



Connecting for Health: Accelerating the Effective Use of Information Technology in Health Care

Conference to increase awareness of Connecting for Health efforts to identify and promote optimal environments for personal health technologies

SUMMARY

From 2004 to 2007, the Robert Wood Johnson Foundation (RWJF) funded various aspects of the [Markle Foundation](#)'s initiative Connecting for Health, which works with more than 100 collaborators from government, health care, industry and consumer groups to establish policy guidelines and technical solutions to pave the way for nationwide electronic health information exchange. This initiative, which began in 2002, has the overarching goal of creating a secure environment in which personal medical information is available electronically when and where it is needed by patients and the clinicians who care for them.

Key Results

Over the almost four-year period, the Markle Foundation and its collaborators:

- Produced a [Roadmap Report](#) in July 2004 with recommendations for developing a decentralized electronic health information network that uses the Internet and is based on a "Common Framework" of rules for data sharing.
- Created a three-state prototype to test the Common Framework that was able to exchange electronic health information both within and among its sites in Boston, Indianapolis and Mendocino County, Calif., by February 2006.
- In 2006, using lessons learned from the prototype, released the "[Connecting for Health Common Framework: Resources for Implementing Private and Secure Health Information Exchange](#)". This compendium of 16 policy guides and technical documents is intended to help organizations develop their own decentralized health information networks using the Internet to exchange information following the Common Framework guidelines.

- In 2005 and 2006, collaborated with several federal agencies in sponsoring two conferences, "[Connecting Americans to Their Healthcare](#)," that explored consumer engagement in health information exchange and specifically the use of electronic personal health records.

Key Findings

In October 2005, at the "Connecting Americans to Their Healthcare" conference, Public Opinion Strategies released the results of two surveys about personal health records and nationwide health information exchange. The surveys produced the following findings:

- Two-thirds of the public (65 percent) are interested in accessing their own personal health information electronically.
- More than seven out of 10 Americans support the creation of a nationwide health information exchange for doctors and patients.
- Americans believe an electronic exchange of health information would enhance the quality and increase the efficiency of the health care system.
- When ranking attributes for a proposed nationwide health information exchange, survey respondents rated security and privacy as the highest priorities.

Funding

RWJF supported the work of Connecting for Health with five grants totaling \$1,546,500 between January 2004 and June 2007.

THE PROBLEM

The Consequences of Scattered Medical Information

As the Institute of Medicine study *To Err Is Human: Building a Safer Health System* pointed out, medical errors annually kill more Americans than motor vehicle accidents, HIV/AIDS or breast cancer. One of the key contributing factors is a scattered, paper-based health information system.

Records do not typically follow people as they move from provider to provider for treatment of the same condition, let alone as they move to new geographic locations. Over the course of a person's life, medical records are developed and stored, mostly on paper, in various physicians' offices, pharmacies, hospitals and other organizations that have provided patient care. Physicians may find themselves providing care without always knowing what has been done earlier to a patient and by whom.

Research indicates that these factors lead to inefficiencies, redundancies, higher costs, compromised quality of care and increased medical errors. For example:

- Pertinent patient data were unavailable in 81 percent of cases, with an average of four missing data items per case in an internal medicine clinic. The entire medical record was unavailable 5 percent of the time.
- Physicians spent an estimated 20 to 30 percent of their time searching for and organizing information.

The Promise of Health Information Technology

Since 2000, when the Institute of Medicine released its landmark study, emerging technologies, including electronic medical records and personal health records, offered solutions to the problem of a paper-based information system. However, to realize the benefits of such innovations in health information technology, electronic connectivity and interoperability (the ability of computer systems to understand one another) are essential.

Before computers at any health care location in the country are able to exchange and make use of information, stakeholders, including individual consumers, must address a range of technical, financial and legal barriers to electronic connectivity. These include a culture that rewards individual rather than shared ownership of information and the tendency to store information in "silos" that do not communicate with one another.

