSpark primarily serves a rural area. Each effort is profiled in this section; Appendix C provides summary information about the characteristics of each initiative, as well as a list of project participants.

The case study interviews and a survey of the available literature revealed several key questions commonly asked by hospital executives evaluating whether to participate in RHIO collaborations, which are explored in-depth in this section:

- What are the benefits for patient care?
- What is the cost, and who provides financing?
- What is the return on investment?
- Who will have control of the project, and how will it impact the competitive marketplace?
- Is the technology ready?
- Can privacy and security be achieved?
- What legal barriers can be anticipated?

WHAT ARE THE BENEFITS FOR PATIENT CARE?

For many hospital and health system executives the potential clinical value of health IT investment is a matter of common sense. As one hospital executive succinctly stated "We want our providers to have the information they need to make good decisions." Health information exchange enables hospitals to bring better information to the point-of-care and enhances opportunities for clinical decision support.

When computerized information is available at the time a physician sees a patient, and especially when it is coupled with systems that remind the physician of guidelines for quality of care, medical errors can be dramatically reduced.[18] Among other things, these systems can help physicians with dosing calculations and the selection of drugs, catch potentially harmful interactions between drugs, and transmit prescriptions reliably to nurses, pharmacists and patients themselves.[19] In a fragmented health care system, IT can help integrate and coordinate care.[20]

While there is agreement that HIE can benefit patient care, hospital executives participating in a RHIO need to understand precisely which clinical benefits will be realized before committing scarce personnel and capital resources. RHIOs often take an incremental approach, utilizing existing data resources to provide immediate clinical value for participating physicians and patients. Since pharmacy and laboratory data are typically available in electronic form, many RHIOs start by using that data to promote medication management and more efficient use of lab and other diagnostic services. For example, CareSpark plans to use pharmacy data to increase generic substitution across provider settings, reduce ad-

Case Study

Indiana Health Information Exchange

Project Description. In the 1990s, the Regenstrief Institute began developing an information exchange initiative, the Indiana Network for Patient Care (INPC), to link health systems in Indianapolis. The network provided Web-based access to discharge summaries, inpatient labs, and emergency department data. Building upon these early achievements, the Indiana Health Information Exchange (IHIE) was launched in 2004 to expand the INPC infrastructure and include local and state public health departments, Indiana Medicaid, medication management companies, and large physician practices aligned with the member health systems.

Market and Governance. The IHIE is primarily an urban project in the Greater Indianapolis area, which has 18 hospitals and roughly 3,500 physicians. IHIE is a 501(c)(3) organization with a board of directors comprised of representatives from participating health systems, local and state governments, a medical school, the medical society and both the Regenstrief Institute and BioCrossroads, an organization dedicated to attracting the life science industry to Indiana.

Operational Plan. IHIE seeks to use information technology and shared clinical information to improve quality and create enhanced research capabilities. Since 2004, IHIE has facilitated an electronic clinical messaging service for pathology, radiology and electrocardiogram reports. Four of the five health systems are currently using this messaging system; the last system should go live in 2006. Roughly 2,800 physicians involved with these hospitals are receiving reports from the clinical messaging system. As of November 2005, about 90 percent of clinical messages were being sent electronically, with the remainder sent by facsimile. While hospitals and federal grants provided the initial funding, IHIE plans to become self-sustainable. Currently, the participating hospitals and laboratories pay user fees based on their volume of use. Physicians do not pay fees but must upgrade their own office infrastructure. IHIE is developing a set of user fees for new stakeholders and expects to receive additional grant monies from the state and federal governments to continue expanding.

Future Plans. IHIE recently launched electronic access to medication reconciliation and history for hospitals to access on their patients' behalf. Currently, four hospitals are doing so. It is also working with the Regenstrief Institute to build a clinical quality application to analyze data from multiple sources that local payers will use to develop a pay-for-performance initiative. Additionally, IHIE is expanding its clinical messaging service statewide.

verse drug events and increase patient compliance.

Many RHIO stakeholders believe that over time they will exchange radiology images, hospital discharge summaries and even many data elements from patients' EHRs. These more robust data elements are viewed as critical to support longer-term initiatives such as disease management, care coordination, quality measurement, clinical outcomes research, and public health surveillance and reporting.

WHAT IS THE COST, AND WHO PROVIDES FINANCING?

Among the first questions any hospital or health system executive asks about a RHIO are: What is it going to cost, who is funding it, and will we realize a return on our investment? The answers to these questions depend on the size and capabilities of the provider organization, the nature of the project, the stage of the project's development and the business arrangements negotiated between the various stakeholders.

Costs of Project. The costs of forming a RHIO can be divided into three phases: planning, development and implementation, and operations. In the planning phase, costs generally range from $300,000 to $1,000,000 and involve intensive educational sessions, meetings, business planning, readiness assessments, vendor selection, and legal and organizational costs.

The costs of the development and implementation phase will depend on the scope of the project, including the technical and business approaches, as well as decisions about how different project costs are shared among the parties. Costs can range from $3 million to $10 million, depending on the technology platform selected, the vendor, and the number and complexity of the interfaces that need to be built, among other considerations. Costs will be considerably higher if they include implementing e-prescribing, EHRs or other information systems in provider settings, and/or population health improvement applications, such as disease management initiatives or public health surveillance and reporting.

Costs in the operational phase also vary depending on whether the RHIO limits itself to operating an HIE or takes on more ambitious tasks such as providing technical support to providers or coordinating community-wide health improvement projects. Generally speaking, operational budgets range between $2 million and $5 million annually. These estimates are based on the current, early stage of HIE development. As HIE becomes more standardized and matures, technology pricing may become more competitive. Many also believe RHIOs themselves will not operate technology, but subcontract to qualified technology partners.

Table 2: Estimated Costs of Forming a RHIO by Stage of Development

Stage of Development	*Costs*
Planning	$300,000 to $1 million
Development and Implementation	$3 million to $10 million
Operations	$2 million to $5 million

Financing. The planning phase of a RHIO project generally is supported by project grants or contributions from stakeholders. In some cases, the initial project costs have been underwritten by a single motivated stakeholder.

The development of financing plans for the later phases of RHIO projects are still in very formative stages. Early projects like the Santa Barbara Health Information Exchange and the Indiana Network for Patient Care were largely financed through grants. Grant funding, however, is not likely in most cases to represent a viable financing option, so projects have begun to develop financing plans that seek to distribute the benefits and costs of RHIOs among project participants in an equitable manner. This is discussed further below.

WHAT IS THE RETURN ON INVESTMENT?

Hospitals and health systems engaged in RHIOs face a misalignment of financial incentives that must be addressed in business planning. The cost of developing health IT systems is borne primarily by provider organizations; however, improving outcomes and reducing inappropriate care through health IT financially benefits payers and may also reduce provider revenues. According to one executive interviewed, "There is a significant disconnect between the costs and benefits, and we will struggle to get these projects moving until we remedy that disconnect."

Financing plans that seek to distribute the benefits and costs of HIE projects among project participants in an equitable manner can help address this tension. Distributive financing plans involve defining the financial costs and benefits for each stakeholder, and then structuring participation agreements between the RHIO and each stakeholder accordingly. The agreements define both the level and duration of the stakeholders' financial commitment and the specific services or outcomes to which the stakeholder is entitled. Special mechanisms may be needed for safety net providers. In each instance, however, a concrete business plan must demonstrate that an investment will produce a defined return.

For example, the CareSpark business plan calls for all participants to share in the costs by paying subscription fees based on a predefined formula. The financing plan also calls for all participants to share in cost savings generated through specific programs, such as medication management, which encourages generic substitution and reductions in adverse drug events. Essentially, this is a form of a gain sharing to offset the inherent inequities that exist between payer and purchaser.

Clinical information exchange efforts that are targeted toward specific, hospital-sensitive costs — such as uncompensated care or emergency department services — also may offer significant return for hospital partners.[21] IHIE, for example, developed a sustainable business plan for its initial clinical messaging initiative on the premise that a collaborative electronic exchange could provide clinical messaging for less than the $.81 per message hospitals were currently paying for a fragmented, paper-based system. The assumption proved accurate, with one hospital executive testifying that the new system saved his institution $1.2 million in postage alone.

As previously discussed, in addition to direct patient benefits, participating hospitals may also derive benefits such

Case Study
CareSpark (Appalachia)

Project Description. Launched by the Community Health Improvement Partnership, a local volunteer nonprofit organization, CareSpark is a mid-stage HIE effort in the Appalachian region. CareSpark was formed in January 2005 after a seven-month strategic planning process with the mission to "improve the health of people in our region through the collaborative use of health information." CareSpark partners include hospitals, physician group practices, employers, pharmacies, a medical school, public health departments and insurers. CareSpark is participating in the recently awarded federal contract to build a national health information network prototype architecture and has also received significant support from the state of Tennessee.

