HEALTH CARE INFORMATION TECHNOLOGY: WHAT ARE THE OPPORTUNITIES FOR AND BARRIERS TO INTER-OPERABLE HEALTH INFORMATION TECHNOLOGY SYSTEMS?

FIELD HEARING

BEFORE THE

SUBCOMMITTEE ON ENVIRONMENT, TECHNOLOGY, AND STANDARDS

COMMITTEE ON SCIENCE

HOUSE OF REPRESENTATIVES

ONE HUNDRED NINTH CONGRESS

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February 23, 2006

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HEALTH CARE INFORMATION TECHNOLOGY: WHAT ARE THE OPPORTUNITIES FOR AND BARRIERS TO INTER-OPERABLE HEALTH INFORMATION TECHNOLOGY SYSTEMS?

THURSDAY, FEBRUARY 23, 2006

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENVIRONMENT, TECHNOLOGY, AND STANDARDS,
COMMITTEE ON SCIENCE,
Washington, DC.

The Subcommittee met, pursuant to call, at 12:18 p.m., at the Providence St. Vincent Medical Center, Souther Auditorium, 9205 S.W. Barnes Road, Portland, Oregon, the Honorable David Reichert presiding.

COMMITTEE ON SCIENCE
U.S. HOUSE OF REPRESENTATIVES

Health Care Information Technology: What are the Opportunities for and Barriers to Interoperable Health Information Technology Systems?

Thursday November 23, 2005
12:00 PM – 2:00 PM PST

Providence St. Vincent Medical Center
9205 SW Barnes Road
Portland, OR 97225

Witness List

Dr. William Jeffrey
Director
National Institute of Standards and Technology

Dr. Jody Pettit
Project Chair
Oregon Health Care Quality Corporation

Ms. Diane Cecchettini, RN
President and CEO
MultiCare Health System

Mr. John Jay Kenagy
Chief Information Officer
Oregon Health and Science University

Dr. Homer Chin
Medical Director for Clinical Information Systems
Kaiser Permanente Northwest

Mr. Luis Machuca
President and CEO
Kryptiq Corporation

Mr. Prem Urali
President and CEO
HealthUnity Corporation

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HEARING CHARTER

SUBCOMMITTEE ON ENVIRONMENT, TECHNOLOGY, AND STANDARDS
COMMITTEE ON SCIENCE
U.S. HOUSE OF REPRESENTATIVES

Health Care Information Technology: What Are the Opportunities For and Barriers to Inter-operable Health Information Technology Systems?

THURSDAY, FEBRUARY 23, 2006
12:00 P.M.–2:00 P.M.
PROVIDENCE ST. VINCENT MEDICAL CENTER
SOUTHER AUDITORIUM, 9205 S.W. BARNES ROAD,
PORTLAND, OREGON 97225

Purpose

On February 23, 2006 at 12:00 p.m. in Portland, Oregon, the Subcommittee on Environment, Technology, and Standards of the House Science Committee will hold a field hearing about the opportunities for and barriers to inter-operable health information technology (IT) systems.

The purpose of this hearing is to learn about the potential benefits of IT to health care providers and consumers, the impact of IT on health care costs and quality, and about the major challenges to implementing a national health information technology system. The hearing will review federal, State and private-sector efforts to promote connectivity, which would enable health care providers to access patient data from any location. The hearing will examine efforts to develop standards for security, privacy and inter-operability, which are crucial to the adoption of nationwide health IT systems.

The Committee plans to examine these overarching questions:

1. What are the potential benefits of information technology to the health care industry and health care consumers?
2. What should Federal and State governments and the private sector do to foster the development of better health IT systems? What is preventing the widespread adoption of these systems?
3. What is happening in the states of Oregon and Washington to help insurers, hospitals, doctors, and other providers develop more comprehensive health IT systems? What role has the Federal Government played? What else needs to be done?

Witnesses:

Dr. William Jeffrey, Director of the National Institute of Standards and Technology (NIST). NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life. NIST has a memorandum of understanding with the Department of Health and Human Services (HHS) to collaborate on the development of health IT infrastructure and standards.

Dr. Jody Pettit, Project Chair, Oregon Health Care Quality Corp (QCorp). The Oregon Health Care Quality Corp provides both a forum for sharing information and best practices and a mechanism to identify strategic projects for improving health care through community based activities. Dr. Pettit chairs the Oregon Health Information Infrastructure (OHII) Project for the QCorp. The OHII seeks to create an Oregon multi-stakeholder collaboration to apply health care information and communication technology so that care is timely, effective, efficient, safe, equitable and patient-centered.

Mr. Luis Machuca, President and CEO of Kryptiq Corporation. Kryptiq makes software products for health care providers for secure messaging, electronic prescribing, disease management and contract management.

Dr. Homer Chin, Medical Director for Clinical Information Systems, Kaiser Permanente Northwest. Kaiser Permanente is America's leading integrated health care organization, with 8.2 million enrolled members. Kaiser Permanente Northwest started a pilot health IT system in 1994 and rolled out a full system in 1998.

Mr. Prem Urali, President and CEO of HealthUnity Corporation. HealthUnity makes software and hardware health IT products for health care providers.

Ms. Diane Cecchettini, RN, President and CEO of MultiCare Health System. MultiCare Health System is the largest provider of key medical services in Pierce County, south King County and much of southwest Washington State. MultiCare has adopted a comprehensive health IT system throughout its network of providers.

Mr. John Jay Kenagy, Chief Information Officer, Oregon Health & Science University (OHSU). OHSU offers instruction in health care, biomedical science, environmental engineering and computer science for more than 3,900 students, interns, residents, fellows and clinical trainees each year. Furthermore, the University provides education and training for about 18,000 health professionals through its continuing education programs. OHSU is currently implementing an electronic health record system for its patients.

Background:

What Are Inter-operable Health IT Systems?

Inter-operability allows different information technology systems and software applications to communicate, exchange data, and use that information. Inter-operable health IT systems can involve the use of and the ability to share: up-to-date patient electronic health records (EHRs); electronic physician orders for drug prescriptions and lab tests; electronic referrals to specialists and other health care providers; and electronic access to current treatments and research findings. For these systems to share information, especially if they are different IT systems, they must use common standards for data transmission, medical terminology, security, and other features.

Potential Benefits of Health IT Systems

Studies suggest that eliminating errors related to paperwork and enabling better communication between health care providers could improve treatment and lower costs in the health care industry. For the purposes of this charter, health care providers include both individuals (such as physicians, nurses and lab technicians) and institutions (such as hospitals and medical practices). According to a study in the *Annals of Family Medicine,* miscommunication is a major cause of 80 percent of medical errors, including poor communication between physicians, misinformation in medical records and misfiled charts.[1] Providing doctors with access to EHRs could reduce duplicate medical tests and adverse drug interactions. A patient's EHR would include all of his or her lab tests and/or drug allergies, thereby reducing the chance for error. In addition, EHRs could provide health care workers with the ability to access a patient's medical history at short notice in emergency situations. Inter-operable health IT systems could allow physicians to: share patient medical information and lab results between hospitals, labs, and clinics; order drug prescriptions; and alert patients of drug recalls much faster than by sharing paper records. Several health associations estimate that the potential savings of greater IT adoption by the health care industry run into the tens of billions of dollars. A recent study in the journal *Health Affairs* estimates that a fully inter-operable national health IT network could yield $77.8 billion per year in savings, or five percent of America's annual health care spending.[2]

Barriers to Adoption of Health IT Systems

The adoption of EHRs and other health-related IT has been slow. According to a May 2005 Government Accountability Office report on the subject, the Department of Health and Human Services (HHS) has identified the health care industry as the largest part of the U.S. economy that has not fully embraced IT.[3] An expert at

[1] *Annals of Family Medicine.* July/August 2004.
[2] *Health Affairs.* January 2005. "The Value of Health Care Information Exchange and Interoperability," by Jan Walker et al.
[3] "Health Information Technology: HHS is Taking Steps to Develop a National Strategy," GAO Report to the Chairman, Committee on the Budget, House of Representatives. May 2005.

Brigham and Women's Hospital in Boston, found that the health care industry invests only about two percent of its revenues in IT.[4] Other information-intensive industries invest approximately 10 percent of revenues. There are many reasons for this relative lack of adoption including: **cost of purchasing IT systems** and institutional resistance to the adoption of new technology; **contradictory incentives** for health care providers and payers; **concerns about security systems for patient records;** and the **lack of standards** necessary for uniform data entry and exchange, software, and terminology.

Estimates of the number of providers who currently utilize EHRs range from five percent to 20 percent nationwide, meaning that the remainder rely on paper-based records that must be faxed or mailed if a doctor outside of a medical office or provider network wants to see a patient's history. According to a study in *Health Affairs,* only 12 percent of practices with five or fewer full-time-equivalent physicians, where most physicians work and most patients receive care, use EHRs.[5] A major reason for low rate of utilization is the **cost of IT systems.** Large health care providers and hospitals have a distinct advantage over smaller and rural practices because they have greater access to capital to purchase new technology, more integrated offices, and larger physical concentrations of doctors and patients. In addition, many physicians have used paper records and files for years, and are uncomfortable abandoning this system to use IT.

A typical medical practice in the U.S. has five doctors handling approximately 4,000 patient visits in a year. The Markle Foundation in New York finds that these practices would lose money if they had to invest in, and learn how to use an interoperable health IT system. Furthermore, the current medical reimbursement system creates a **contradiction** between insurers and patients on the one hand, who would benefit from IT adoption, and health care providers on the other hand, who would have to pay for IT adoption. Providers do not necessarily have the economic incentive to adopt these systems, even if they are more convenient to use. Currently, most health care providers operate on a financial reimbursement system, which does not reward efficiency. For instance, a physician may wish to order a duplicate test for a patient rather than wait for the physical transfer of the patient's test results from another practice. The patient's health plan or insurance company will reimburse the provider for this additional test. Use of an IT system could reduce this inefficiency by providing remote access to the patient's original test results. HMOs, such as Kaiser Permanente, are exceptions to this model and have incentives to adopt IT because the payer and provider exist in a single financial entity.