Markle Foundation: Committed to Removing Barriers to Health Information Exchange

Overcoming barriers to electronic connectivity in health care requires commitment and consensus from a variety of stakeholders willing to engage in a range of different actions.

In 2002, the Markle Foundation, located in New York City, launched Connecting for Health, a public-private collaborative with more than 100 stakeholders working to "break open the logjam" preventing the flow of vital health care information through all segments of the health care system.

Markle's key priority, addressed in [Connecting for Health](#), is to improve people's lives by using the potential of emerging information and communication technologies to address critical public health needs.

Central to Connecting for Health is the belief that the greatest improvements in health care will occur when all Americans can access, control and make use of their own health information in partnership with their care teams. A critical goal of health information networking is to empower patients to manage their own health better, make more informed decisions, improve communication with clinicians and take better care of loved ones. Emerging personal health information technologies, such as personal health records, are important tools to achieve these ends, according to the Markle Foundation.

Between 2002 and 2004, the Connecting for Health collaborative focused on moving the health care field toward adoption of an initial set of health care data standards that would enable disparate systems to communicate with one another. In June 2003, the collaborators released a report summarizing the Steering Group Key Themes and Guiding Principles of their work. Working groups on Data Standards, Privacy and Security and Personal Health produced companion reports with recommendations for these areas.

Connecting for Health principles were endorsed by national leaders, including top congressional leaders and President George W. Bush, who, in 2004, issued an Executive Order establishing the position of the National Health Information Technology Coordinator within the Office of the Secretary of the Department of Health and Human Services (HHS). The coordinator's role is to work with government and industry to address the need for information technology to help transform the health care system.

The early work of Connecting for Health had moved the national dialogue on health information forward-bringing about a widespread recognition of the economic and clinical inadequacy of a paper-based health information system and its detrimental effect on health care quality and safety. What was needed next was a "roadmap," a set of practical recommendations for specific actions that would move stakeholders closer to the goal of securing nationwide health information connectivity.

CONTEXT

The [President's Message](#) in the *2004 RWJF Annual Report* includes the following: "Despite all our sophisticated scientific and diagnostic technology, health care doesn't have its own integrated IT system.... Today, our medical and health care information is for others to know and for us to wonder about. 'Knowledge is power' and much of the knowledge about us is kept secret from us. Tomorrow, no more secrets; knowledge will be a power tool that is shared freely. We're finally going to know as much about our health care as the system knows so we'll be able to make informed health care decisions for ourselves and our families."

Further on in the *2004 Annual Report*, it states, "The Pioneer Portfolio promotes innovative projects that can lead to fundamental breakthroughs in health and health care. Similar to research and development investments in the for-profit sector, projects under this Portfolio are future-oriented and often look to nontraditional sources and fields to make significant improvements in health.... Our investments in 2004 included a series of grants that were largely exploratory...."

"Progress on...information technology could lead to long-term improvements in U.S. health care. In 2004 the Foundation invested in [a] partnership with the Markle Foundation, the *Connecting for Health* initiative, [which] seeks to lay the groundwork for

an effective and secure national health information network that would make patients' medical records available when they are needed, to those authorized to access them."

THE PROJECT

From 2004 to 2007, the Markle Foundation and the Connecting for Health collaborative built on their early work by undertaking specific actions to clear the way for an interconnected, electronic national health information infrastructure.

The First Step: A Preliminary Roadmap (ID# 049834)

The Connecting for Health Steering Group met in January 2004. Members included some 60 health care stakeholders, representing government and for-profit and not-for-profit organizations. The Steering Group set three closely intertwined tasks:

- Develop a roadmap containing recommendations for action in the near term.
- Establish working groups to address specific barriers hampering the development of electronic connectivity in health care.
- Design a demonstration project to test recommendations in a real-world setting.