Market and Governance. CareSpark's rural service area, a 17 county region of northeast Tennessee and southwest Virginia, includes a population of around 700,000 people, 18 hospitals, and roughly 1,200 physicians. The CareSpark region is designated as medically underserved and nearly half of its population is enrolled in either Medicaid or Medicare. During its initial planning phase, CareSpark formed a steering committee that was supported by six work groups — governance and legal, clinical, finance, ad-hoc financing and incentives, technology, and communications. Once it had prepared a detailed business plan, CareSpark formed a nonprofit entity. The Board of CareSpark consists of a broad range of community leaders who have been selected for their standing in the community and commitment to serve as independent fiduciaries in support of CareSpark's mission. CareSpark is currently applying for 501(c)(3) tax status.

Operational Plan. The CareSpark project will cost approximately $15 million over its first three years and involves building and operating an HIE for the region. CareSpark will arrange financing of the IT infrastructure, develop and oversee privacy and security policies, operate the exchange, administer selected care improvement and population health programs, and ensure that consumers in the region are fully informed of its programs and policies. The CareSpark business model calls for a fully sustainable organization. Its initial strategic planning efforts were largely supported by federal and foundation grants, as well as contributions from stakeholders. Going forward, CareSpark expects to sustain its operations through a distributive financing model that shares cost savings realized by payers among all participants. By year five, the CareSpark financial model projects $30.6 million in revenue and $24.6 million in operating expenses.

Future Plans. CareSpark is currently selecting its technology partners and plans for its HIE to become op erational by the fall of 2006. Initial programs will focus on medication improvement, diagnostic improvement and public health improvement.

as attracting and retaining patients by improving quality, enhancing convenience and engaging patients directly in their care. Interoperable information exchange also could make it easier for hospitals to respond to payers' demands for quality reporting for pay-for-performance and other incentive-based reimbursement programs.

The extent to which a hospital will benefit from information exchange will depend in part on its existing internal systems. Hospitals show variable health IT adoption, depending on their size.[22] More than half of large hospitals already use, or are implementing, EHRs and other health IT tools. Participation in a RHIO can enhance hospitals' internal capabilities by providing them with better, more timely clinical information and a more cost effective way to integrate their own EHRs.

On the other hand, small hospitals, especially those serving the safety net and rural areas, exhibit very low technology adoption rates, and nearly all small providers face economic hurdles to EHR adoption. For these hospitals, participation in a RHIO is likely to impose significant economic hardship, unless the RHIO invests in building and supporting the hospitals' own systems as part of the project.

WHO WILL HAVE CONTROL OF THE PROJECT, AND HOW WILL IT IMPACT THE COMPETITIVE MARKETPLACE?

While RHIOs typically include multiple stakeholders, hospitals almost universally play a central role. In the words of one executive, "If you can't get hospitals on board, you can't do it."

Yet health care providers operating in a competitive marketplace with thin margins understandably approach RHIOs with practical concerns about the forces driving the initiative and how the information could be used. Will my competitors be able to use my information to gain competitive advantage? Will payers use the information to undermine my compensation? Who is making the decisions, and whose interests will be served? Successful RHIOs have addressed competitive issues

by including diverse stakeholders and establishing transparent organization and governance policies.

Competitive issues often pose the largest barrier in the early planning stages of RHIO initiatives, and it is not uncommon for early meetings to include a number of cautious skeptics around the table. For this reason, most efforts invest substantial time in establishing trust at the outset. For most, this is a high touch process that is benefited greatly by transparency and frank acknowledgement of the competitive dynamics at play.

Hospital executives involved in CareSpark noted that having a community improvement organization serving as a neutral convener helped maintain the focus on common goals and diffused competitive impulses. "There is a zone of competition and a zone of cooperation," observed one executive, adding, "Eventually, those who were unable to focus on the zone of cooperation stopped coming to the meetings." In both Nebraska and CareSpark, an early belief by some participants that the initiative could benefit all has helped foster collaboration. A significant impetus for several actors was economic development — a desire to create a business friendly environment with an efficient health care delivery system and a healthier population.

Governance in many early efforts is typically — and wisely — informal and consensus-based. Projects that seek to formalize governance rules too early risk getting mired in potentially contentious process issues that detract from core business planning. However, as the initiatives begin to take shape, participants will need to develop business agreements and organizational structures.

There are three models of RHIO governance:

- **Nonprofit Model.** A nonprofit corporation is formed to be the policy, business and/or operating organization for the project. Most RHIOs use this model.

- **Virtual Model.** A loose collaboration of stakeholders governs without a new legal entity, and relationships are managed through committees and contractual agreements. This model was popular among early projects; however, many of those projects have since established non-profit entities.

- **For-profit Model.** A new for-profit entity is formed. This model is rare and often raises concerns about community image and the ability to attract charitable donations and grants.

While some question the need for a new organization, many RHIOs have found that one is necessary to resolve complicated issues of public trust, financial alignment and privacy and security solutions.

For most RHIOs, good governance is defined by the ability to make decisions in the interest of the project while letting all stakeholders be heard. The structure of the board of the new RHIO entity and the membership define who makes what decisions, under what circumstances, and how leadership is perpetuated. Board composition may be all-inclusive, meaning that each participating provider and all other interested parties who want a seat at the table are invited to join in governance, or the initiative may choose to form classes of membership with representative governance. A third alternative is to select an independent, self-perpetuating governing body whose leadership is comprised of trusted individuals respected by the region being served. This alternative is favored by those who desire to avoid a governance structure tied to existing interest groups. Finally, contractual relationships, often in the form of participation agreements, define the specific rights of individual organizations with respect to the RHIO.

IS THE TECHNOLOGY READY?

As hospital and health system executives consider participating and investing in RHIOs, they may question whether such investment makes sense in light of the nascent stage of technologies to support HIE. The questions often asked are: Who is doing this, what vendors are they using, and does it work? The short answer is that there is no one commercial technology product for RHIOs, and the suite of technology components for HIE is emerging but lacks standardization or commercial ma-

Case Study

Nebraska Health Information Initiative

Project Description. The Nebraska Health Information Initiative (NeHII) is an early-stage, statewide initiative by several of the state's major hospitals, the Nebraska Hospital Association, the Nebraska Medical Association and Blue Cross/Blue Shield of Nebraska. The organizers hope to improve health care delivery outcomes, increase efficiency, reduce costs and support economic development in the state. Blue Cross/Blue Shield of Nebraska has underwritten the initial planning costs.

Market and Governance. With 89 hospitals statewide (13 of which are considered major regional centers), roughly 3,300 physicians and a population of 1.7 million people, participants view wiring the state as achievable. Participants have a strong commitment to a statewide focus that facilitates exchange of information between physicians in rural areas and their counterparts in urban specialty centers. The initiative is still in the early planning phase, and participation is loose but gradually expanding. Committees were recently formed to address clinical, governance, technical and financing issues.

Operational Plan. Nebraska hospitals are playing a key role in NeHII's development, actively participating in all phases of business planning. Agreement has been reached on the mission and vision of NeHII and project participants are now actively engaged in technology, business and operational planning. The project has retained consultants to evaluate the technical approach and the related costs and logistics of implementation. Participants hope to build upon two other successful efforts in the state: Nebraska's Statewide Telehealth Network connects hospitals and public health departments in order to provide access to consults; and a network of rural providers in the western part of the state is developing its own RHIO.

Future Plans. NeHII plans to complete its business, technology, and governance planning in the first half of 2006. Simultaneously, the collaborative is recruiting additional participants, such as smaller rural hospitals, insurers, employers, consumer advocates and government entities.

turity. Stakeholders involved in RHIO projects today must be comfortable with being pioneers and navigating new terrain.

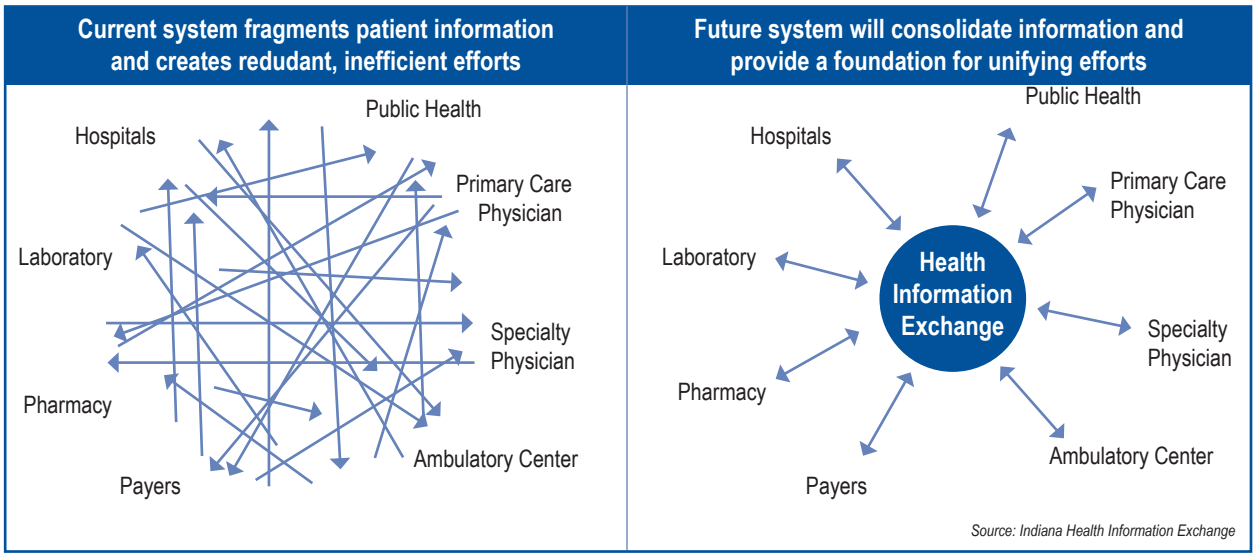
From a technical perspective, the RHIO, either directly or through a subcontract with a technology partner, manages a core set of services necessary for HIE: establishing patient identity, authenticating the identity of the requester, establishing proper authorization by the patient and locating relevant data from connected health IT. These services require a common framework resulting in a single set of network protocols, standards and policies.