In 2005, ChoicePoint informed approximately 163,000 people that their personal information, including names, addresses, birth dates, social security numbers and credit summary information were obtained by suspected criminals posing as legitimate business people. This data breach highlights **security concerns** for IT. Most patients want to restrict access to their medical records, which contain sensitive personal information, to their doctors and to other vital medical personnel. Whereas paper files may not provide ideal security, breaches require deliberate action, and even then the bulk of paper records prevents or discourages large-scale mischief. With EHRs, it is easier to access a lot of information quickly because data can be distributed to hundreds or even thousands of people at the click of a button. Last February, for example, the names and addresses of over 6,000 HIV carriers were accidentally e-mailed to all 900 staff members of the Palm Beach County Health Department. For these reasons, system designers must ensure that passwords and encryption provide adequate security to prevent hackers and other unauthorized users from gaining access to sensitive personal information. The system design itself must also include checks that protect this information from inadvertently being transmitted to inappropriate recipients.

Some health care networks, organizations, municipalities and states have been working to develop health IT systems. They recognize the need for connectivity using agreed-upon **inter-operability standards.** Comprehensive health care networks, such as Kaiser Permanente Northwest and the Veterans Health Administration, have sophisticated IT systems, which allow extensive connectivity within their networks. However, these are closed systems which cannot share electronic patient information with outside providers. Some cities have implemented pilot programs which allow interconnectivity at various levels, but this often involves the exchange of information in PDF form. PDF files are not easily transferred into searchable databases. If agreed-upon standards existed for EHR data exchange, these bur-

[4] *The Economist,* April 28, 2005. "The No-Computer Virus."

[5] *Health Affairs.* September 2005. "Medical groups' adoption of electronic health records and information systems," by D. Gans et al.

geoning systems could adopt them, making seamless and efficient connectivity between them much easier.

Federal Initiatives:

In April 2004, President Bush established a national goal that most Americans have EHRs within 10 years. To carry out the President's goal, HHS, in partnership with the National Institute of Standards and Technology (NIST), has embarked on a number of initiatives, with both public and private entities, to facilitate health IT adoption without directly mandating standards.

Office of National Health Information Technology Coordinator

In April 2004, President Bush signed an executive order establishing the position of the National Health Information Technology Coordinator (National Coordinator) in HHS. The National Coordinator was charged to develop a plan to "guide the nationwide implementation of inter-operable health IT in both the public and private health care sectors that will reduce medical errors, improve quality, and produce greater value for health care expenditures."

On May 6, 2004, Dr. David Brailer was appointed as the National Coordinator for Health IT. Dr. Brailer previously served as a Senior Fellow at the Health Technology Center in San Francisco, CA, a non-profit research and education organization that provides advice to health care organizations about the future impact of technology in health care delivery. Dr. Brailer announced a plan to achieve health inter-operability nationwide, which includes having NIST work with the National Coordinator's Office to oversee the development of standards to facilitate this process. HHS and NIST signed a Memorandum of Understanding, which transfers $6 million from HHS to NIST to pay for its health IT work. The National Coordinator's Office and NIST are collaborating with industry, standards organizations, consortia, and government agencies to build tools and prototypes to advance the adoption of IT within health care systems.

In his 2006 State of the Union address, President Bush called for the "wider use of electronic records and other health information technology, to help control costs and reduce dangerous medical errors." The President's 2007 budget requests $116 million for the Office of the National Coordinator for Health Information Technology, an increase of $55 million or 90 percent over the FY 2006 enacted level. Funding will support strategic planning, coordination, and analysis of technical, economic, and other issues related to public and private adoption of health IT. The total FY 2007 budget request for health IT initiatives in HHS is $169 million, an increase of $58 million or 52 percent over the FY 2006 enacted level.

NIST

NIST is the Nation's oldest federal laboratory and conducts research in a wide range of physical and engineering sciences. NIST researchers collaborate with colleagues in industry, academic institutions, and other government agencies to support the development of standards for a broad array of technical fields including software, hardware, communications, and computer security. NIST activities to support the President's health IT goals include participation in key standards-related efforts, developing performance and conformance metrics for health IT, developing procedures for certifying conformance to consensus-based standards, and helping to secure sensitive information and information systems. NIST has extensive experience working with industry on standards development, conformance testing, and other aspects of standards. In particular NIST has worked with the IT industry on standards for inter-operability and computer security, which would be a significant component of health IT. NIST helped HHS develop Requests for Proposals for contracts on heath IT, and it continues to work on these projects, providing technical advice and other support to the participants.

HHS Contracts for Health IT Development

On October 6, 2005, Secretary Michael Leavitt announced that HHS has let three contracts to develop a *Standards Harmonization Process,* a *Compliance Certification Process,* and *Privacy and Security Solutions.* On November 10, HHS awarded contracts to four groups of health care and health IT organizations to develop a *Nationwide Health Information Network.*

Standards Harmonization Process: $3,300,000 annually for three years

HHS awarded a contract to the American National Standards Institute, a non-profit organization that administers and coordinates the U.S. voluntary standardization activities, to convene the Health Information Technology Standards Panel (HITSP). The HITSP will bring together U.S. standards development organizations and other stakeholders to develop, prototype, and evaluate a harmonization process

for achieving a widely accepted and useful set of health IT inter-operability standards. NIST staff will work with the HITSP during the standards harmonization process.

Compliance Certification Process: $2,700,000 total over three years

HHS awarded a contract to a non-profit organization, the Certification Commission for Health Information Technology (CCHIT) to develop criteria and evaluation processes for certifying EHRs and the infrastructure or network components through which they inter-operate. More than 200 EHR products are on the market, but there are no criteria for prospective buyers to objectively evaluate them. This hinders informed purchasing decisions and further discourages the widespread adoption of health IT systems. CCHIT submitted recommendations to HHS for ambulatory EHR certification criteria in December 2005, and developed an evaluation process for ambulatory health records in January 2006. The CCHIT is currently developing pilots for these projects. A cross disciplinary team of NIST researchers serves as a technical advisory committee to support the CCHIT. An optional extension to continue refinement and assessment of the processes during a fourth year will be up for consideration as the base period is completed.

Privacy and Security Solutions: $11,500,000 total for 18 months

Regulations promulgated pursuant to the *Health Insurance Portability and Accountability Act* (HIPAA) established baseline health care privacy requirements for protected health information and established security requirements for electronic protected health information. Many states have adopted policies that go beyond HIPAA. In addition, the manner in which hospitals, physicians and other health care organizations implement required security and privacy policies varies and is tailored to meet their individual organizations' needs. These variations in policies present challenges for widespread electronic health information exchange, due to the lack of common standards.

HHS awarded a contract to the Research Triangle Institute International (RTI), a private, nonprofit corporation to oversee the Health Information Security and Privacy Collaboration (HISPC). HISPC is a new partnership consisting of a multi-disciplinary team of experts and the National Governors Association. The HISPC will develop plans to harmonize the variations in business policies and state laws that affect privacy and security practices. NIST will provide expertise to help ensure that the systems being developed are secure and address privacy.

Nationwide Health Information Network: $18,600,000 total for one year

HHS awarded contracts to four groups of health care and health IT organizations to develop pilot projects for secure information sharing in a nationwide health IT system. The four consortia are led by Accenture, Computer Science Corporation, IBM, and Northrop Grumman. NIST will create an architecture management system to serve as a repository for the content of the four prototypes being proposed.

Health IT Adoption Initiative

The National Coordinator's Office is partnering with the George Washington University and Massachusetts General Hospital/Harvard Institute for Health Policy through a contract on the Health IT (HIT) Adoption Initiative. The new initiative is aimed at better characterizing and measuring the state of EHR adoption and determining the effectiveness of policies aimed at accelerating adoption of EHRs and inter-operability. These institutions will examine the current state of metrics for assessing EHR adoption measurement and make publicly available the gaps in adoption measurement data and the currently known gaps in actual adoption. The HIT Adoption Initiative will provide not only a baseline measurement on EHR adoption rates but also a quantifiable method for measuring the anticipated increased uptake of health IT. Beginning in the fall of 2006, an annual report will synthesize multiple surveys using the methodologies developed under the HIT Adoption Initiative, and ultimately provide metrics with which to assess the progress of the entire program.

American Health Information Community

The April 2004 Executive Order called on the National Coordinator to coordinate outreach and consultation by the relevant branch agencies (including federal commissions) with public and private parties of interest, including consumers, providers, payers, and administrators. As part of this collaboration, Secretary Leavitt created the American Health Information Community (AHIC) on September 13, 2005. The AHIC provides input and recommendations to HHS on how to make health records digital and inter-operable, and assure that the privacy and security of those records are protected, in a smooth, market-led way. Membership includes officials from HHS and its component agencies, and other federal agencies, including the Department

of Veterans Affairs, Office of Personnel Management, Department of Commerce, Department of Treasury, and the Department of Defense. Other members include physicians, health care providers, a patient advocate, payers, purchasers, public health experts and business officials. The AHIC was chartered for two years with the option to renew, and will have a duration of no more than five years. A list of Community members can be found at: *www.hhs.gov/healthit/ahic.html*

State of Washington Initiatives:

The State of Washington has recently implemented a Health Information Technology and Electronic Medical Records Initiative. The initiative will develop a strategy for the adoption and use of electronic medical records and health information technologies.

The Washington State Health Care Authority (HCA), together with the Health Information Infrastructure Advisory Board (HIIAB), will develop the health information and technology strategy. In addition to the HIIAB, the HCA is also creating a Health Information Infrastructure Stakeholder Advisory Committee (HIISAC) that will provide feedback and input to the HIIAB. Unlike the HIIAB, the HIISAC will represent a broad variety of stakeholder groups such as consumers, clinicians, business, payers of health care, employers, and health care organizations (hospitals, carriers, long-term care facilities).