Although it had the ultimate responsibility for roadmap recommendations, the Steering Group convened four expert working groups to explore particular topics in depth and prepare separate reports with detailed recommendations:

- **Working Group on Accurately Linking Health Information.** This group's task was to find a way to link accurately the records of a patient receiving care from multiple doctors and hospitals while maintaining or enhancing quality and safety.
- **Working Group on Financial, Organizational and Legal Sustainability.** This group addressed sustainability concerns by developing an analytical framework and set of tools to help private and public sector leaders make the case for private sector investment in health information technology and the development of favorable laws and policies.
- **Working Group on Policies for Electronic Information Sharing Between Doctors and Patients.** This group was concerned with the relationship between, and the necessary policies to connect, doctor- or hospital-oriented electronic health records and patient-oriented personal health records.
- **Technical Expert Group.** This group was formed in response to the Steering Group's emphasis on technical issues as roadmap priorities. It provided the Steering Group with additional support and input on system architecture, infrastructure, standards and applications.

Testing the Roadmap: From Rough Contours to a Skeletal Framework (ID# 050781)

The roadmap provided a theoretical model for achieving electronic connectivity, but the Steering Group pressed for a demonstrable test in real-world communities engaged in health information exchange.

In late 2004, in cooperation with local partners, Connecting for Health embarked on the development of a three-state prototype of electronic health information exchange based on the Common Framework in Boston, Indianapolis and Mendocino County, Calif.

The three local or regional networks were:

- Massachusetts SHARE or MA-SHARE (Simplifying Healthcare Among Regional Entities), a regional collaborative located in Waltham, Mass., involving payers, providers, patients and employees in Massachusetts in health information exchange. The MA-SHARE clinical connectivity vision is a way to design technology solutions that assemble, organize and distribute a variety of up-to-date clinical information to a broad range of clinical settings in a secure, confidential manner.
- The [Regenstrief Institute](#) is an informatics and health care research organization established in 1969. It is closely affiliated with the Indiana University School of Medicine and the Health and Hospital Corporation of Marion County, Ind.
- [Mendocino Health Records Exchange](#) (HRE) is a technology collaboration among safety net clinics, public health organizations, rural hospitals and small private practices in Mendocino County.

Development of the prototype occurred over a period of 18 months in coordination with the interdependent work of two Connecting for Health subcommittees—one focused on technology, the other on policy. They collaborated closely with experts at the three sites to develop and document solutions to problems and the thinking behind them for the benefit of other communities working on health information exchange.

An important concept was that policy objectives must be considered at the beginning of any technical undertaking and that decisions about technical architecture must be guided by policy objectives—not the other way around.

"Every phase of this project was filling in more details," said Carol Diamond, M.D., M.P.H., the managing director of health at the Markle Foundation and chair of Connecting for Health. "The first phase was rough contours. The roadmap was a skeletal frame that was unproven. The prototype communities helped answer the questions, 'what does it look like?' and 'could it work?'"

Conferences and Communicating With the Public About the Potential of Personal Health Technology (ID#s 053537, 056712, 053539)

Starting in August 2005, RWJF provided the Markle Foundation with three additional grants to educate key stakeholders—especially consumers—about Connecting for Health and the benefits of personal health technologies, including personal health records.

"When we started Connecting for Health in 2002, people were saying 'why do consumers need their [medical] information?'" Diamond said. "Our big goal was to get consumers access to their own information. An essential part of achieving that goal was having public education."

With Grant ID#s 053537 and 056712, the Markle Foundation conducted two conferences designed to raise the understanding of key consumer groups about the benefits of personal health technologies and to engage them more actively in these technologies.