While there are many variations on the theme, three basic data architectures exist:

- **Peer-to-peer.** All data resides in the original source systems or repositories behind the firewall of hospitals and other participating organizations.
- **Central data repositories.** Participants integrate their data into one central repository at the regional level or participant-specific vaults sit in a single, federated repository.[23]
- **Hybrid, with peer-to-peer and central repository.** Some data resides in a centralized repository at the regional level, such as critical care information, and other data resides in the distributed original source systems.

The decision of whether to centralize data is often significantly influenced by whether the stakeholders envision actively engaging in care management programs requiring use of personal health information, as opposed to serving a more limited role of simply facilitating the exchange of information. Population health improvement applications such as quality measurement, disease management and public health surveillance and reporting could be integrated with any of the data models above. Figure 2 depicts how HIE technology simplifies the process of sharing information among health care actors.

Figure 2: Improving Information Flow



A major technical hurdle confronting RHIOs is the lack of a single set of architectural components, protocols and standards for HIE. Recent federal efforts (described in Appendix A) may provide a new generation of harmonized standards, products and services that significantly reduce the risks associated with being an early adopter. However, it is too early to assess exactly where these efforts will lead or on what timeframe they will yield results. Some RHIOs have sought to minimize the risks associated with choosing the wrong path by selecting contractors who are capable of aligning their work with the emerging consensus on standards, protocols and policies for HIE.

The technical approach will ultimately depend on the funding available, the technical leadership involved and the goals of the initiative. Hospitals more comfortable with taking a wait-and-see approach might instead elect to invest in their own internal systems. If they elect to pursue this approach, it will be important to keep pace with evolving certification criteria for networks as well as individual products, such as EHRs. This will be essential so that, as the exchange effort matures, hospitals will be better positioned to "plug in" without the need to "rip and replace" existing systems.

CAN PRIVACY AND SECURITY BE ACHIEVED?

Privacy, security and patient consent must be at the core of any HIE effort and supported through strong policies, processes and design principles. Each RHIO must determine who has the right to access health information, the extent to which patients control access to their own records, how data is protected and how information is stored or linked to other data sources. These decisions must be guided not only by state and federal law, but also by corresponding business practices, public expectations and risk management considerations.

A threshold issue for hospitals is ensuring compliance with the *Health Insurance Portability and Accountability Act of 1996* (HIPAA). Fortunately, in most HIE projects, HIPAA creates parameters but not roadblocks. HIPAA permits hospitals to share protected health information for treatment, payment and health care operations (such as quality improvement) without patient authorization. Given the fact that most HIE projects are focused on using data for these purposes, they generally can be implemented under HIPAA without establishing a patient authorization process.

State privacy laws, however, pose more formidable challenges. Many states have laws that are more stringent than HIPAA and require patient consent for the disclosure of health care information, particularly for highly sensitive information, such as mental health, HIV/AIDS and genetic testing data. These laws create a

patchwork of consent requirements that can vary widely among neighboring states.[24] Thus, each information exchange must analyze an array of state laws governing different types of health records and organizations and develop business practices to ensure compliance. Collaborations may want to go beyond the letter of the law to build public trust, or for business or risk management purposes. Developing clear policies regarding sensitive health information, patient consent, consumer access to information, the disposition of information once it is shared, and many other data use and disclosure issues will help ensure RHIOs meet their privacy and security goals.

WHAT LEGAL BARRIERS CAN BE ANTICIPATED?

There has been substantial discussion among industry experts regarding the extent to which federal fraud and abuse laws, including the anti-kickback statute and the Stark law, impede the development of data-sharing arrangements. In October 2005, the Centers for Medicare and Medicaid Services (CMS) and the Office of the Inspector General (OIG) issued parallel proposed rules that would create new Stark exceptions and anti-kickback safe harbors permitting the donation by a hospital of e-prescribing and EHR software and related training services to physicians on the hospital's medical staff. These proposals have been widely criticized by the field as too narrow to support large-scale HIE, and many hope that the final rules will provide greater flexibility.[25]

Absent broader reform, it may be possible to channel subsidies to physicians through the RHIO itself, if it is treated as a joint venture among all major community stakeholders and appropriate compliance safeguards are established early in the process. While this approach presents operational and governance challenges, if a consortium adopts objective criteria for the distribution of subsidies and no hospital has the ability to funnel its contribution to particular physicians, fraud and abuse requirements should be satisfied. This concept has not been tested specifically in the context of HIE, but the OIG has embraced similar efforts in analogous health care contexts.

Finally, payments to providers by insurers and employers to subsidize health IT purchases do not raise fraud and abuse concerns because these entities do not receive referrals from physicians. However, to the extent that competing health plans pay standardized or coordinated financial incentives to physicians for using the network or meeting health care quality goals, federal and state antitrust laws are potentially implicated. As with satisfying fraud and abuse laws, substantial authority over the design and administration of the incentive program should be vested centrally with a broad-based consortium to minimize the risk of violating the antitrust statutes.

Final Observations

The rapid move toward digital health information has challenged hospital and health system executives to develop a strategy to navigate the changing landscape. As hospital executives consider their options, the lessons learned by early innovators may provide some helpful guidance. The first three observations provide guidance to executives contemplating whether to join a health information collaborative while the rest target how to best maximize the benefits of participation.

1. BE PROACTIVE.

Hospital executives should stay informed about RHIO activities happening in their communities. As the case studies illustrate, successful RHIO initiatives have the potential to significantly alter the way health care is delivered, and even paid for, within regional markets. It is in the interest of hospital executives, as well as their patients, to influence these developments so that they support hospitals, rather than add to their burdens.

Where efforts are being contemplated or are under way, they need to be evaluated in the context of the activities of other communities, the federal agenda, marketplace trends and the hospital's own goals and strategic plan. This will help gauge the efforts' relevance and viability. No matter what one's opinion of the current RHIO trend, it has shown sufficient strength to warrant the attention of even the busiest CEO. In the words of one hospital executive, "Hoping it will go away is not a good strategy."

2. PROVIDE LEADERSHIP.

The inclination of many hospital CEOs upon hearing about a local RHIO initiative is to delegate the project to the chief information officer or other staff with proficiency in IT. According to one CEO, "The CEO generation is still not comfortable using their own PCs." Therefore, the prospect of large-scale technology planning is far from enticing. However, RHIOs involve significant commitment of resources and high-level decision making on a range of issues related to market and business strategy. In fact, too much focus on technology in the earliest stages of a project can detract from clinical goals, effective business planning and other core priorities of the initiative.

Among the first tasks for a RHIO should be developing a mission statement. Often the discussion around mission statements reveals important information about the priorities and concerns of participants and serves as a vehicle for the group to begin to coalesce. Once established, mission statements serve as important touchstones for projects as they transition from the planning phase to implementation and beyond, helping to provide a level of accountability to the initiative and avoid diversions from the entity's central purpose. While too much time spent discussing mission will cause frustration among executives eager for action, ignoring this first step likely will lead to wasted time and poor decision-making down the road.

Finally, one of the great challenges of RHIO collaborations is that everybody involved already has full-time jobs. Yet projects cannot succeed without dedicated personnel who can commit time and attention to moving the project forward. It is important not to underestimate the level of support RHIO initiatives require in both internal resources and outside assistance, and to staff the initiative accordingly.

3. ASSESS YOUR INTERNAL CAPACITY.

While RHIO efforts often have a collaborative, community focus, it is up to each institutional member to understand how the initiative will play out within its own four walls. Thus, hospital executives should assess the technological readiness of their hospitals and affiliated physicians by considering:

- How much electronic information is currently available?
- What is the status of the hospital's hardware systems?

- What is the size and the technical competence of the IT staff?

- What is the status of other internal IT projects?

Executives also should consider the availability of their own staff time to support and guide the initiative and their institution's ability to contribute financial resources to the RHIO's planning, implementation and operational activities. For those hospitals that do not have significant IT capacity, a RHIO may be a way to centrally develop such capabilities, thereby sharing the cost over many providers. Regardless of whether a hospital ultimately decides to participate in a RHIO, the process of assessing the institution's internal capacity will be valuable for considering future efforts.