State of Oregon Initiatives:

The Oregon Health Policy Research (OHPR) office has been working closely with key health care experts and stakeholders around the state on electronic health records and data connectivity issues through its staffing of the Oregon's Health Policy Commission (OHPC). The OHPC is directed by statute to develop and oversee health policy and planning for the state and includes key health leaders from both the private sector and the State legislature. The Commission's recent Subcommittee on Electronic Health Records and Data Connectivity, developed key recommendations to move the state's health information technology agenda forward. The Oregon Healthcare Quality Corporation (QCorp) acts as a non-profit private sector partner with the OHPR.

QCorp has worked in partnership on a number of state initiatives for health IT including the Oregon Chronic Disease Data Clearinghouse. The Clearinghouse merged data from 11 health plans on 150,000 patients with asthma and diabetes for use in developing reports for physician practices. On a 10-point rating scale, clinicians and practice managers rated the value of the merged, single source and format reports from the Clearinghouse as 8.4 (highly favorable) compared to 1.4 (highly unfavorable) for the traditional approach with multiple report sources and formats. QCorp also works on the Electronic Health Record Inventory. An important part of this work is assessing the current state of EHR adoption. In addition, QCorp is currently working with the Oregon Business Council EHR Leadership Team to develop next steps for health data exchange.

Witness Questions:

The witnesses were asked to answer the following questions in their testimony.

Dr. William Jeffrey, Director of NIST

1. What are the most significant standards-related barriers to the widespread adoption of information technology within the health care industry?
2. What is NIST's role in removing these barriers and what is the expected time line for the completion of these activities?
3. How is NIST working with the health-care industry, information technology companies, federal agencies, states and other stakeholders to facilitate this process?
4. What role will NIST play in the HHS National Health Information Infrastructure? What responsibilities has HHS assigned NIST?

Dr. Jody Pettit, Project Chair, Oregon Health Care Quality Corp.

1. What role or potential role does health information technology play in improving the delivery of health care in Oregon?
2. What role does the Oregon Health Care Quality Corporation play in this process?
3. What incentives and barriers exist to the adoption of information technology in the health care industry, and are these financial, technical, or of some

other nature? What has been the experience of the State of Oregon in this regard?

4. What specific measures can the Federal or State governments take to encourage broader adoption of health information technology?

Mr. Luis Machuca, President and CEO of Kryptiq Corp.

1. What role or potential role does health information technology play in improving the delivery of health care in Oregon?
2. What benefits have been realized or are expected from the widespread adoption of information technology in the health care industry?
3. What incentives and barriers exist to the adoption of information technology in the health care industry, and are these financial, technical, or of some other nature? What has been Kryptiq's experience with these incentives and barriers?
4. To what extent have the Department of Health and Human Services and NIST reached out to businesses like yours in its effort to develop a national strategy on Health IT?
5. What specific measures can the Federal or State governments take to encourage broader adoption of health information technology?

Dr. Homer Chin, Medical Director for Clinical Information Systems, Kaiser Permanente Northwest

1. How does Kaiser Permanente use health care-specific information technology? What benefits has Kaiser Permanente realized so far? What future benefits are expected from the further adoption of this kind of technology?
2. What incentives and barriers exist to the broader adoption of information technology in the health care industry, and are these financial, technical, or of some other nature? What was Kaiser Permanente's experience with these incentives and barriers?
3. How does Kaiser Permanente differ from other non-HMO providers? Do these differences affect the incentives for adoption of health care IT?
4. To what extent have the Department of Health and Human Services and NIST reached out to businesses like yours in its effort to develop a national strategy on Health IT?
5. What specific measures can the Federal or State governments take to encourage broader adoption of health information technology?

Mr. Prem Urali, President and CEO of HealthUnity Corp.

1. What role or potential role does health information technology play in improving the delivery of health care in Washington?
2. What benefits have been realized or are expected from the widespread adoption of information technology in the health care industry?
3. What incentives and barriers exist to the adoption of information technology in the health care industry, and are these financial, technical, or of some other nature? What has been HealthUnity's experience with these incentives and barriers?
4. To what extent have the Department of Health and Human Services and NIST reached out to businesses like yours in its effort to develop a national strategy on Health IT?
5. What specific measures could the Federal or State governments take to encourage broader adoption of health information technology?

Ms. Diane Cecchettini, RN, President and CEO of MultiCare Health System

1. How does MultiCare use health care-specific information technology? What benefits has MultiCare realized from adoption of health IT? What future benefits are expected from the further adoption of this kind of technology?
2. What incentives and barriers exist to the broader adoption of information technology in the health care industry, and are these financial, technical, or of some other nature? What has been MultiCare's experience with these incentives and barriers?

3. To what extent have the Department of Health and Human Services and NIST reached out to businesses like yours in its effort to develop a national strategy on Health IT?
4. What specific measures can the Federal or State governments take to encourage broader adoption of health information technology?

Mr. John Jay Kenagy, Chief Information Officer, Oregon Health & Science University (OHSU)

1. How does Oregon Health and Science University (OHSU) use health care-specific information technology? What benefits has OHSU realized so far? What future benefits are expected from this kind of technology?
2. What incentives and barriers exist to the broader adoption of information technology in the health care industry, and are these financial, technical, or of some other nature? What has been OHSU's experience with these incentives and barriers?
3. To what extent have the Department of Health and Human Services and NIST reached out to institutions like yours in its effort to develop a national strategy on Health IT?
4. What specific measures can the Federal or State governments take to help the broader adoption of health information technology?

Mr. REICHERT. Well, good afternoon. It's a pleasure to be here. Someone asked me, earlier if I had—if this is my first time to Portland, and it's not. I went to college here in Portland, at Concordia University, so I've been here a little while. It's nice to be back again.

This hearing will now come to order. Good afternoon and welcome to today's hearing entitled "Health Care Information Technology: What Are the Opportunities For and Barriers to Inter-operable Health Information Technology Systems?"

Today we are here to discuss the potential benefits of IT to health care providers and consumers, the impact of IT on health care costs and quality, and the major challenges to the widespread use of IT in the health care industry. We will learn about federal, State, and private sector efforts to promote electronic systems that enable health care providers to access patient data from any location.

Information technology has profoundly changed the way we live and work. Computers are everywhere, and we increasingly expect their convenience to touch on every aspect of our daily lives. However, go into a doctor's office and in most cases, the records of that visit, the prescriptions that are written, and referrals to specialists will all be made on paper. Many health experts tout the benefits of converting to electronic records for billing, referrals, and prescriptions. Experts claim that not only would it be cheaper in the long run and more convenient, but the conversion to electronic records will also enable doctors to share patient data more easily, which would make for better diagnosis and treatment, prevent deaths from drug interactions and allergic reactions, and help public health agencies track diseases in populations.

In addition to serving on the Science Committee, I also chair the Subcommittee of Emergency Preparedness Science and Technology. And this is under the Homeland Security Committee. During one of our recent hearings we held on pandemic flu, we heard testimony on the real-world benefits of IT in the health sector. One of the best ways to slow the spread of pandemic is to quickly identify health trends in an area. Health IT enables us to do that. We must recognize that we are incapable of storing, moving, and accessing information in times of crisis.

Health IT would have been beneficial in the aftermath of Hurricane Katrina as well, while a lack of electronic patients' medical records contributed to the difficulties and delays in the medical treatment of evacuees.

There are many challenges to the widespread adoption of electronic health records and linking health care providers to computers to exchange information. These systems are often very expensive and complicated to implement. Standards are needed to allow different systems to talk to each other. There are serious security and privacy concerns associated with putting sensitive patient data on computers. Experts must consider these and other factors when thinking about the use of IT in health care.

I want to thank Congressman David Wu, the Ranking Member of the Subcommittee on Environment, Technology, and Standards, for suggesting this topic for discussion this afternoon, which is a matter of great interest to myself and my constituents, and I'm

sure it is to Mr. Wu's as well. I also want to thank our witnesses today who have taken time out of their busy schedule. I look forward to learning more from our witnesses from the region and what they are doing to help with health care in the Pacific Northwest to become more IT enabled and how the lessons learned can be applied nationwide. The Chair now recognizes Mr. Wu.

[The prepared statement of Mr. Reichert follows:]

PREPARED STATEMENT OF REPRESENTATIVE DAVID G. REICHERT

Good afternoon. Welcome to today's hearing entitled "Health Care Information Technology: What Are the Opportunities For and Barriers to Inter-operable Health Information Technology Systems?"

Today we are here to discuss:

- the potential benefits of IT to health care providers and consumers,
- the impact of IT on health care costs and quality, and
- the major challenges to the widespread use of IT in the health care industry.

We will learn about federal, State and private-sector efforts to promote electronic systems that enable health care providers to access patient data from any location.

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In addition to serving on the Science Committee, I also Chair the Subcommittee on Emergency Preparedness under Homeland Security. During one of our recent hearings we held on the Pandemic Flu, we heard testimony on the real world benefits of IT in the health sector. One of the best ways to slow the spread of a pandemic is to quickly identify health trends in an area. Health IT enables us to do that. We must recognize that we are incapable of storing, moving and accessing information in times of crisis. Health IT would have been beneficial in the aftermath of Hurricane Katrina as well, when a lack of electronic patient medical records contributed to difficulties and delays in the medical treatment of evacuees.

There are many challenges to the widespread adoption of electronic health records and linking health care providers' computers to exchange information. These systems are often very expensive and complicated to implement. Standards are needed to allow different systems to "talk" to each other. There are serious security and privacy concerns associated with putting sensitive patient data on computers. Experts must consider these and other factors when thinking about the use of IT in health care.

I want to thank Congressman David Wu, the Ranking Member on the Subcommittee on Environment, Technology, and Standards, for suggesting the topic for this hearing, which is a matter of great interest to myself and my constituents, as I am sure it is to Mr. Wu's. I also want to thank our witnesses, who have taken time out of their busy schedules to testify before us today. I look forward to learning more about what our witnesses from the region are doing to help health care in the Pacific Northwest become more IT-enabled, and how the lessons learned here can be applied nationwide.

Mr. WU. Thank you very much, Mr. Chairman.