A third grant (ID# 053539) supported a variety of strategic communications related to Connecting for Health. Under this grant, Markle subcontracted with:

- **GYMR**, a Washington-based public relations firm, to develop a strategic communications plan to convey the benefits of using information technology to improve patient care.
- **Public Opinion Strategies**, a Washington-based polling firm, to conduct focus groups and surveys to help the Connecting for Health staff create messages and materials about the importance of personal health records for patients, providers and policy-makers. Specifically, they conducted:
 - Six focus groups in June 2005 (four in Chicago and two in Washington) to explore attitudes and receptivity toward electronic connectivity in health care among patients, health plan and hospital administrators and policy-makers.
 - Two national surveys in September and October 2005. The first reached 800 adults and the second 800 registered voters.
- **SWANDIVEDIGITAL**, a New York-based design company; **Bremmer & Goris**, a communications firm in Alexandria, Va.; and **Home Front Communications**, a Washington-based communications firm to create materials for Connecting for Health. Those materials included:
 - A five-minute video explaining the Connecting for Health Common Framework.
 - Results of a survey of 150 Common Framework users.
 - An "ABC" guide to the Common Framework.
 - A frequently asked questions document to assist speakers who represent the Common Framework.

See the [Bibliography](#) for details.

Other Funding

During this grant period, Markle contributed about \$8.5 million of its own resources to these projects. Markle also received additional funding from federal agencies for the conferences, including the Agency for Healthcare Research and Quality (\$80,000), the National Cancer Institute (\$15,000) and the Office of Disease Prevention and Health Promotion (\$10,000).

RESULTS

- **In July 2004, the Markle Foundation completed its preliminary roadmap for achieving electronic connectivity in health care.** The roadmap report (available [online](#)) calls on the public and private sectors to work together to build an infrastructure allowing for the rapid, accurate and secure exchange of health information. The report laid out a series of recommendations for practical strategies and specific actions, including:
 - ***Create a technical framework for connectivity.*** Instead of a National Health ID or a centralized database of records, the roadmap calls for a decentralized "network of networks" that uses the Internet; is based on national data standards; has safeguards to protect patient privacy; and is built incrementally rather than as a single, "big bang" solution.
 - To support the creation of the local and regional networks, the roadmap cites an immediate need for the development and pilot testing of a "Common Framework" of agreements among participants about data standards, policies and methodologies for information exchange.
 - ***Address financial barriers.*** The report recommends a number of financial incentives and related processes (such as certification) to promote health care quality through adoption of clinical applications and information exchange based on standards.
 - ***Reach out to the public.*** The report urges government and health care and consumer leaders to use a consistent set of messages to promote the benefits of electronic connectivity and to encourage patients and consumers to access their own health information. Stories of a [patient](#), a [patient's mother](#) and a [physician](#) illustrate the consequences of not having access to accurate medical records.

For detailed recommendations, see the [Appendix](#).

The four work groups also prepared reports for their particular areas with more detailed recommendations:

- [Summary of Organizational and Governance Recommendations](#)

- *Summary of Financial Incentives Recommendations*
- *Summary of Recommendations: Technical Panel*
- *Linking Health Care Information: Proposed Methods for Improving Care and Protecting Privacy*
- *Financial, Legal and Organizational Approaches to Achieving Electronic Connectivity in Healthcare*
- **In February 2006, the three-state prototype of the Common Framework exchanged electronic health information both within and among its sites in Boston, Indianapolis and Mendocino County, Calif.** This milestone, announced at a [press conference](#), demonstrated that completely different regional, local and other health information networks can communicate with one another using a decentralized model that adheres to the Common Framework, avoiding the need to create a "one-size-fits-all" network or a national database.
 - A feature of the prototype was that each site developed a record locator service (RLS) rather than a common patient identifier to link patient records across the three networks securely and privately. The regions were then able to exchange information about prescription records and laboratory test results.
 - Will Ross, project manager with Mendocino Health Records Exchange in Ukiah, Calif., noted that the prototype "demonstrated that large systems with tremendous information technology resources and rural networks like ours, made up of safety net clinics and small practices capable of only modest technology investments, can affordably exchange health information over the Internet using tools [that] conform to the Common Framework."
- **In April 2006, using lessons learned from the prototype, the Markle Foundation produced *The Connecting for Health Common Framework: Resources for Implementing Private and Secure Health Information Exchange*.** This compendium of 16 documents including technical rules, policy guidelines and model contractual language is designed to support communities, businesses and health systems nationwide as they develop their own health information networks compatible with the Connecting for Health decentralized model. By sharing these materials, Connecting for Health aimed to encourage new entrants into the field.