4. CONSIDER THE RISKS AND BENEFITS OF BEING A PIONEER.

Those who pioneer efforts in any field suffer from a steeper learning curve than those who follow. Investment in HIE at this early stage in the market's development carries the risk that shifts in the public or private sector could require costly adaptation of systems at a later date. Efforts to create standards and protocols that will lay the groundwork for a national network for HIE are under way, and initiatives that seek to establish systems before those standards are in place risk finding their investments obsolete.

On the other hand, those who are engaged in early efforts are best positioned to form policy and take advantage of the benefits of new systems. Hospital executives who are involved in RHIO efforts expressed a mix of entrepreneurial spirit, a desire to get in front of emerging trends and a belief that the best defense is a good offense. According to one executive, "With government pushing it and third-party payers pushing it, some of this is inevitable. And I don't like things crammed down my throat. I want to shape it from the front end." Another executive put it this way, "This is a movement that is taking place and we want to be a part of it and have an effect on what's being done."

5. LET CLINICAL AND CARE IMPROVEMENT PRIORITIES DRIVE THE PROJECT.

Health information exchange collaborations are, first and foremost, about health care. Clinical improvement goals, supported by careful business planning, should drive the project, with technology serving as means to support the clinical ends.

A range of clinical initiatives can lead to enormous improvements in hospital-physician communication and significantly enhance quality improvement programs, which are increasingly becoming a hallmark of successful hospitals. In addition, RHIOs can facilitate the implementation of population-based care improvement initiatives, such as disease management projects and registries, and initiatives that engage patients more directly in their care through personal health records and other means. Staying focused on clinical goals will help ensure that the multitude of implementation challenges related to legal, technology, finance, privacy and other issues will be approached in a way that serves the ultimate purpose.

6. RECOGNIZE THE NEED TO BUILD TRUST AND GOOD WILL.

The natural tension inherent in a collaborative planning effort among competing entities requires some frank and thoughtful discussion at the outset. Many early stage projects are characterized by concerns about the motives and actions of fellow participants, especially when there is not a strong history of collaboration among competitors. Developing a list of guiding principles allows participants to state clearly and directly their commitment to the process. One key principle is a commitment to openness and transparency. Another important principle is that health information is not to be used for competitive advantage. In order to build trust among participants, guiding principles need to be endorsed at the CEO level and communicated to all senior management.

7. CREATE A PLATFORM FOR SHARED INVESTMENT AND FINANCIAL SUSTAINABILITY.

While most early projects have been supported with significant grant funding, RHIOs cannot succeed in the long

term without developing a sustainable business plan. Effective business plans create a platform for local investment and shared financing. Incorporating financial incentives — such as pay-for-performance or pay-for-use programs — into the business planning increases the likelihood of success.

The business plan also should reflect the incremental approach of the initiative. With each stage of the project's rollout, participants should develop a clear understanding of who pays and who benefits. Focusing on incremental value creates momentum and builds accountability into the project. In the words of one CareSpark executive, "Our business plan has been key — it has given us a solid foundation on which to build." His advice to other CEOs: "Don't put the cart before the horse. Even with a solid foundation, this is a precarious endeavor."

8. BUILD PRIVACY AND SECURITY INTO THE BUSINESS AND TECHNICAL INFRASTRUCTURES.

RHIOs cannot succeed without ensuring that they meet both legal and public expectations related to privacy and security of health care information. This can only be accomplished through developing business practices and deploying technical infrastructures that meet or exceed HIPAA and state law requirements.

9. HAVE A STRATEGY FOR ENGAGING PUBLIC PARTNERS.

While public partners have not been at the forefront of most emerging RHIOs, they should not be ignored. As the payer for Medicaid and state employees, state government is often the single largest payer for health care services in a state. State and federal governments also may offer grant funding that can support planning and/or help provide financing for capital investment. Because state laws govern issues related to privacy, fraud and abuse and antitrust, the state's role as regulator often proves important to HIE efforts. Finally, state and local governments' interest in monitoring and protecting the public health often are directly relevant to the goals of the exchange and may provide an additional source of financing.

10. BE REALISTIC ABOUT TIMEFRAMES.

Should hospital executives agree to commit their institutions to participating in RHIO collaborations, they should do so with the understanding that it is a multi-year endeavor. While early efforts have taken six to 10 years to establish operations and some sort of sustainability, it is likely that emerging projects, which have the benefit of the experiences of their predecessors and improvements in technological capabilities and standards development, may take less time. Nevertheless, it should be anticipated that the first planning phase will take one to two years and implementation an additional one to four years, depending on their goals. In the words of one executive, "This is going to take time. No way around it."

Conclusion

Hospitals and their patients have much to gain from prudent investment in health IT. While it is still early in the development cycle and significant risks exist, HIE offers the potential to enhance the benefits of health IT exponentially. Ultimately, the decision to participate in a RHIO depends on an individual institution's needs and capacity, the viability and goals of the RHIO itself, and the regional marketplace characteristics. Whether through active leadership or watchful waiting, few hospitals can afford to ignore the emerging RHIO trend entirely.

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[2] National Committee on Vital and Health Statistics, "Assuring a Health Dimension for the National Information Infrastructure" (October, 1998); Institute of Medicine, "To Err is Human: Building A Safer Health System" (November 1999); Institute of Medicine, "Crossing the Quality Chasm: A New Health System for the 21st Century" (March 2001).

[3] See White House website: http://www.whitehouse.gov/news/releases/2004/04/20040427-4.html.

[4] Office of the National Coordinator for Health Information Technology, Department of Health and Human Services, "Framework for Strategic Action: The Decade of Health Information Technology: Delivering Consumer-centric and Information-rich Health Care," (July 2004).

[5] S. Rosenfeld, C. Bernasek, and D. Mendelson, "Medicare's Next Voyage: Encouraging Physicians to Adopt Health Information Technology," *Health Affairs* 24, no. 5 (2005): 1138-1146.

[6] DDB Issues and Advocacy, "Health Information Technology: Federal Policy Landscape," prepared for the Community Clinics Initiative (2005).

[7] S. 1418 passed the U.S. Senate on November 18, 2005 and was sent to the U.S. House of Representatives for consideration (H.R. 4642).

[8] New York State Department of Health and Dormitory Authority of the State of New York, "Request for Grant Applications: HEAL NY Phase 1: Health Information Technology (HIT) Grants" (October 2005).

[9] On February 6, 2006, Rhode Island Gov. Carcieri proposed earmarking $20 million in the Governor's Innovation Bond Fund for health information technology. These funds will leverage federal and private resources to secure hardware, software and the network capabilities necessary to share, secure, and compile medical data. While more providers are adopting electronic health records, the state funding will play an important role in designing, implementing, and overseeing such a network.

[10] J. Halamka et. al., "Exchanging Health Information: Local Distribution, National Coordination," *Health Affairs* 24, no. 5 (2005): 1170-1179.

[11] http://www.calrhio.org/.

[12] Med-Vantage, Inc., "Pay for Performance Issues & Trends: Pay for Performance Issues & Trends: Key Findings from the Med Key Findings from the Med-Vantage Vantage 2005 National P4P Survey" (2005).

[13] The Bridges to Excellence initiative is comprised of three individual programs: The Physician Office Link, which encourages reducing errors in exchange for payment to physicians to increase quality; The Diabetes Care Link, and The Cardiac Care Link, both of which provide rewards to patients who use disease management tools and payment to top-performing physicians (http://www.bridgestoexcellence.org/bte/). The Leapfrog Group, which currently manages a national compendium of all incentive and reward programs updated on a voluntary basis by those listed, will now begin a partnership with Med-Vantage to collaborate on a national survey and compendium tracking all incentive and pay-for-performance programs, whether aimed at health plans, providers, or consumers (http://www.leapfroggroup.org/). The Integrated Healthcare Association provides four pay-for-performance domains: the Clinical Measure Domain, the Patient Experience Domain, the Information Technology Domain, and the Bonus Opportunity Domain, all of which are developed through rigorous stakeholder criteria meetings to determine the measures and the rewards (http://www.iha.org/index.html).

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[20] *Ibid.*

[21] AHRQ is currently funding an evaluation of a statewide regional health information exchange in Indiana emergency departments to demonstrate actual cost savings related to the effort and develop a business case for replication. See Statement by Carolyn M. Clancy, M.D., Director, Agency for Healthcare Research and Quality, U.S. Department of Health and Human Services, on Health Information Technology Activities at the Agency for Healthcare Research and Quality before The Committee on Commerce, Science, and Transportation Subcommittee on Technology, Innovation, and Competitiveness United States Senate (June 30, 2005) available at http://www.hhs.gov/asl/testify/t050630.html.

[22] American Hospital Association, "Forward Momentum: Hospital Use of Information Technology" (October 2005).

[23] C. McDonald et. al., "The Indiana Network for Patient Care: A Working Local Health Information Infrastructure," *Health Affairs* 25, no. 5 (2005): 1214-1220.

[24] The Health Information Security and Privacy Collaborative (HISPC), comprised of RTI, the National Governor's Association and up to 40 states, is assessing these challenges and developing solutions to overcome them under a contract with ONC. The 40 states will work with local RHIOs to ensure that those directly responsible for the decisions are involved.