I want to welcome everyone to this afternoon's hearing, and I would like to begin by thanking Representative Reichert for traveling from the Puget Sound area to take part in this hearing. I also want to thank Dr. Bill Jeffrey, the Director of the National Institute of Standards and Technology, for traveling from Washington, D.C., out of a snowstorm, to take part in this hearing as well.

Health care costs and efficiency have become the issue of the moment and will be the issue of tomorrow. The most recent report by the Centers for Medicare and Medicaid Services predicts that health care costs could consume close to 20 percent of our GDP within ten years. There's general agreement that increased utilization of information technology in the health care industry may save billions of dollars in costs and save thousands of lives each year. It will certainly improve the patient experience and provide a better work environment for health care providers.

This hearing is a follow-up to a round table discussion that I held in August of 2005. Before that round table, the solution seemed obvious: To get all patient information out of paper files and onto electronic databases that can be connected with each other; in this way, our health care providers can access all the information that they need to help any given patient, at any time, in any place. In other words, we would create an inter-operable system of doctors, hospitals, laboratories, pharmacies, and insurers.

If I can use any ATM in almost any place in the world, and international financial markets operate seamlessly and transparently—well, much of the time—why must I fill out a patient information form every time I am referred to a medical specialist?

The initial round table we held last August made me aware of not only the technical barriers but also the system and financial barriers to the widespread adoption of IT in the health care industry. Today's field hearing will focus on the technical barriers to developing a comprehensive health care IT system. Technical standards are critical not only to issues of inter-operability of systems, but also to the privacy and security of electronic health records.

I hope our witnesses will identify some of the stumbling blocks to the development of the required standards and make recommendations on how we can best move forward together. We need technical standards to create a functional IT network; however, in order to reap the benefits of a comprehensive health care IT network, it must fully—it must be fully utilized in all health care settings.

There is agreement that IT use lags in the health care industry, with only 10 percent of hospitals and five percent of doctors using IT effectively. Anecdotally, the health care industry apparently has the same percentage of gross revenues devoted to IT as the mining industry, and these two industries are at the lowest level of investment in IT.

We need to understand these nontechnical barriers to the adoption of IT by our health care industry. And I hope that our witnesses will address factors such as capital costs, training and education of medical personnel, reimbursement structure, patient confidence and confidentiality, in their testimony. If we want to be successful in our efforts, we need to address these issues early on in the process.

Many of you will be wondering about the Science Committee's involvement in health care IT issues. The Science Committee in the mid-1990s held hearings on the technical aspects surrounding the security and privacy issues of the *Health Care Insurance Portability and Accountability Act,* which you all—which everyone knows as HIPAA. As a result of those hearings, the National Insti-

tute of Standards and Technology, NIST, assisted HHS in the development of some of those regulations, which many of you came to discuss with me in my offices prior to their implementation.

I was pleased that HHS turned to the NIST early on in the development of the President's health information technology plan. NIST has a long history of working with the private sector in the development of standards for the IT industry as well as many other industries.

In the Pacific Northwest, we have a group of experts who have been working on these health care IT issues, and just a few of them are represented by the panelists here today. I intend to profit from their experience and knowledge as federal efforts move forward. I want to thank all of the witnesses for taking time from their busy schedules to appear before us. We value your expertise and we are looking forward to your guidance.

Mr. Chairman.

Mr. REICHERT. Thank you, Mr. Wu.

At this time, I'd like to introduce our witnesses. The first is Dr. William Jeffrey; he's the Director of the National Institute of Standards and Technology, also known as NIST. Second, Ms. Diane Cecchettini is the President and CEO of MultiCare Health System, headquartered in Tacoma, Washington. And third, Mr. Prem Urali is the President and CEO of HealthUnity Corporation, headquartered in Bellevue, Washington.

And for the purpose of introductions, the Chair yields to the Ranking Member, Mr. Wu.

Mr. WU. Thank you.

Dr. Jody Pettit is Project Chair at the Portland Health Care Quality Corporation, based in Portland, Oregon.

Luis Machuca is the President and CEO of Kryptiq Corporation, based in Hillsboro, Oregon.

Dr. Homer Chin is the Medical Director for Clinical Information Systems at Kaiser Permanente Northwest. And I have to say that, as a Kaiser patient, I appreciate your hard work and the availability of that data.

Mr. John Kenagy is the Chief Information Officer at Oregon Health and Science University, in Portland, Oregon.

Mr. Chairman.

Mr. REICHERT. Thank you, Mr. Wu.

As our witnesses should know, spoken testimony is limited to five minutes each; after which, the members of the science committee will have five minutes each, to ask questions.

And we will start by hearing the testimony of Dr. Jeffrey.

STATEMENT OF MR. WILLIAM JEFFREY, DIRECTOR, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

Dr. JEFFREY. Thank you very much, Representative Reichert and Representative Wu. I'm very pleased to be here today to take part in this important hearing. And I'm also very pleased to be in Portland, which is the first time I've been here, and I'm very impressed with what I've seen.

With your permission, I ask that my full statement be put in the record so that I can summarize it in the short time frame.

Mr. REICHERT. Without objection.

Dr. JEFFREY. Americans expect the world's best health care, and whereas our current health care system is second to none, we can make it even better. Today Americans spend an increasing share of their income on health care. In fact, when I was born, in 1960, the U.S. spent five percent of its GDP on health care; and as Representative Wu said, that is supposed to go up to—it's estimated to go up to 20 percent by the year 2015.

In addition to increase in costs, there are indications that lack of information or confusing information reduces the quality of care. The Institute of Medicine estimated about five years ago that between 44,000 and 98,000 Americans die each year from inpatient medical errors. The Agency for Health Care Quality and Research estimates more than 770,000 people are injured or die each year in hospitals from adverse drug effects; and a significant cost is borne for treatments and tests that may not improve health, may be redundant, or may be inappropriate.

Health care is a critical issue facing the Nation, impacting our economic security and quality of life. In the most recent State of the Union Address, President Bush proposed a comprehensive agenda to make health care in America more affordable, portable, transparent, and efficient. The portion of the President's plan that I'll touch upon today is the incorporation of IT into routine health care, with the goal of lower costs, fewer medical errors, and improved quality.

In 2004, the President launched an initiative to make electronic health records available to most Americans within the next ten years, and for the development of a nationwide health information network to connect patients, practitioners, and caregivers.

So how might this work? Let's say, hypothetically, that a visitor from Washington, D.C., ends up getting sick and going to the emergency room in Portland. Well, the patient's electronic health record can be accessed by the ER physician, removing the burden from the patient of having to accurately remember his or her entire medical history. Vital signs are monitored, tests run, and the results added to the electronic record. The data is transferred to a consulting physician, who orders a battery of tests. Several of these tests may have already been conducted, and so the data is called up rather than repeating the tests, which could be costly or uncomfortable for the patient. Medication may be suggested; but before ordered, the medication is checked against the patient's known allergies and other known medications, to avoid the adverse reactions. The prescription is then electronically sent to a nursing station, avoiding the risk—if there's any nurses here—of deciphering the doctor's handwriting. And all of this information is securely sent to the hometown physician for follow-up care.

So in this kind of vision, IT can clearly add to the quality of the patient's life, can save money and potentially save time in the diagnosis. So the administration is taking steps toward making this vision, including establishing the position of the National Coordinator for Health Information Technology and providing funds for projects harmonizing standards for electronic information exchange, developing certification criteria to ensure health IT investments meet proper standards, addressing privacy and security issues, and developing models for a nationwide Internet-based

health information system. And through the American Health Information Community, the administration and the private sector are working together to provide input and make recommendations to HHS, Health and Human Services, on how to make health records digital and inter-operable and to ensure that the privacy and security of the records are protected.

While the Department of Health and Human Services naturally takes the lead in this initiative, it's clear that in this area, as the President put it, step 1 is to set the standards. NIST has a long and effective history of working with health related standards organizations to improve our nation's health care system. Because of these collaborations, NIST and HHS signed an interagency agreement in September of 2005 for us to support the office of the National Coordinator for Health IT office, known as ONC.

Since signing of that agreement, NIST has been collaborating with the ONC in standards harmonization, conformity assessment, developing the architectural management system for the health information network, and privacy and security.

As you know, the efforts to develop a nationwide health IT infrastructure is highly complex, with dozens of players. We are therefore actively involved with the key health IT standards, including ANSI, ASTM, IEEE, the American Telemedics Association, Health Level 7, and scores of others. Because there are so many different relevant standards in existence and under development, we're collaborating with the community to develop and demonstrate a prototype health care standards landscape.

The landscape, as we call it, is a Web based repository of information on health care standards and resources that can assist in the development, implementation, and hopefully the adoption of standards by the stakeholders. In addition to the standards, we're helping to address conformity assessment. Conformity assessment activities form a vital link between standards and the performance of the products themselves. NIST is collaborating with the ONC to enable performance testing, to provide assurances that health care information technology products deliver the functionality necessary for inter-operability. This activity is important, because there are more than 200 electronic health record products on the market, that criteria exists for objectively evaluating product capabilities.

The challenges are great but they're not insurmountable. Working closely with the Office of the National Coordinator of Health IT, NIST is happy to play our part in realizing the President's vision. As he said two years ago, at the outset, by introducing information technology, health care will be better, the cost will go down, and the quality will go up.

Thank you, and I'd be happy to answer any questions.

Mr. REICHERT. Thank you, Dr. Jeffrey.

[The prepared statement of Dr. Jeffrey follows:]

PREPARED STATEMENT OF WILLIAM JEFFREY

Introduction

Representative Wu and Representative Reichert, I am William Jeffrey, Director of the National Institute of Standards and Technology (NIST), part of the Technology Administration of the Department of Commerce. I am pleased to be offered the opportunity to add to this discussion regarding health information technology.

I will focus my testimony on NIST's role in meeting the challenges we are facing as we incorporate advances in information technology to the health care enterprise, critical to improving values in the Nation's health care spending, now over 16 percent of the GDP.[1]

Our nation enjoys the best medical care and the brightest medical personnel in the world. Nonetheless, the enterprise is fraught with poor coordination, inefficiencies in administration, and avoidable medical errors. Studies suggest that between 44,000 and 98,000 Americans die each year from inpatient medical errors;[2] more than 770,000 people are injured or die each year in hospitals from adverse drug events, which may cost up to $5.6 million each year per hospital depending on hospital size;[3] and a significant annual expenditure on treatments that may not improve health, may be redundant, or may be inappropriate.