According to an overview, the Common Framework puts forth a model of health information exchange that:

- Protects patient privacy by allowing health information to remain under local control with doctors and hospitals that patients trust; it does not require information to be moved to large, centralized databases in order for it to be shared. Nor does it require the creation of a national patient identification number.

- Avoids large-scale disruption and huge up-front capital investments by making use of existing hardware and software.
- Supports better informed decisions about key policy topics related to sharing health information.
- Establishes trust among collaborating organizations by applying model contract language, in consultation with local advisors, to fit their needs.
- **In November 2005, a consortium that included Connecting for Health and 11 other public and private organizations received federal funding to develop a prototype for a nationwide health information network modeled on the Common Framework.** The consortium, led by the for-profit [Computer Sciences Corporation](#) (CSC), was one of four in the country to receive \$18.6 million in funding from the U.S. Department of Health and Human Services to develop health information [networks](#).
 - The consortium conducted further tests on information exchange in the same three cities in which Connecting for Health had conducted its prototype demonstration project (Boston, Indianapolis and Mendocino County, Calif.).
- **In 2005 and 2006, two conferences, "Connecting Americans to Their Healthcare," sponsored by the Markle Foundation, RWJF and several federal agencies, explored consumer engagement in health information exchange and specifically the use of personal health records.**
 - About 550 consumers and other stakeholders attended the one-day October 2005 conference designed to raise the level of awareness and advocacy for personal health records and other technologies to engage consumers in their health and health care.
 - About 600 individuals attended the three-day [conference](#) in December 2006 focused on specific actions that organizations can take to advance the use of personal health records. The goal of the conference was to raise awareness about personal health technology issues and to make them a higher priority for the attendees.

FINDINGS

Public Opinion About Personal Health Records

- **In July 2005, Public Opinion Strategies presented its findings from six focus groups that explored attitudes and receptivity toward electronic connectivity in health care.** The firm presented the following findings on common themes:

- **Privacy and security concerns.** There is an overwhelming and immediate concern about privacy and security that arises when discussing the possibility of developing nationwide electronic health information exchange.
- **Testing models.** In testing the model of a "network of networks" as well as images describing how the nationwide electronic health information exchange might operate, confusion and doubts arise among respondents as to how it would actually work.
- **Testing messages.** Message testing involved talking about the benefits of a nationwide electronic health information exchange in emergency situations when access to medical information could mean the difference between life and death.
- **In October 2005, Public Opinion Strategies released the results of two surveys about personal health records and nationwide electronic health information exchange.** The surveys had the following findings:
 - More than seven out of 10 Americans support the creation of a nationwide health information exchange for doctors and patients.
 - Americans believe an electronic exchange of health information would enhance the quality and increase the efficiency of the health care system.
 - Attributes of a proposed nationwide health information exchange that focus on security and privacy are rated as the highest priorities among survey respondents.
 - A majority of Americans believe that doctors keeping electronic medical records on their patients would:
 - Allow physicians to access medical information at a moment's notice (93 percent).
 - Allow physicians to determine which treatments work best for different diseases (81 percent agree).
 - Improve health care quality (80 percent agree).
 - Six out of 10 Americans support the creation of a secure online "personal health record" service that would allow consumers to:
 - Check and refill prescriptions.
 - Get results over the Internet.
 - Check for mistakes in their medical records.
 - Conduct secure and private e-mail communication with their doctors.
 - There is strong evidence that Americans would use a secure online personal health record service.