[25] Among other things, the donations may not include hardware, operating system software or connectivity, and the hospital must not have knowledge that the physician already has access to equivalent technology. CMS and the OIG are also considering whether to set a dollar limit on the value of donations.

Appendix A
Profile of Federal Strategies

There are many reasons why the health care industry has not invested heavily in health information technology (IT). These reasons include, most prominently, barriers imposed by misaligned financial incentives, complex privacy rules, fraud and abuse and antitrust laws, and the professional culture of physician practices that places an enormous emphasis on confidential communications with individual patients. Indeed, efforts to institute electronic health records (EHRs) and clinical health networks date back to the 1960s, but have repeatedly floundered on the structural and financial barriers created by the fragmented American health care system.

For hospital executives, the failure in the 1990s of Community Health Information Networks (CHINs) provides a particularly poignant reminder of the pitfalls of multi-stakeholder collaborative efforts to invest in shared IT infrastructure. Competing entities involved in CHIN projects were reluctant to share information that would undermine their competitive advantage. In some cases, organizers were too technologically ambitious in their plans. In others, entities that invested in the effort received insufficient return on investment to warrant continued contribution. Interest in, and funding for, the early exchange efforts waned when start-up money (usually grants) was exhausted before competing organizational needs could be aligned and the systems fully deployed.

Yet, notwithstanding this legacy of failure, hospital executives today find themselves making decisions about whether and how to participate in emerging health information exchange (HIE) projects that may have a significant impact on their futures. While there is still good reason to be cautious, given the early stage of development of many HIE projects, participation in these projects could potentially be a distinguishing feature of successful hospitals in years to come.

Over the past few years, the federal government and the strong leadership of the private sector have made progress in setting the stage for transforming health care delivery through vastly improved use of health IT. In 1998, the National Committee on Vital and Health Statistics (NCVHS), a federal advisory committee composed of private sector experts, reported that the nation's information infrastructure could be an essential tool for promoting the nation's health in its seminal concept paper, "Assuring a Health Dimension for the National Information Infrastructure."[1] Following this, the Institute of Medicine (IOM) released two reports — "To Err is Human: Building a Safer Health System" (1999) and "Crossing the Quality Chasm: A New Health System for the 21st Century" (2001) — which catapulted the issue of health IT to the national stage by observing that more Americans die each year from preventable medical errors than from AIDS-related illnesses or cancer.[2] These and other important works have led to a near universal conclusion that, in the words of George Halvorson, chairman and chief executive officer of Kaiser Foundation Health Plan Inc. and Kaiser Foundation Hospitals, "Trying to create an accountable system or a well functioning health care marketplace without accurate, accessible, meaningful, and timely data is an exercise in futility."[3]

Since the NCVHS's and IOM's calls to action, much progress has been made toward the development of a national health information infrastructure. In 2002, the Markle Foundation organized Connecting for Health, a large, multi-stakeholder collaborative including many hospital leaders. In 2004, the Foundation released a report, "Preliminary Roadmap for Achieving Electronic Connectivity in Healthcare," which set forth a Common Framework for information exchange intended "to facilitate the transfer of selected information from one endpoint system to another, as is required for providing care and supporting informed patient participation."[4]

Consistent with developments in the private sector, federal policy also has focused on developing a uniform approach that will allow multiple HIE networks to com-

municate successfully with each other. In 2003, the federal government announced the Consolidated Health Informatics (CHI) initiative involving the departments of Health and Human Services (HHS), Defense (DoD), and Veterans Affairs (VA). This initiative set uniform standards for the electronic exchange of clinical health information across the federal health care enterprise.

In April 2004, President George W. Bush issued Executive Order 13335 calling for widespread adoption of interoperable EHRs within 10 years, and establishing the Office of the National Coordinator for Health Information Technology (ONC). Shortly thereafter, David J. Brailer, M.D., Ph.D. was appointed as the first National Coordinator for Health Information Technology. By July 2004, the ONC released a *Framework for Strategic Action* which described a set of strategic actions, embraced by both the public and private health sectors, needed to realize the vision of transforming health care. The *Framework* laid out four goals: to inform clinical practice, interconnect clinicians, personalize care and improve population health.

The federal government's approach has been to focus on the steps needed to build a national architecture to enable networks — whether they are defined geographically or by affinity groups — to exchange information. Accordingly, the limited federal funds that have been made available have been directed toward contracts that will support the creation of national health information communication and exchange capabilities (Table A-1).

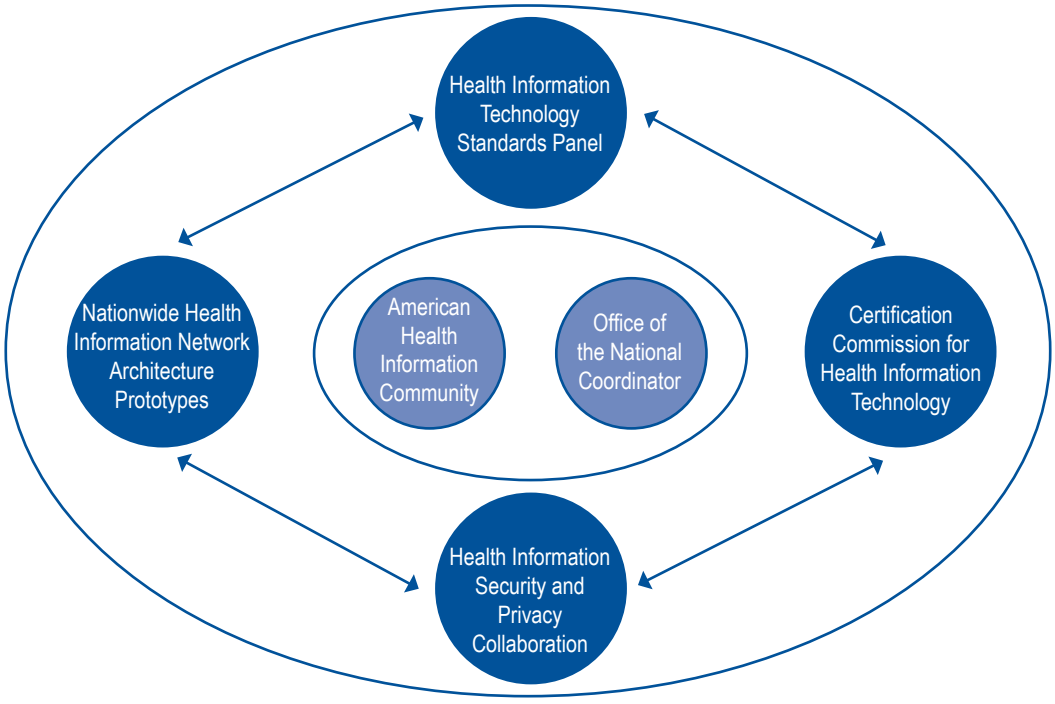
The federal contracts are aimed at creating what has been referred to as a National Health Information Network (NHIN).

In September 2005, HHS Secretary Michael Leavitt created the American Health Information Community (the Community), a federally chartered commission to provide input and recommendations to HHS on how to make health records digital and interoperable, and assure that the privacy and security of those records are protected in a smooth, market-led way. The Community and the multiple health IT contractors indicated above will work together to drive specific health IT applications along with the market development and capacity building among the four main health IT contracts. The Community consists of a combination of key leaders in the public and private sectors representing stakeholder interests in advancing its mission and who have strong peer support. Exhibit A-1 shows the federal health IT leadership structure.

Table A-1: Contracts from the Office of the National Coordinator of Health Information Technology

Initiative	Purpose	Amount
Health Information Technology Standards Panel	Develop, prototype and evaluate a harmonization process for achieving a widely accepted and useful set of health IT standards that will support interoperability among health care software applications, particularly EHRs.	$3.3 million
Certification Commission for Health Information Technology	Develop criteria and an evaluation process for certifying EHRs and the infrastructure or network components through which they interoperate.	$2.7 million
Nationwide Health Information Network Architecture Prototypes	Design and implement four prototypes to share secure information among hospitals, laboratories, pharmacies and physicians. Develop a structure to share information among all four networks, thus establishing a single infrastructure.	$18.6 million
Health Information Security and Privacy Collaboration	Assess and develop solutions to address how the variation in state privacy and security laws, and business practices can be harmonized to support HIE and use.	$11.5 million

Exhibit A-1: Federal Health IT Leadership and Organization



Other federal agencies also are supporting investments in health information technology. The Centers for Medicare and Medicaid Services (CMS) has a number of initiatives designed to encourage the growth of HIE, including a pay-for-performance demonstration program for doctors who treat Medicare patients. The Agency for Healthcare Research and Quality (AHRQ) in 2004 announced $139 million in grants to drive the adoption of health IT. These grants were spread across 38 states to a number of health care stakeholders; five grants of $1 million annually for five years were awarded to states to specifically develop HIE networks.