Today, we have new technological opportunities to address these problems. The President's Health Information Technology Plan, with the ultimate mandate of making our country's premier health care system safer, more affordable, and more accessible through the utilization of information technology (IT), is designed to overcome all of these trends, which are closely related to failure to adequately develop and adopt information technology for the health care system. In particular, the President has called for ensuring that most Americans have electronic health records within the next ten years and for the development of an Internet-based Nationwide Health Information Network to connect patients, practitioners, and payers. These initiatives will reduce redundancies and save administrative time, and could greatly improve patient safety and quality of care.

When the President's vision is realized:

- consumers will have their choice of providers and will be able to move seamlessly between practitioners without loss of information;
- clinicians will have information needed when and where it is needed, that is, at the point of care;
- payers will benefit through the economic efficiencies of fewer errors and less redundant testing; and
- public health officials will benefit from more efficient and effective reporting, surveillance, and quality monitoring.

To meet these goals, the Office of the National Coordinator for Health Information Technology (ONC) was created in the Department of Health and Human Services in response to Executive Order 13335, April 27, 2004. I am pleased that NIST has the opportunity to assist ONC realize this vision. NIST is contributing through NIST laboratory activities in measurement and consensus based standards and by direct collaboration with ONC.

Standards and measurements go directly to the heart of NIST's core mission. In fiscal year 2005, NIST health related projects encompassed many areas of the health care sector, including screening and prevention, diagnostics, treatments, dentistry, quality assurance, bioimaging, systems biology, and clinical informatics. Also, NIST has a long and effective history in working with health-related organizations to improve our nation's health care system. Building on those collaborations, NIST and HHS signed an interagency agreement in September 2005 to support ONC in realizing the President's health IT goals. Since the signing of the interagency agreement, NIST has been providing technical expertise to the ONC in areas such as standards harmonization, developing procedures for certifying conformance, developing performance and conformance metrics, developing the architecture management system for the nationwide health information network.

NIST Laboratory Activities in Health IT

NIST works with industry, government, and academia to establish consensus-based standards, develop associated test metrics to ensure that devices perform according to the defined standards, and establish comprehensive certification capabilities for the IT industry. NIST has for many years focused on developing metrics for the information technology industry. We develop tests and diagnostic tools for building robust and inter-operable systems. Applying such tools early in the life cycle process helps industry determine whether its products conform to the standard, and ultimately, will inter-operate with other products. In addition, the development and

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[1] Smith, Cynthia, Cathy Cowan, Stephen Heffler, Aaron Caitlin and the National Health Accounts Team, *National Health Spending in 2004: Recent Slowdown Led By Prescription Drug Spending.* 25 HEALTH AFFAIRS 186 January/February 2006.

[2] Kohn, L.T., J. Corrigan, and M.S. Donaldson. *To Err Is Human: Building a Safer Health System.* National Academy Press: Washington, D.C., 2000.

[3] Agency for Healthcare Quality and Research, *http://www.ahrq.gov/qual/aderia/aderia.htm.*

use of these metrology tools fosters thorough review of the standards, which will, in turn, aid in resolving errors and ambiguities.

a.) Standards Harmonization

In accordance with the *National Technology Transfer and Advancement Act of 1995* (Public Law 104–113) and Administration policies, NIST supports the development of voluntary industry standards both nationally and internationally as the preferred source of standards to be used by the Federal Government. NIST collaborates with national and international standards committees, users, industry groups, consortia, and research and trade organizations, to get needed standards developed.

As a matter of policy, NIST encourages and supports participation of researchers in standards developing activities related to the mission of the Institute. More than a quarter of NIST's technical staff—381 employees—participate in standards developing activities of 97 organizations. These include U.S. private sector standardization bodies, industry consortia, and international organizations. NIST staff members hold 1,328 committee memberships and chair 161 standards committees.

NIST is helping ONC in establishing the Health Information Technology Standards Panel. Supported by an ONC contract with the American National Standards Institute (ANSI), the Panel is working to harmonize standards in the health IT arena, the NIST staff also participates in the following key IT standards-related efforts:

- American National Standards Institute (ANSI) Healthcare Information Technology Standards Panel (HITSP)
- ASTM International—Operating Room of the Future
- American Telemedicine Association (ATA)
- Federal Health Architecture/Consolidated Health Informatics (FHA/CHI)
- Medical Device Communications, Wireless Networks of the Institute of Electrical and Electronics Engineers (IEEE)
- Healthcare Information and Management Systems Society/Integrating the Healthcare Enterprise (HIMSS/IHE)
- Health Level 7 (HL7)

b) Performance and Conformance Metrics for Health Information Technology

NIST works with industry to establish credible, cost-effective metrics to demonstrate software inter-operability and conformance to particular standards. These metrics often form the basis or criteria upon which certifications are based. Typical NIST metrics include models, simulations, reference implementations, test suites, and testbeds.

Specific activities in support of health information technology include:

Electronic Health Records (EHR): Having access to complete patient health information is critical to improving clinical care and reducing medical errors and costs of care. The EHR is a longitudinal collection of patient-centric, health care information, available across providers, care settings, and time. It is a central component of an integrated health information system. NIST is collaborating with organizations in both the public and private sectors in achieving the benefits of EHRs and overcoming the barriers to their acquisition and use. In particular, NIST leads the effort in HU to define conformance and develop conformance criteria for EHR systems. NIST authored the conformance chapter of the draft standard for trial use and developed guidance (a How to Guide) for writing conformance criteria, thus teaching the community how to do this for themselves. The EHR conformance criteria and those being developed by the Certification Commission for Health Information Technology (CCHIT) form the basis for HER certification efforts.

HIMSS/IHE: A key problem today in the realization of Electronic Health Records for the patient's continuity of care is the inability to share patient records across disparate enterprises. To address this problem, NIST is collaborating with industry to develop standardized approaches to sharing electronic clinical documents across health care organizations and providers. NIST staff have built reference implementations and developed validation tools to demonstrate the feasibility and correctness of implementations, and worked with implementers to create integrated solutions based on these approaches. In particular, NIST is collaborating with the 'Integrating the Healthcare Enterprise' (IHE) project sponsored by the Radiological Society of North America, Healthcare Information and Management Systems Society (HIMSS) and the

American College of Cardiology. The goal is to develop an approach called Cross-Enterprise Document Sharing (XDS). This standards-based approach provides a mechanism to access a patient's multi-faceted clinical information, regardless of where it is physically located, while maintaining local control and ownership of that information and without compromising the privacy and security of the patient's health information.

HL7 Messaging Standards: Health Level 7 is a standards development organization that provides standards for the exchange, management, and integration of data that support clinical patient care and the management, delivery, and evaluation of health care services. NIST is collaborating with HL7 to improve current and future deployment of HL7 and to achieve health care information systems inter-operability and sharing of electronic health information. To achieve this goal, NIST leads the effort to ensure that HL7 conformance can be defined and measured at appropriate levels, by: 1) defining conformance for standards and ensuring that requirements are precise and testable; and 2) building tools that will promote consistent definitions and use of messages. Additionally, NIST is developing a conformance-testing tool that automatically generates test messages for HL7 Version 2 message specifications.

Medical Device Information: In a typical intensive care unit (ICU), a patient may be connected to one or more vital-sign monitors and receive medicine or other fluids through multiple infusion pumps. Devices such as ventilators, defibrillators, or hemodialysis machines may also support more acutely ill patients. Each of these medical devices has the ability to capture data. NIST is collaborating with the Institute of Electrical and Electronics Engineers (IEEE) Medical Device Communications work group and the IHE Patient Care Device project, sponsored by IHE and the American College of Clinical Engineering to develop conformance tests and associated tools that facilitate the development and adoption of standards for communicating medical device data throughout the health care enterprise as well as integrating it into the electronic health record.

Operating Room of the Future: It is estimated that 10–20 percent of hospital errors occur in the perioperative environment (before, during, and after surgery). Technology can play a major role in increasing the overall patient safety in such situations through the development of the operating room of the future (ORF). The ORF will consist of a network of inter-operable plug and play medical devices, where the utilization of advanced technologies, such as robot-assisted surgery, sensor fusion, virtual reality, workflow integration, and surgical informatics, will result in a higher quality of health care by considerably increasing patient safety. NIST is working with the Center for the Integration of Medicine and Information Technology (CIMIT) in the development of an architectural framework for medical device integration, development of clinical requirements for device plug-and-play standards, identification of current interfaces, and development, testing, and simulation of interfaces.

Clinical Informatics: Building on past experience in information modeling and research to support interchange standards for the manufacturing industry, NIST has prepared a comprehensive report of all clinical information-oriented standards, their development organizations, their scope, and the vocabularies/ontologies they employ.[4] NIST will use the report as the basis for developing a plan for applying NIST's experience to assist in clinical information-oriented standards development and closer harmonization.

WPAN's for Health Information: NIST is assisting industry in the development of a universal and inter-operable wireless interface for medical equipment, expediting the development of standards for wireless technologies, and promoting their use in the health care environment. In close collaboration with the IEEE and the U.S. Food and Drug Administration, NIST developed theoretical and simulation models for two candidate Wireless Personal Area Network (WPAN) technologies including the Bluetooth and the IEEE 802.15.4 specifications. NIST evaluated their performance for several realistic health care scenarios and contributed our results to the appropriate IEEE working group. NIST contributions will constitute the basis of standard requirements on the use of wireless communications for medical devices.