- Nearly seven out of 10 consumers say they would use an online personal health record service to check for mistakes in their medical records (69 percent), as well as to check and refill prescriptions (68 percent).
- More than half report that they would use an online personal health record service to conduct secure and private e-mail communication with their doctors (57 percent) and get results over the Internet (58 percent).
- Only 19 percent of Americans say they would not use a personal health record service for any of the items.

LESSONS LEARNED

1. **Engage consumers in advocating for a secure, accurate health information exchange.** Although rhetoric about involving and empowering consumers may sound lofty, be aware that involving patients may be the most pragmatic strategy of all. Even though smarter use of technology is essential, its impact will be greatly magnified by a higher level of patient involvement. "No one has a greater level of investment in health care than the individuals who live or die based on its quality." (Grantee/Steering Group)
2. **When working with high-level volunteer advisory groups, make sure you have a well-thought-out process to make meetings as efficient and useful as possible.** Volunteer advisory group members will appreciate that their time is used well, so make meeting agendas narrow and specific. Rather than broad questions such as "Should there be a national health identification number?" it makes more sense to come to a meeting with potential solutions, a discussion guide and a strategy to come to a decision. (Grantee/Diamond, Program Officer/Downs)
3. **When seeking consensus in an area, such as health information technology, involve the key organizations early in the process and often in the work.** Setting standards for a personal health record required the input of many different sectors including health care organizations, health information technology firms, consumer groups and the government.

The project director spent a lot of time on the phone listening to people, taking their pulse and cultivating key organizations to be part of this project. Because of that up-front work, the consensus documents developed by Connecting for Health had a lot of currency among the organizations and sectors critical to its acceptance. (Program Officer/Downs)

4. **When working in an area that touches on several different sectors, tailor messages and communications to each of those sectors.** Connecting for Health sought to involve divergent groups, from health information technology companies to local and state governments to patients and doctors. Each group had its own set of needs and interests. The Connecting for Health staff found that the best way to meet

each group's needs was to talk to it and revise materials in response.
(Grantee/Lansky)

5. **Take the time to explain in plain English the usefulness of your work to people who might not understand why it's important to them.** People working in a certain area tend to "get in the weeds" of it. They can get the raw material out there but getting that material to a point where it has value for people and they want to take action is difficult. It's important to sit down with people from the groups you are trying to influence to understand the type of information that would be most valuable to them. (Grantee/Lansky)

AFTERWARD

In December 2006, RWJF launched an 18-month \$4.4 million national program called *Project Health Design* designed to support health and information technology organizations in creating a new generation of personal health record systems.

As of May 2008, Connecting for Health was expanding its work in two areas:

- **Connecting consumers.** A Connecting for Health work group was developing recommendations for confirming the identity of individual consumers on a health information network.

Another work group was considering recommendations for other policies such as privacy, consent, secondary uses, breach notification and so on.

- **Connecting all health decision-makers.** Project participants were working on ways that the Common Framework could be used for cross-sectional analysis of distributed data to improve the health of large populations. Among the areas that participants were working on were:
 - Bolstering research capabilities and enabling clinical practices to participate fully in and make use of scientific evidence.
 - Increasing the effectiveness of the public health system.
 - Empowering consumers and professionals with information about cost, quality and outcomes.

Connecting for Health also released a [framework](#) that proposes a set of practices that, when taken together, encourages appropriate handling of personal health information as it flows to and from personal health records and similar applications.