Congress has also focused considerable attention on federal policy and funding for health IT. Members of Congress have advanced a number of proposals to develop standards for IT, enhance privacy protection for patient data, appropriate funds for clinician adoption and for the establishment of regional collaborations, and assist providers in improving care quality. In 2005 alone, nine bills were introduced related to health IT, concrete evidence of the important nature of this issue.[5] The *Wired for Health Care Quality Act of 2005*, introduced by Sens. Frist, Clinton, Enzi and Kennedy, passed the Senate unanimously in November 2005.

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Appendix B
State Initiatives

This list of state initiatives includes proposed and enrolled legislation as well as gubernatorial efforts through executive orders, budget recommendations or planning commissions related to health information technology (IT) as of March 2006. A number of these initiatives are not specific information exchange projects but do serve as enablers of future development of HIE within the states. The list is not exhaustive but demonstrates the extensive and increasing number of health IT initiatives at the state level.

State	Health Information Technology Initiatives
Arizona	**Arizona e-Health Connection Roadmap:** On August 30, 2005, Gov. Napolitano called for: a summit of health care industry leaders, technology leaders, content experts, major employers, community leaders and interested government agencies to solicit input and participation in the creation of a state e-health information infrastructure; and a road map created by a diverse Steering Committee (chaired by the Director of the Government Information Technology Agency) that will identify directions and goals for providers, insurers and consumers (including goals related to privacy and security) as well as funding resources to support a statewide e-health information exchange. The summit was held in October 2005, and the Steering Committee must submit its road map to the Governor by the end of April 2006. **Arizona Telemedicine Program:** A large, multidisciplinary program at the University of Arizona providing telemedicine services (the practice of medicine using a telecommunications system to provide clinical services at geographically separate sites), distance learning, informatics training, and telemedicine technology assessment capabilities to communities throughout Arizona. It was funded in 1996 by the legislature, which mandated that it provide telemedicine services to a broad range of health care service users, including geographically isolated communities, Indian tribes and Department of Corrections rural prisons. Currently the Arizona Telemedicine Program is providing medical services in 20 communities via real-time (using interactive video conferencing) and store-and-forward (relying on transmission of images and data for review immediately or at a later time) technologies.
California	**AB 354:** Signed by Gov. Schwarzenegger on September 30, 2005, this legislation adds a provision to the state's Medical Practice Act, which regulates telemedicine, allowing Medi-Cal-sponsored dermatology and ophthalmology services to occur by store-and-forward telemedicine. The law commences on July 1, 2006, to the extent that federal financial participation is available and requires the Department of Health Services to report to the legislature, the number and type of services provided under this specific benefit by January 1, 2008. **AB 1388:** This currently pending bill would authorize the Public Utilities Com-

mission to establish a Telemedicine Demonstration Grant Program (as well as a Community Based Supplemental Educational Demonstration Grant Program) that would award grants to health care facilities offering telemedicine services (as well as grants related to community education). Health care facility is defined to include Section 501(c)(3) tax-exempt hospitals, diagnostic and treatment centers, neuropsychiatric or mental health facilities, hospices or nursing homes.

Colorado

SB 244: This bill, signed into law by Gov. Owens on May 26, 2005, authorizes the development and negotiation of interstate compacts and model legislation that would advance the delivery of health care services via telemedicine as well as the portability of medical and nursing licenses issued by signatory states. Authority for this is given to the Executive Director of the Department of Regulatory Agencies, together with the State Board of Medical Examiners and the State Board of Nursing, and in consultation with representatives of other relevant state agencies.

Connecticut

HB 6557: This bill was signed into law by Gov. Rell, and became effective on October 1, 2005. It provides that: all doctors licensed in the state may generate prescriptions using an electronic prescribing system; a health care institution licensed by the Department of Public Health may create, maintain or utilize medical records or a medical records system in electronic format, paper format or both (provided such records or system are designed to store medical records or patient health information in a medium that is reproducible and secure); and the Office of Health Care Access has discretionary power to exempt a health care facility or institution from certificate of need review if such place proposes to purchase or operate an electronic medical record (EHR).

Delaware

Delaware Health Information Network: Created by an act of the general assembly and signed into law in 1997, the law seeks to develop a community-based health information network whose patient clinical and financial information will: promote more efficient and effective communication among health care providers; create efficiencies in health care costs; create the ability to monitor community health status; and provide reliable information to health care consumers and purchasers about the quality and cost-effectiveness of health care, health plans and health care providers. It is a public-private partnership that brings together various state agencies, insurers, the Association of Delaware Hospitals and the Medical Society of Delaware. The network is under the direction and control of the Delaware Health Care Commission.

Florida

The 2004 Affordable Health Care for Floridians Act: This bill, signed into law by Gov. Bush in June 2004, contains many measures aimed at improving access to quality, affordable health care. Measures related to health information exchange are: requiring public Internet access to medical and health financial information; creating the Florida Patient Safety Corporation to collect, analyze and evaluate patient safety data and related information; and developing EHRs by the Corporation and state agencies.

Governor's Health Information Infrastructure Advisory Board: On May 4, 2004, Gov. Bush issued Executive Order No. 04-93 to create this 11-member Advisory Board whose members represent the provider community, IT experts and health care policy experts. The Advisory Board is charged with advising and supporting the Agency for Health Care Administration (AHCA) to develop and implement a strategy for a Florida health information infrastructure and the adoption and use of EHRs.

SB 838: Gov. Bush signed this bill into law in 2005. It requires the Agency for Health Care Administration to contract by April 1, 2006, with an entity to design a database of clinical utilization information or electronic medical records for Medicaid providers. This system must be Web-based and allow providers to review on a real-time basis the utilization of Medicaid services, including, but not limited to, physician office visits, inpatient and outpatient hospitalizations, laboratory and pathology services, radiological and other imaging services, dental care and patterns of dispensing prescription drugs in order to coordinate care and identify potential fraud and abuse.

Georgia

SB 204: This bill was signed by Gov. Perdue on May 2, 2005. It allows providers to create, maintain, transmit, receive and store records in an electronic format (noting that providers do not need to maintain hard copies of electronically stored records, and that a copy reproduced from an electronic record shall be considered an original).

Hawaii

SB 114/HB 1053: This pending bill would establish a statewide program to enable FQHCs to obtain state resources for acquiring or upgrading EHRs or other major information systems to provide or support primary care and prevention services. (The bill also provides FQHC funding for facility improvement.)

HB 694: This pending bill would provide a tax exemption to the general excise tax on physician services for a taxpayer (who is a sole proprietor, corporation or any other legal entity) who incurs at least $500 in qualifying health IT costs (defined as amounts paid to purchase, lease or license hardware, software, or Internet access used in connection with medical practice).

Indiana

SB 330: This bill was signed by Gov. Daniels on May 25, 2005. It establishes electronic health care transactions by authorizing the use of electronic signature authentication and identification with respect to individually identifiable health information (including the keeping and transfer of medical records, medical billing, health care proxies, health care directives, consent to medical treatment, medical research and organ and tissue donation or procurement).

State	Health Information Technology Initiatives
Iowa	**HF 456:** This pending bill would establish the Health Care Information Technology and Infrastructure Advisory Committee to assist the Iowa Department of Public Health in developing a health care IT strategic plan relating to the establishment of a statewide interoperable health care information infrastructure within a 10-year period.
Kentucky	**Kentucky e-Health Network Board:** This "e-health bill," signed by Gov. Fletcher on March 8, 2005, creates a board to oversee the development, implementation and operation of a statewide electronic health information network of voluntary participants using federal and voluntarily contributed funds. **Kentucky Health Care Infrastructure Authority:** The Authority is a joint venture between the University of Kentucky and the University of Louisville that will conduct research on health information electronic applications, conduct pilot projects and serve as a forum for the exchange of ideas and consensus building related to health information infrastructure and applications. The Authority reports annually to the governor and various state agencies.
Maine	**Maine Health Data Organization:** MHDO was established by the Maine Legislature in 1996 as an independent executive agency to create and maintain a publicly accessible health information database by collecting, processing, analyzing and reporting clinical, financial, quality and restructuring data. MHDO policy is governed by a board that includes health care providers, third-party payers, employers and consumers. **LD 637:** Signed by Gov. Baldacci on March 24, 2006, this law establishes a telecommunications education access fund for qualified libraries, school and health centers (FQHCs and other free-access health centers deemed qualified by the state) to assist in paying the cost of acquiring and using advanced telecommunications technologies. **Dirigo Health Reform Act:** Also known as Public Law 469, this is a set of initiatives toward comprehensive health care reform signed into law in June 2003. The 2004 State Health Plan (required by the Dirigo Act) identified two key objectives for the quality of health care in Maine: improve data and IT systems to provide tools to measure and improve quality; and develop incentives and support for an EHR for each citizen while ensuring privacy.
Maryland	**SB 251:** Signed by Gov. Ehrlich on May 10, 2005, the bill establishes a Task Force to Study Electronic Health Records composed of a diverse group of stakeholders, including state representatives, the deans of medical schools in the state and representatives of various government agencies and health care sectors (hospitals, laboratories, etc.). The Task Force is directed to study EHRs and their current and potential use in the state, including electronic transfer, electronic prescribing, com-

puterized physician order entry and the cost of implementing these items. The Task Force is required to report its findings to the Governor on or before December 31, 2007.