[4] Bock, C., L. Carnahan, S. Fenves, M. Gruninger, V. Kashyap, B. Lide, J. Nell, R. Raman, R. Sriram. *Healthcare Strategic Focus Area: Clinical Informatics.* National Institute of Standards and Technology: NISTIR 7263, 2005.

c) Certification

NIST has an established history of developing procedures for certifying conformance to consensus-based standards. Conformity assessment activities form a vital link between standards that define necessary characteristics or requirements for software products and the performance of the products themselves. Conformity assessment procedures provide a means of ensuring that the products, services, or systems produced or operated have the required characteristics, and that these characteristics are consistent from product to product, service to service, or system to system. Conformity assessment includes: sampling and testing; inspection; certification; management system assessment and registration; accreditation of the competence of those activities; and recognition of an accreditation program's capability. NIST has been in the certification business since its inception in 1901 and is well positioned to provide technical guidance in the development of a technical certification regimen, including specific certification metrics, software to perform comprehensive certification tests, and certification procedures.

d) Security

For many years, NIST has made great contributions to help secure our nation's sensitive information and information systems. Our work has paralleled the evolution of IT systems, initially focused principally on mainframe computers, now encompassing today's wide gamut of information technology devices. Our important responsibilities were reaffirmed by Congress with passage of the *Federal Information Security Management Act of 2002* (FISMA) and the *Cyber Security Research and Development Act of 2002.*

Beyond our role to serve the Agencies under FISMA, our Federal Information Processing Standards (FIPS) and guidelines are often used voluntarily by U.S. industry, global industry, and foreign governments as sources of information and direction for securing information systems. Our research also contributes to securing the Nation's critical infrastructure systems. Moreover, NIST has an active role in both national and international standards organizations in promoting the interests of security and U.S. industry. Current areas that are applicable to a Nationwide Health Information Network (NHIN) include:

- Cryptographic Standards and Applications
- Security Testing
- Security Research/Emerging Technologies

Recent activities specifically related to health IT include:

Guidance for Understanding the HIPAA Security Rule: The Security Rule issued under the *Health Insurance Portability and Accountability Act of 1996* (HIPAA) directs certain health care entities, known as "covered entities," to comply with standards for keeping certain health information that is in secure electronic form. NIST has published a document, *An Introductory Resource Guide for Implementing the HIPAA Security Rule* that summarizes and clarifies the HIPAA Security Rule requirements for agencies that are covered entities. It also directs readers to other NIST publications that can be useful in implementing the Security Rule.

Health Care Accreditation Guidance: NIST in conjunction with URAC and the Workgroup of Electronic Data Interchange (WEDI) sponsors the NIST/URAC/WEDI Health Care Security Workgroup. The group promotes the implementation of a uniform approach to security practices and assessments by developing white papers, crosswalks (of regulations and standards), and educational programs. The group brings together stakeholders from the public and private sectors to facilitate communication and consensus on best practices for information security in health care. Ultimately, these best practices will be integrated into accreditation criteria used by hospitals and other health care facilities. The group draws heavily upon information technology security standards and guidelines developed by NIST.

NIST Collaboration with the ONC

NIST is committed to supporting the ONC in the implementation of the President's Health IT initiative. Even prior to the interagency agreement NIST and many other federal departments and agencies provided assistance to the ONC in serving on the review task force for responses to a Request for Information (RFI) on implementation of a nationwide health information network and in assisting with subsequent Request For Proposals (RFPs) issued by the ONC.

Following are current areas of collaboration:

a.) The American Health Information Community (The Community)

HHS Secretary Leavitt has convened the American Health Information Community (the Community) to help advance efforts to reach President Bush's call for electronic health records and a nationwide health information network. The Community is a federal advisory committee and will provide input and recommendations to HHS on how to make health records digital and inter-operable, and to assure that the privacy and security of those records are protected, in a smooth, market-led way.

The Community agreed to form workgroups in the following areas: biosurveillance, consumer empowerment, chronic care, and electronic health records. These workgroups will make recommendations to the Community that will produce concrete results that are tangible and offer specific value to the health care consumer that can be realized within a one-year period. NIST has formal representation on three of these groups.

b.) Standards Harmonization

HHS has awarded a contract to the American National Standards Institute (ANSI), a non-profit organization that administers and coordinates the U.S. voluntary standardization activities, to convene the Healthcare Information Technology Standards Panel (HITSP). The HITSP will bring together U.S. standards development organizations (SDOs) and other stakeholders to develop, prototype, and evaluate a harmonization process for achieving a widely accepted and useful set of health IT standards that will support inter-operability among health care software applications, particularly EHRs. This activity is fundamental to the success of widespread inter-operability, the seamless and secure exchange of patient information electronically, and will overcome today's scenario of many standards for health information exchange, but with variations and gaps that hinder inter-operability and the widespread adoption of health IT.

NIST, as with many other federal agencies, is a member of the Healthcare Information Technology Standards Panel. NIST is helping ONC in establishing the Health Information Technology Standards Panel. In addition, NIST is working with HHS to develop a strategy to promote voluntary consensus standards across both the private and public sectors. As part of this process towards standardization of health information, NIST will continue to work with the ONC's Office of Inter-operability and Standards to develop appropriate implementation strategies for health care IT standards. This will include consideration of the development, when appropriate, of Federal Information Processing Standards and guidance to agencies through NIST Special Publications for adopted standards. This will help the government to achieve a greater level of inter-operability of health data.

c.) Assist in the Development of Procedures for Certifying Conformance

HHS has awarded a contract to the Certification Commission for Health Information Technology (CCHIT) to develop criteria and evaluation processes for certifying EHRs and the infrastructure or network components through which they inter-operate. CCHIT is a private, non-profit organization established to develop an efficient, credible, and sustainable mechanism for certifying health care information technology products. This initiative addresses the problem that there are more then 200 EHR products on the market, but no criteria exist for objectively evaluating product capabilities. Similarly, criteria are not available by which communication architectures can be standardized in a way to permit two different EHRs to communicate.

A cross-disciplinary team of NIST researchers serves as a technical advisory committee to support the CCHIT in tasks including functional criteria and test methods, general test procedures, accreditation, security, selection of jurors, and statistical tests of juror bias. Additional areas for interaction are being defined as the collaboration continues. In addition, the EHR conformance criteria, developed under NIST leadership, form the basis for CCHIT's certification efforts.

d.) Develop Performance and Conformance Metrics

In a Nationwide Health Information Network, consumers, practitioners, researchers, and payers must have tools, systems, and information that are complete, correct, secure, and inter-operable. Compliance to specific standards and regulations is the key to the development and implementation of this network. In addition, there must be a way to determine that the standards and regulations have been fulfilled. This is accomplished through conformance testing, a procedure to provide a means to ensure that products, services, or systems produced or operated have the requisite characteristics, and that these characteristics are consistent from product to product, service to service, or system to system.

NIST is collaborating with the ONC to help enable conformance testing to provide assurances that health care information technology products and infrastructure

components deliver the functionality necessary for inter-operability. NIST will work to help the community understand the current state of conformance testing within health information technology markets as well as what will be needed to test conformance of products for suitability, quality, inter-operability, and data portability so that the risk now assumed by health IT purchasers will be mitigated and the adoption of robust, inter-operable information technologies will be accelerated throughout the health care system of the United States.

e.) Provide Technical Expertise for a Nationwide Health Information Network

Four groups of health care and health information technology organizations have been awarded contracts by ONC to develop prototypes for a Nationwide Health Information Network (NHIN) architecture. These four consortia will bring together hospitals, laboratories, and health care providers with technology developers that will lead the health care industry to develop a uniform architecture for health care information that can follow consumers throughout their lives.

To manage the content of the four prototypes being proposed, a NIST team is working with ONC to create an architecture management system that will serve as a repository for all the final architectural elements, including but not limited to: user requirements, conformance testing requirements, functional specifications, and high level standards used. This system will also help manage the inter-relationships between all elements, which will aid in the development of the Nationwide Health Information Network. This architecture management system can be compared to a blueprint for building a house.

f.) Interagency Health IT Policy Council

Secretary Leavitt has established an Interagency Health Information Technology Policy Council (the Council) with in ONC to coordinate health information technology policy decisions across federal departments and entities that will drive action necessary to realize the President's goals of widespread health IT adoption. The Council brings together representatives from various entities within HHS and elsewhere in the government for the purpose of advancing both short-term and long-term health IT policy. The initial focus of the Council is to establish a strategic direction for policy and to identify accelerators to support the Community breakthroughs. NIST will participate as a member agency on this Council.

Conclusion

As the Committee can see by the few examples I have cited, NIST has a diverse portfolio of activities supporting our nation's health information technology effort. With its long experience as well as a broad array of expertise both in its laboratories and in its collaborations with other government agencies and the private sector, NIST is poised to help facilitate the harmonization of the many ongoing efforts, which together contribute to achieving the President's goal for developing both electronic health records and the establishment of a Nationwide Health Information Network.

Once again thank you for inviting me to testify about NIST's activities and I will be happy to answer any questions you may have.

BIOGRAPHY FOR WILLIAM JEFFREY

William Jeffrey is the 13th Director of the National Institute of Standards and Technology (NIST), sworn into the office on July 26, 2005. He was nominated by President Bush on May 25, 2005, and confirmed by the U.S. Senate on July 22, 2005.

As Director of NIST, Dr. Jeffrey oversees an array of programs that promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve quality of life. Operating in fiscal year 2006 on a budget of about $930 million, NIST is headquartered in Gaithersburg, Md., and has additional laboratories in Boulder, Colo. NIST also jointly operates research organizations in three locations, which support world-class physics, cutting-edge biotechnology, and environmental research. NIST employs about 2,800 scientists, engineers, technicians, and support personnel. An agency of the U.S. Commerce Department's Technology Administration, NIST has extensive cooperative research programs with industry, academia, and other government agencies. Its staff is augmented by about 1,600 visiting researchers.

Dr. Jeffrey has been involved in federal science and technology programs and policy since 1988. Previous to his appointment to NIST he served as Senior Director

for Homeland and National Security and the Assistant Director for Space and Aeronautics at the Office of Science and Technology Policy (OSTP) within the Executive Office of the President. Earlier, he was the Deputy Director for the Advanced Technology Office and Chief Scientist for the Tactical Technology Office with the Defense Advanced Research Projects Agency (DARPA). While at DARPA, Dr. Jeffrey advanced research programs in communications, computer network security, novel sensor development, and space operations.