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APPENDIX

Recommendations for Achieving Health Care Interconnectivity

A Preliminary Roadmap from the Nation's Public and Private-Sector Healthcare Leaders Executive Summary July 2004 presents recommendations in seven areas for achieving health care interconnectivity:

- **Engaging the American Public**
 - Develop and employ a core set of messages, both general and tailored to specific audiences (e.g., chronically ill, caregivers), that will encourage members of the American public to become partners in improving health care through the use of IT [information technology].
 - Identify techniques, standards and policies to be employed by all developers of personal health records [PHRs] in order to ensure that information can be exchanged between PHRs and other data sources for the patient's benefit.
 - Support demonstration projects that use these common practices to determine the value for patients of having access to health information.
- **Infrastructure**
 - Develop the health information infrastructure in a way that safeguards privacy, leverages both bottom-up and top-down strategies, is incremental in nature, and is based on a decentralized and federated model—an interoperable, standards-based "network of networks" built on the Internet. The network should not contain a central repository for patient medical records. Instead, it should be a pathway that facilitates their identification and exchange, with appropriate authorization, in a private and secure way.
 - A "Common Framework" is needed immediately in order to pursue a decentralized strategy that builds out from a local and regionally driven approach to creating the infrastructure. Only by conforming to a Common Framework can we ensure that data exchange pilots, personal health records and regional systems will be able to operate across and with other regional systems.
 - Communities should assess their readiness for local and regional data sharing by conducting a rigorous review of the technical, clinical, organizational, community commitment and leadership aspects of their initiatives, all critical success factors in building and managing a local health information infrastructure.
 - Communities will require a source of activation to catalyze or enforce development of a health information infrastructure.

- **Accurate Linking of Health Records**
 - Linking of patient information for high-quality care can and should be done without a National Health ID.
- **Rate of Adoption of Clinical Applications**
 - If funding and reimbursement incentives are provided to encourage the adoption of IT, they should support a wide range of applications from comprehensive EHRs [electronic health records] and incremental applications to simple data exchanges, provided these applications do not represent "dead ends" but rather enable an evolution toward greater electronic connectivity.
 - Consider certification for EHR applications to assure that incentives result in the use of systems that meet a minimum set of functional capabilities using the HL-7 EHR functional standard and incorporate a minimum level of interoperability. (HL-7 [Health Level 7] is an ANSI [American National Standards Institute] standard for healthcare specific data exchange between computer applications.)
 - Represent all stakeholders in the governance of the certifying process and place minimal compliance burdens on care delivery organizations and encourage new entrants and continued innovation.
- **Data Standards**
 - Focus on implementing the "ready set" of data standards that are mature and proven.
 - To ensure interoperability, there is an immediate need for certifying interface conformance. The certification methodology should be developed in conjunction with the Reference implementation.
 - Establish a certifying process and appropriate, affordable and scalable interface conformance methods based on combinations of standards for specific information exchange needs that support differing levels of sophistication.
 - Fund some regional and local health information exchange initiatives in addition to the Reference Implementation to provide a test bed for these interface standards.
 - Publicize and share the approaches to secure Internet transport in the Reference Implementation, and facilitate a smooth transition to evolving standards that will make this problem more tractable for large networks.
- **Funding and Incentives**
 - Realign financial incentives to promote quality care improvement via IT adoption, connectivity and information exchange among all health care providers.

- Financial incentives of the approximate range of \$3.00 to \$6.00 per patient visit or \$0.50 to \$1.00 per member per month (based on 4,000 patient visits per year or a 2,000 patient panel over at least a three-year period) appear to be a sufficient starting point to encourage and sustain widespread adoption of basic EHR technologies by small, ambulatory primary care practices.
 - The qualitative analysis supports a business case that is better for some "incremental applications" than for others. These incremental applications can be implemented as steps toward the full implementation of an EHR. Applications with a smaller investment or a very high net beneficial business case could be considered as candidates for initial implementation as long as they are not dead-end applications.
 - Small and medium-sized practices have greater potential than others to benefit from information exchange, but they will require greater attention and support in order to achieve sustainability.
- **Legal Safe Harbors**
 - Public and private sector guidance is needed to clarify how providers can participate in data sharing pursuant to the Medicare Modernization Act of 2003, specifically through clinical pilots and electronic prescribing programs. Guidance will help identify opportunities for provider-based connectivity that promotes the expansion of widespread data-sharing initiatives.

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