Massachusetts Gov. Romney's Executive Office of Health and Human Services is developing a five-year statewide health IT strategic framework and plan. The governor also joined with the Massachusetts eHealth Collaborative to announce its 2005 launch of pilot programs to test large-scale, community-wide electronic medical records in three Massachusetts communities.

Minnesota During the 2004 legislative session, the Minnesota legislature agreed that expanding the use of interoperable EHRs was a top health priority and directed the Minnesota Department of Health to convene a group to provide recommendations and advice on how best to accelerate progress in Minnesota. An e-Health Steering Committee was convened from September 2004 to June 2005.

Minnesota e-Health Initiative: This initiative is a public-private collaborative effort to improve health care quality, increase patient safety, reduce health care costs and enable individuals and communities to make the best possible health decisions by accelerating the adoption and use of health IT. This new advisory committee will build on the work done by the e-Health Steering Committee.

HF 139: Signed by Gov. Pawlenty on July 14, 2005, the bill states that the Commissioner of Health shall establish a Health Information Technology and Infrastructure Advisory Committee to advise the Commissioner on the following matters: assessment of the use of health information technology by the state, licensed health care providers and facilities, and local public health agencies; recommendations for implementing a statewide interoperable health information infrastructure, to include estimates of necessary resources, and for determining standards for administrative data exchange, clinical support programs, patient privacy requirements and maintenance of the security and confidentiality of individual patient data; and other related issues. The bill also states that the Commissioner shall develop a statewide plan for all hospitals and physician group practices to have in place interoperable EHRs by January 1, 2015.

SB 1639: This currently pending bill would establish a loan program to help physicians and group practices obtain the necessary finances to install an interoperable electronic medical record system.

New Hampshire **HB2-FN-A:** Signed by Gov. Lynch on June 30, 2005, the bill provides that the Department of Health and Human Services shall apply for federal funding to develop an electronic health information infrastructure that enables performance measurement, care coordination and case management in the delivery of state-funded health insurance services. The bill also provides that as part of the electronic health

information infrastructure, the department may, in conformance with HIPAA requirements, enter into collaborative agreements with the Department of Insurance, private health insurance plans, hospitals, clinics, physicians' offices and other health care providers on the use of IT as a means of cost containment and quality improvement in the delivery of such services.

New Mexico

Telehealth Act of 2004 (HB 581): This act provides a framework for health care providers to follow in providing telehealth services to New Mexico citizens when it is impractical for those citizens to receive health care consultations face-to-face with health care providers.

Telehealth Commission Act of 2005 (SB 473): This act creates a New Mexico Telehealth Commission of diverse stakeholders (providers, payers, consumers, the telecommunications industry and various state agencies) to encourage a single, coordinated statewide effort to create a telehealth system. The Commission is charged with identifying uses for and barriers to telehealth, coordinating public- and private sector initiatives to enhance connectivity and expand telehealth capacity, and developing telehealth standards and guidelines to ensure quality care.

New York

Health Care Efficiency and Affordability Law for New Yorkers Capital Grant Program (HEAL-NY): In 2004 the state created this $1 billion capital financing program to reform and reconfigure the state's health care delivery system and to encourage improvements and efficiency in operations. The state is currently considering applications for the first phase of the health IT initiative in which it is anticipated that a total of $53 million in grants will be distributed. Grants will likely be between $50,000 and $10 million and will support the development of clinical information exchange projects, the creation of e-prescribing capabilities and the use of EHRs.

Health Information Technology Workgroup: The State Department of Health (NYSDOH) established this workgroup, which includes representation from the departments and divisions of the NYSDOH and other state departments and agencies that are affected by health IT in early 2005. The goals of this workgroup are to provide communication and coordination among state government agencies and to make recommendations on policy positions.

Statewide Stakeholder Group: The NYSDOH is in the process of organizing a statewide stakeholder group to represent all the interests within the state on health IT-related issues and policies. The NYSDOH has formed a high-level, multistakeholder committee to develop a plan for the stakeholder group by June 2006.

North Carolina

North Carolina Healthcare Information and Communications Alliance: Gov. Hunt created NCHICA in 1994 as a nonprofit consortium to foster the development and implementation of a statewide health care information system. Today the consortium includes over 220 organizations in the state, including providers, payers,

professional associations, law firms, health care and IT consulting firms, vendors and state and local government agencies. Current projects include working with IBM to develop a Nationwide Health Information Network Architecture Prototype, and a project with local public health directors to help them accelerate the adoption of IT to improve public health (funded by the state's Health & Wellness Trust Fund Commission).

Oklahoma

HB 1447: This pending bill would authorize grants to public hospitals or health care facilities for telemedicine programs. The authority is contingent upon the provision of appropriated funds designated for telemedicine services programs and requires that the recipient match the grant with its own funds or in-kind distributions. The goal of the program is to use telemedicine to provide greater access in rural areas to health care services, expand the range of services available to these patients, reduce patient transfers to urban areas and reduce the cost of medical care.

Oregon

Oregon Health Policy Commission: This commision was created in 2003 by HB 3653 to develop and oversee health policy and planning for the state. The Commission created an Electronic Health Records & Health Data Connectivity Subcommittee to develop recommendations for fostering the adoption of EHRs and for developing infrastructure for the secure exchange of electronic health data. The subcommittee produced a major report in March 2005 for the Assembly explaining the value of and barriers to EHRs and the state's role in financing their development.

SB 541: This pending bill would create a Task Force on Electronic Medical Records to study and make recommendations on the development and promotion of standards for transfer and exchange of EHRs and health-related data.

Rhode Island

Rhode Island Healthcare Information Technology and Infrastructure Development Fund: In July 2004 Gov. Carcieri signed into law SB 2651 establishing the Fund within the State Department of Health to promote the development and adoption of health IT designed to improve the quality, safety and efficiency of health care services, and the security of individual patient data.

Robert Wood Johnson Foundation Grant: In December 2005, Rhode Island received a grant to support the state's health IT efforts. The state plans to focus on short-term strategies such as increasing the number of health care professionals who adopt a common set of standards for exchanging laboratory data.

Health Information Network Bond Fund: In February 2006, Gov. Carcieri proposed that $20 million in the Governor's Innovation Bond Fund be earmarked for health IT to develop a real-time system of patient health care information that reduces health care costs and improves the overall quality of care that patients receive.

State	Health Information Technology Initiatives
South Carolina	**SB 305:** This currently pending bill would authorize the Director of the Office of Information Technology of the State Budget and Control Board to convene an Information Technology Planning Team to develop plans for the efficient and effective use of IT by health and human service agencies. The director must include an equal number of private-sector IT professionals on the team. The advisory committee will guide public agencies in designing and managing health and human service agency information systems.
Tennessee	**eHealth Coordinating Council:** In January 2006, Gov. Bredesen announced the statewide eHealth Coordinating Council to guide the ongoing development of eHealth initiatives across the state to ensure interoperability, facilitate the definition of uniform standards, eliminate duplication of effort and reduce competition for resources. **Tennessee Volunteer eHealth Initiative:** Launched by the state in 2004 as a technology pilot project, this initiative provided the foundation for hospitals, physicians, clinics, health plans and other health care stakeholders in southwestern Tennessee to work together to establish regional data-sharing agreements. Although TennCare, the state's Medicaid managed care plan, was a catalyst for this effort, the initiative has expanded to focus on improving the health care of all Tennesseans. **Community Connection:** The program, operated by BlueCross subsidiary Shared Health, creates a patient-centered community health record that allows multiple providers treating the same patient to view that patient's medical information via a secure Web site. TennCare enrollees will be the first to participate in this program. Eventually Shared Health services will be expanded and offered to all Tennesseans, and it will also be made available to other insurers.
Texas	**SB 1340:** This bill, signed by Gov. Perry and effective September 1, 2005, sets regulation and reimbursement of health care services provided through telehealth or telemedicine under the state Medicaid program. **SB 45:** This bill, signed by Gov. Perry and effective on September 1, 2005, instructs the statewide health coordinating council to form an advisory committee on health IT. The advisory committee will develop a long-range plan, including the use of EHRs, computerized clinical support systems, computerized physician order entry, regional data-sharing interchanges for health care information and other methods of incorporating IT in pursuit of greater cost-effectiveness and better patient outcomes in health care.
Utah	**Utah Telehealth Network:** In 1995, the Utah Legislature approved a onetime $200,000 allocation to support a pilot project for telemedicine at the behest of Gov. Leavitt. At the same time, the University of Utah Health Sciences Center established the Telemedicine Outreach Program, developed to link the University with its

clinic on the Nevada border. Over time the initiatives became the Utah Telehealth Network, consisting of a hub at the University of Utah Health Sciences Center directly connected to over 25 sites throughout Utah, including rural hospitals, clinics and local health department offices. The network provides patient care, including emergency services such as telestroke and teleburn assessment, transmission of radiology images, continuing education for health professionals and patients and connections to facilitate business and administrative meetings. In 2006 the Utah Telehealth Network received ongoing state support of $500,000 per year.