Prior to joining DARPA, Dr. Jeffrey was the Assistant Deputy for Technology at the Defense Airborne Reconnaissance Office, where he supervised sensor development for the Predator and Global Hawk Unmanned Aerial Vehicles and the development of common standards that allow for cross-service and cross-agency transfer of imagery and intelligence products. He also spent several years working at the Institute for Defense Analyses performing technical analyses in support of the Department of Defense.

Dr. Jeffrey received his Ph.D. in astronomy from Harvard University and his B.Sc. in physics from the Massachusetts Institute of Technology.

Mr. REICHERT. The Chair recognizes Dr. Jody Pettit.

STATEMENT OF DR. JODY PETTIT, M.D., PROJECT CHAIR, PORTLAND HEALTH CARE QUALITY CORPORATION, PORTLAND, OREGON

Dr. PETTIT. Mr. Chairman and Mr. Wu, my name is Jody Pettit. Thank you very much for inviting me to provide testimony on a subject about which I feel so strongly.

I'm a board-certified internist and I've practiced medicine in Portland for the past 11 years. As a physician, I've had the privilege to take care of people and to see our medical system from the front line. There's a glaring problem, and it's the lack of information flow between systems.

I'll tell you a story about a woman that we saw in a clinic, who came in with a persistent cough despite treatments. We ordered a chest X-ray, and it showed a lesion in her right lung. She'd had a previous chest X-ray several years and remembered it was abnormal in some way but wasn't sure how. Luckily, she remembered where she had it done, and so we ordered the old film for comparison. If the lesion looked exactly the same, we could feel comfortable and watch it over time. So we waited. A week later, we still didn't have the film. We called again, because we could save her the worry, the radiation exposure, the time, the money that she and her health plan would pay for more tests. We eventually gave up and ordered a CT-scan, a chest CT, which cost close to a thousand dollars. A week later, finally, the old film did show up and, in fact, the lesion was exactly the same after almost four years. But by now she had spent the time, her 20 percent co-pay, she'd missed several hours of work, she'd gotten a hefty dose of unnecessary radiation, and she spent weeks in fear that she might have lung cancer.

This story, unfortunately, is not some bizarre exception or rare occurrence; there are issues of information flow every day. Experiences such as these have led me to refocus my energy. For the past three years, I've been one among hundreds—and they're here, too, today—of Oregonians from the private and public sector that want to find a better way through the use of health information technology. We've called this effort, collectively, the Oregon Health Information Infrastructure, or OHII for short.

The Oregon Health Care Quality Corporation has provided the nonprofit multi-stakeholder home for OHII. The State of Oregon re-

cently created a position in the Office of Health Policy and Research for health information technology coordinator, and I will be serving in that role.

The vision is fourfold: A person's health information available to them anywhere, any time that they need it. It's private and secure and under their control. Health information infrastructure is designed with the patient at the center. And that it's used to assure high-quality, cost-effective, personal and population-based care. There are many barriers to overcome and achieve this vision. And I think we're all well-versed in the EHR adoption issues, the technical issues, standards, privacy and security, business case, and sustainability issues—and not the least of which, political will, governance, stakeholder cooperation, data sharing, and just plain old trust.

So what are the roles of the Quality Corporation and the State and the Federal Government in resolving these issues? The Quality Corporation, with lots of partners, has helped bring attention to this issue by bringing people together from around the state and has completed a data sharing project with 12 health plans. We're working on assessment of EHR adoption and currently engaged in a joint effort with the Oregon Business Council's EHR and interoperability committee. The goal of OHII is to catalyze the formation of a regional health information organization, or RHIO.

The state, likewise, has given attention to this issue. The Oregon Health Policy Commission appointed a subcommittee to give recommendations to the state; that report is available here today. The Oregon Office of Health Policy and Research has committed to resources for coordination. And the Governor's Office is applying for a federal contract—subcontract to examine privacy and security laws and practices in Oregon.

With regard to the federal role, the answers for all the issues are, clearly, not worked out yet; but what we do have is a forum for discussion and an appropriate framework in the Office of the National Coordinator for Health Information Technology. And the good news is, the agenda is moving forward. National level activities are underway but state levels are not well supported. Exceptions are communities that have already received federal funding or have been working on this for well over a decade.

The expectation is not for the government to fund this indefinitely. There are RHIO business models being studied in several communities, but assistance or start-up capital would be helpful. A good example of this is the federal contract process. The HISPC, the Health Information Security and Privacy Collaboration, where RTI serves as a prime contractor and the states as subcontractors. This allows contract money to be awarded to states but with some coordination at the national level. Working through the Governor's Office is an effective way to gain state leadership. The process takes some leadership and some followership.

I will close with these points. Number one, there is a critical need for better information flow for better care.

Number two, real change involves rearranging the system such that the patient is truly at the center. Until we do this, the changes are incremental and not transformational. There is a need for the data holders to share their data for the good of the patient.

We need to resolve these issues regarding—or arguments regarding data ownership. A person's data needs to be available to them without question. It's understood that data holders, i.e., providers, health systems, and health plans, need to keep a copy for their own records; however, they should endeavor to make patient centered data sharing arrangements.

Number three, the Office of the National Coordinator is a vehicle that's working. It has some money for national coordination but very little to pass through to the states and communities for RHIO information. Start-up capital could help to build the infrastructure that's necessary to derive value and ultimately achieve financial sustainability.

We all need to have courage to make this happen. We're building something that hasn't existed before, but it needs to exist as soon as possible, for all of our sakes.

Mr. Chairman and Ranking Member, thank you for coming to the Great Northwest to listen to our concerns.

Mr. WU. Thank you.

Mr. REICHERT. Thank you, Dr. Pettit.

[The prepared statement of Dr. Pettit follows:]

PREPARED STATEMENT OF JODY PETTIT

Introduction:

Thank you very much for inviting me to provide testimony on a subject about which I feel so strongly. I am a board-certified Internist and have practiced medicine in Portland for the past 11 years. As a physician, I have the privilege to take care of people and to see our medical system from the front line. There is a glaring problem—and it is the lack of information flow.

Let me tell you a story about a woman that I saw in clinic who came in with a persistent cough. We had tried several treatment regimens but her cough continued. We ordered a chest x-ray and it showed a lesion in her right lung.

She had a previous chest x-ray several years ago and she told us it was abnormal in some way but wasn't exactly sure how. Fortunately, she remembered where she had it done, so we called over to that facility to get the old chest x-ray for comparison. If the lesion still looked exactly the same after several years then we wouldn't have to worry as much and we could watch it.

So we waited.

A week later we still didn't have the film. We called again because we could save her the worry, the radiation exposure of more tests, the time and the money that she and her insurer would pay for more tests. We called again, but eventually the resident gave up and ordered a chest CT. A chest CT costs a little less than $1,000. The following week, the old film finally made it over and indeed the lesion was exactly the same after almost four years. But by now she spent the time, her 20 percent co-pay, missed several hours of work, got a hefty dose of unnecessary radiation via CT and spent a weekend in fear that she might have lung cancer.

A chest x-ray + a lack of information could equal a chest CT + biopsy could = a pneumothorax, a chest tube, an ICU admission, a hospital-acquired infection and sepsis. And a $50,000 hospital bill. Or a chest x-ray + timely information = reassurance and prevention of a hospitalization.

This story is not some bizarre exception, or a rare occurrence—there are issues of information flow every time I go to clinic.

I could tell you countless stories of scrambling for information—phone calls to medical records clerks in the wee hours of the morning while the 50 yo man with chest pain is being wheeled down the hall to the cath lab—we didn't have an old ECG for comparison or his previous cath report—we didn't know if the ECG changes were new so he was going to have a catheter pushed up through his groin into his heart to look at his coronary arteries.

Any case could follow one of two equations:

Clinical condition + unattainable information = cascade of unnecessary tests, possible complications and avoidable cost

Clinical condition + timely information = accurate, well-informed medical decisions and efficient medical care. (cost-effective)

Experiences such as these have led me to refocus my energy.

For the past three years, I have been one among hundreds of Oregonians from the private and public sector that want to find a better way with the use of information technology. We call this collective effort the Oregon Health Information Infrastructure or OHII for short. The Oregon Healthcare Quality Corporation has provided the non-profit, multi-stakeholder home for OHII. The State of Oregon recently created a position in the Oregon Office of Health Policy and Research for a Health Information Technology Coordinator and I will be serving in that role.

The Vision:

The vision of better information flow in health care is four-fold:

- A person's health information is available to them anywhere, anytime they need it.
- Health information is private and secure and under the control of the individual.
- Health information infrastructure designed with the patient at the center.
- Health information is used to assure safe, high quality, cost-effective personal and population-based health care.

The Issues:

There are many barriers to overcome to achieve this vision.

EHR adoption issues—Clinicians aren't adopting EHR because of a lack of financial incentives, expense, risk of implementation failure and lack of inter-operability which makes for expensive interfaces and prohibits migration to different system.

Technical issues—The optimal technical architecture for inter-operability and health data exchange is still being explored. Vendors are just starting to create products to perform this function and engines are operating only in experimental settings.

Standards issues—There are numerous standards organizations in competition for becoming the standard. There is a need for harmonization of these standards. EHR vendors have some but not all data in proprietary formats and new standards would require largely require retrofitting into their software.

Privacy & Security issues—Inappropriate disclosure of health information is one of the top concerns for consumers. Fear of discrimination especially from employers makes people cautious about sharing their health information. Among the many issues, patient control over access is a prominent one.

Business case and sustainability issues—It is well-recognized that in order for the building of information technology systems to be funded that the investors must recognize some value or return on their investment. Furthermore, operating expenses of these systems must be offset by a revenue source in order to be financially sustainable. Studies of the value of HIT and projections regarding whom benefits and how much have been published in the past couple of years. Sustainability models are likewise being devised and tested in some communities are around the U.S. The answers in this realm are not readily apparent and the question of who will pay is still largely unanswered.