Virginia

Governor's Task Force on Information Technology in Health Care: Created in January 2005 by Gov. Warner, the Task Force is responsible for developing and implementing a state health information system that better uses technology and EHR systems to improve the quality and cost-effectiveness of health care. The initial objectives are to evaluate the use of EHR and other technologies to improve Virginia's health information structures as well as to study how to ensure that the privacy and security of health information is maintained. In the second year, the Task Force will identify specific recommendations to implement a Virginia health information infrastructure.

Washington

Washington State Public Health Information Technology Committee: The Committee was created to provide a forum for coordination of IT planning across many separate public health entities so that communications and data transfer systems are compatible, reliable, secure and cost-effective. The goal is for public health professionals to have access to information when and where they need it by employing appropriate and effective technology, in the background, to make the work of ensuring the publics' health easier, more efficient and more effective. The Committee is a part of the Public Health Improvement Partnership, which guides the development and implementation of a plan for collaborative action to bring about improved health in all the communities of Washington State.

SB 5064: This bill was signed by Gov. Gregoire on May 4, 2005, creating the Washington Health Information Infrastructure Advisory Board (WHIAB) to encourage the use of health IT to support high-quality, cost-effective health care. The WHIAB is developing a strategy for the adoption and use of EHRs and health IT that is consistent with emerging national standards and promotes interoperability of health information systems. The Board submitted an interim report in December 2005 and will complete a final report for the governor on December 1, 2006.

West Virginia

SB 170: This bill, signed by Gov. Manchin on March 22, 2006, creates the West Virginia Health Information Network to facilitate the communication of patient clinical and financial information among health care stakeholders. The legislation provides for the establishment of a governing board and the authorization of funding from the state's Health Care Authority.

State	Health Information Technology Initiatives
Wisconsin	**eHealth Care Quality and Patient Safety Board:** Gov. Doyle created the Board on November 2, 2005, to recommend a plan of action to create a statewide health information infrastructure. The Board shall make recommendations to the governor to identify funding resources and technology options, ensure privacy and security, facilitate the adoption of EHRs, and establish a governance structure for a statewide HIE.
Wyoming	**Wyoming Healthcare Commission:** In 2003, the legislature created the Wyoming Healthcare Commission. The Commission is working toward the development of a long-term, sustainable plan for supporting the effective, efficient and secure exchange of health information across the spectrum of health care stakeholders. The Commission is charged with examining a wide range of health care issues and drafting specific recommendations designed to improve access to, and quality of, health care in Wyoming communities. In 2003, the Commission recommended that the state legislature fund a feasibility study for the creation of a statewide HIE. **Information Technology Technical Management Subcommittee:** In 2004, the legislature created the Information Technology Technical Management Subcommittee, following the recommendation of the Wyoming Healthcare Commission, and allocated $400,000 to study the feasibility of and plan for a uniform statewide health care information and communications technology system. An outcome of this project was the creation of the Wyoming Health Information Organization (WyHIO), which plans to facilitate statewide information exchange. **SF 50:** As a result of the report released by the Information Technology Technical Management Subcommittee of the Healthcare Commission, this pending legislation would authorize the governor to designate an organization to serve as a statewide RHIO. The legislation would also appropriate $9.9 million in funding for the development of a statewide hub and e-prescribing infrastructure.

Note: This chart was compiled from the following sources: State legislature and gubernatorial Web sites; "eHealth Initiative Connecting Communities State Legislative Tracking Center," available at http://ccbh.ehealthinitiative.org/communities/community.aspx?Section=288; and "Government Health IT: A Guide to Public Policy and its Applications in Health IT," available at http://www.govhealthit.com.

Appendix C
Background Information on Case Studies

	Nebraska Health Information Initiative (NeHII)	CareSpark	Indiana Health Information Exchange (IHIE)
Started	2005	2003	Formed in 2004; however, exchange efforts have been under way since the late 1990s.
Background	NeHII was initiated by the Chamber of Commerce looking to enhance health care technology — bioinformatics was the first initiative. The Nebraska Hospital Association was also involved early to secure hospital support.	CareSpark was initiated by members of the Community Health Improvement Partnership to explore ways to share health information securely, efficiently and cost-effectively.	IHIE was created in 2004 to support the Indiana Network for Patient Care (INPC). INPC had been capturing and sharing data among hospitals, laboratories and medication management companies in Indianapolis.
Status	Planning stage.	Planning close to complete, implementation to begin shortly.	Clinical messaging service is operational. Implementation of medication history underway.
Operational	No.	No — medication improvement and decision support will be launched first.	Yes — clinical messaging, medication history and clinical quality applications.
Technical Approach	Peer-to-peer links and a central data repository are both under consideration.	Hybrid — federated databases with a central data repository for limited sets of information.	Data is held by providers. IHIE acts as coordinating entity.
Organizational Model and Governance	Collaborative effort with committees. No formal structure.	Multi-stakeholder board with clinical focus. Workgroups also meet, with broad community participation.	Multi-stakeholder board.
Funding	Blue Cross/Blue Shield of Nebraska funded initial planning efforts.	Initial funding comes from federal and state government, private industry, hospitals, physicians and other community organizations. User participation fees will most likely be implemented to cover operating costs.	Grants and hospital contributions funded early efforts. User fees paid by hospitals now fund operations.
Next Steps	Recruiting additional participants and developing a business plan.	Diagnostic improvement, chronic care coordination and preventive services are considered in the business plan.	Expand medication history service and initiate a pay-for-performance program with payers.

	Nebraska Health Information Initiative (NeHII)	CareSpark	Indiana Health Information Exchange (IHIE)
Project Participants	• Alegent Health • BlueCross/BlueShield of Nebraska • Bryan LGH Health System • Children's Hospital • Columbus Community Hospital • Creighton University Medical Center • Faith Regional Health Services • Fremont Area Medical Center • Good Samaritan Health System • Great Plains Regional Medical Center • Mary Lanning Memorial Hospital • Nebraska Hospital Association • Nebraska Medical Association • Nebraska Methodist Hospital • Nebraska Pharmacy Association • Panhandle Partnership • Regional West Medical Center • Saint Elizabeth Regional Medical Center • Saint Frances Medical Center • University of Nebraska-Lincoln, Center for Public Policy Research • University of Nebraska Medical Center	• BlueCross/BlueShield of Tennessee • Cardiovascular Associates • Cariten HealthCare • Cumberland Plateau Health District • Eagle's Landing Technology Services • East Tennessee State University • Eastman Chemical Company • eTechSecurityPro • Frontier Health • Health Alliance PHO • Highlands Physicians Inc. • Highlands Wellmont Physician Network • Holston Medical Group • Intellithought • James H. Quillen VA Medical Center • John Deere Health • Johnston Memorial Hospital • Kingsport Tomorrow • Laughlin Memorial Hospital • Mountain Region Family Medicine • Mountain States Health Alliance • Sullivan County Regional Health Department • United Way of Greater Kingsport • University of Virginia College at Wise • Upper East Tennessee Health Information Management Association • Wellmont Health System • Wilson Pharmacy	• BioCrossroads • Clarian Health Partners • Community Health Network • Health and Hospital Corporation of Marion County • Indiana State Department of Health • Indiana State Medical Association • Indiana University School of Medicine • Indianapolis Medical Society • Marion County Health Department • Regenstrief Institute • St. Francis Hospital and Health Centers • St. Vincent Health • The Central Indiana Corporate Partnership • The City of Indianapolis • Wishard Hospital

Appendix D
Interview Instrument & Participants

INTERVIEW INSTRUMENT

The authors used the following questions while interviewing representatives and stakeholders from the three case studies outlined in the report.

• **Stakeholder Participation.** Who is participating? What roles are hospitals playing in the effort? Who is driving the effort? Who else is at the table and what are their roles? How have competitive issues influenced the project?

• **Mission and Goals.** What do the hospitals and other stakeholders hope to achieve? What problem are they trying to solve? What are the expected benefits of the project to the participating hospitals and other leading stakeholders?

• **Governance.** How are decisions made, and what role do hospitals have in decision making? What, if any, organizational structure exists for the HIE entity? To what extent does the governance policy and structure meet the needs of hospitals?

• **Technology Approach.** What model is the HIE collaboration using, and in what ways, and to what extent, does this structure serve hospital needs? What, if any, disadvantages or challenges have arisen?

• **Clinical Approach.** What data are being or will be exchanged? What is the purpose of exchanging the data? Who will access the data?

• **Privacy and Security.** What concerns do hospitals have about privacy and security issues, and how are these concerns being addressed?

• **Financing.** How is the start up being funded? What business models are under consideration to ensure sustainability (user or participation fees, cost avoidance, pay for performance, grants)?

• **Status.** What stage of development is the HIE? Has financing been raised? Has an organization been formed? Are data being exchanged? Has there been any evaluation of the costs and benefits to hospitals or other stakeholders?

INTERVIEW PARTICIPANTS

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