Political will, governance, stakeholder cooperation, data sharing and trust issues—Part of the challenge of moving from an institution-centric model to a patient-centered model is that it requires that data holding entities share information. Patients almost never get all of their medical care in a single location and thus it is inadequate to maintain walled off silos of data at the various points of care. However, institutions may view holding onto the records as a means of holding onto the patient. Thus competitive issues between health care entities may lead to an unwillingness to share. Establishing a governance in which the various entities have a seat at the table and agree to rules for decision-making and data sharing is one of the major challenges.

Role of the Oregon Healthcare Quality Corporation:

The Oregon Healthcare Quality Corporation (QCorp) has four initiatives, all of which relate directly or indirectly to the use of health information technology.

Chronic Disease Data Clearinghouse

This proof-of-concept pilot demonstrated that 12 health plans, working together, can provide helpful tools that physicians will use to manage care for patients with diabetes and asthma.

Analysis is providing answers about where people receive their care to guide decisions about how to reduce fragmentation through common data systems.

Common Practice Measurements

Providers, health plans and purchasers are working together to identify a shared set of appropriate out-patient practice quality measurements. These will be used by multiple stakeholders for assessing, reporting and rewarding quality care in Oregon.

Advocacy and Education

Legislative testimony, serving on multiple Health Policy Commission committees and cross-organization board memberships are a few of the ways that Quality Corporation staff advocate for a collaborative quality agenda. Sponsoring and participating in numerous conferences bring Oregonians together for a shared agenda for quality improvement.

Oregon Health Information Infrastructure (OHII)

A strategic plan, developed through stakeholder meetings, is setting the agenda to encourage adoption of electronic health records and systems for securely and efficiently getting information to where it is needed. OHII work (with partners) has included: multiple state-wide conferences, CIO/CMIO forums, a pilot project proposal, EHR inventory to establish a baseline. The Quality Corporation is working to foster the formation of a regional health information organization (RHIO). The Office of the National Coordinator for Health Information Technology (ONCHIT), has called for at least one RHIO per state and one overarching RHIO. In Dr. Brailer's view, a RHIO provides governance and oversight. He believes it is essential to develop a process for making decisions in public and RHIOs should have this public governance process. The OHII effort endeavors to play a role in establishing an open, neutral, inclusive governance process for Oregon and is engaged in dialogue with top health care leaders including those in the Oregon Business Council's EHR and Inter-operability Subcommittee.

Role of the State of Oregon:

The following is taken from the report to the Oregon Health Policy Commission entitled "Report to the 73rd Legislative Assembly: Electronic Health Records & Data Connectivity," *http://egov.oregon.gov/DAS/OHPPR/HPC/docs/EHR_LegReport_March05.pdf*

The report made recommendations regarding the State's possible roles:

- Convene stakeholders
- Assess EHR adoption and community inter-operability efforts
- Sponsor meetings
- Examine State laws regarding HIT
- Collaborate with Public Health
- Engage the public
- Coordinate efforts around the state
- Provide funding, if possible
- Partner with the private sector
- Incentivize HIT adoption in role as Payer through Oregon Medical Assistance Program (OMAP)
- Incentivize HIT adoption in role as Purchaser through Oregon Public Employees Benefits Board (PEBB).

Role of the Federal Government:

The Office of the National Coordinator for Health Information Technology (ONCHIT) is organized into the following offices:

Office of HIT adoption

Office of Inter-operability and Standards

Office of Programs & Coordination

Office of Policy & Research

They have the following as their major initiatives with the corresponding roles:

American Health Information Community (AHIC)	advisory
Health Information Technology Standards Panel (HITSP)	standards
Certification Commission for Health Information Technology (CCHIT)	compliance
Health Information Security and Privacy Collaboration (HISPC)	security and privacy
National Health Information Network consortia (NHIN)	architecture

A Recommendation for Action:

We don't have the answers to all the issues but what we do have is a framework and a forum for discussion in the Office of the National Coordinator for Health Information Technology (ONCHIT). The good news is things are progressing in the ONCHIT agenda but the missing piece is significant money flowing to the states. The activities that need to take place at the national level are underway but the activities that need to occur at the state level are not well-supported. Exceptions are communities that have received funding or have already been working on this for over a decade. The expectation is not for the government to fund this indefinitely, but assistance with start-up capital could be helpful. There are business models being studied and demonstrated in some communities in the country.

An example of a working model for government funding is the Federal contract process, e.g., with Research Triangle International (RTI) and the Health Information Security and Privacy Collaboration (HISPC). RTI serves as a prime contractor and states as subcontractors. This allows contract money to be awarded to states in a semi-competitive process with coordination at the national level. Working through the Governor's office is an effective way to engage state leadership.

So this process requires some leadership *and* some followership.

Economic Analysis of Health Information Technology impact:

Several groups have begun to tackle some of the economic issues relating to the adoption of HIT, the implications for inter-operability and the use of clinical decision support tools. Below are some high-level numbers that have been cited as relevant to the discussion.

U.S. health care industry expenditures = $1.7 trillion per year

RAND estimates $81 billion per year **savings** with EHR implementation and networking.

The Center for Information Technology Leadership (CITL) estimates fully standardized health information exchange and inter-operability of could yield a net value of $77.8 billion per year once fully implemented. Combined with potential savings from adoption of CPOE in office EHR of $44 billion, the CITL suggests adoption of HIT could save approximately five percent of health care expenditure.

A study out of Harvard published in the Annals of Internal Medicine last year estimates the cost to build the National Health Information Network at $156 billion

in capital investment over five years and $48 billion in annual operating costs. (*Annals of Internal Medicine 2005;* 143:165–173.)

The Bush Administration has requested $169 million for health information technology in the 2007 Health and Human Services Department budget, a $58 million increase from the $111 million allocated for health IT in the fiscal 2006 budget passed last month. The health IT funding line includes a requested $116 million for ONCHIT, $50 million for the Agency for Healthcare Research and Quality and $3 million for the HHS assistant secretary for planning and evaluation's budget. (Source: *Government Health IT,* Feb. 6, 2006)

U.S. health care industry expenditures = 1.7 trillion/yr
Estimated Operating Savings = $124 billion/yr
Estimated Operating Cost = $48 billion/yr

Net Operating Savings = $ 76 billion/yr

The CITL suggests adoption of HIT could save approximately five percent of health care expenditure.

ONCHIT budget = $169 million/yr

The estimated capital investment is $156 billion, the proposed budget is $169 million—this is 1/1,000th of the necessary funding.

These figures help to make the argument for federal funding to help move this effort forward and for CMS in it's role as a payer to incentivize HIT adoption.

Closing Comments:

I will close with these points:

1. There is a critical need for better information flow in health care to achieve safe, efficient and high quality care.
2. Real change involves rearranging the system such that the patient is at the center. Until we do this, changes are incremental, not transformational. There is a need for the data holders to share their data for the good of the patient. We need to resolve the arguments regarding data ownership. A person's data needs to be made available to them without question. It is understood that the data holders, i.e., providers, health systems and health plans need to keep a copy for their own records, however they should endeavor to make patient-centered data sharing arrangements.
3. The Office of the National Coordinator for HIT is a vehicle already in place for change and to a great degree it is working. We have a forum for discussion and a framework for strategic action. The ONCHIT has been able provide some money for national coordination but very little money to pass through to the states and communities for RHIO formation. What we're lacking is the real financial commitment for this effort at a state level. Start-up capital could help to build the infrastructure that is necessary to derive value and ultimately achieve financial sustainability.
4. Support legislation that authorizes the Secretary of Health and Human Services to make health information technology grants or contracts for the development of information sharing infrastructure and collaborative efforts to spur adoption by small physician groups and others.

ADDENDUM:

Specific examples of issues or barriers:

Solicitation of some health information technology colleagues in Oregon yielded the following specific examples:

Example of lack of regulatory harmonization: A health IT colleague 'on the ground' implementing systems points to regulation from various compliance organizations, e.g., JCAHO, NEC, UL, EOC, etc., that result in layers and layers of regulations. There is apparently a need for harmonization of these sometimes contradictory and stifling combinations. It was conveyed that the regulations make sense in isolation but become nearly unimplementable when several overlap. There is also a concern that increasing regulation increases the cost of implementation of systems.

Example of vocabulary standards issue or need: Colleagues at Oregon chapter of the American Health Information Management Association (AHIMA) have brought this issue to the fore. They feel that the U.S. needs to adopt and begin implementing ICD–10 clinical coding systems in order to improve the quality of health

data and patient care. Their concern it that current classification system, ICD–9–CM is obsolete. Developed nearly 30 years ago, they assert that it cannot accurately describe the diagnoses and inpatient procedures of care delivered in the 21st century. Furthermore, they point out that the U.S. is the only industrialized country in the world that has not adopted it. Ninety-nine other countries have preceded the U.S. thus far.

Example of potential legislative need: The U.S. might consider lengthening the statue of limitations on keeping a medical record from seven years to 107 years. The rationale is that records need to be available for the duration of a person's life.

BIOGRAPHY FOR JODY PETTIT

Dr. Pettit is working in a dual role regarding health IT in Oregon. She was recently selected by the Oregon Office of Health Policy and Research to serve in the role of Health Information Technology Coordinator.

She is the Director of the Oregon Health Information Infrastructure project of the Oregon Healthcare Quality Corporation, a multi-stakeholder collaborative dedicated to improving health care quality. The organization has as one of its primary goals to foster the building of an Oregon Regional Health Information Organization.

She is a Board-Certified Internist practicing part-time as faculty with the Department of Medical Education at Providence Ambulatory Care and Education Center, the Department of Medicine Faculty Practice at St.Vincent's and with Legacy Health Systems in Portland.

She was the Medical Director of the InterHospital Physicians Association (IPA) in Portland, Oregon from 2001–2005.

Dr. Pettit worked in the role of clinical consultant for the electronic health records company MedicaLogic in Hillsboro, Oregon from 1999–2001.

She is a Clinical Assistant Professor at the OHSU Department of Medical Informatics and Clinical Epidemiology.

She has been on the Board of the Oregon Healthcare Quality Corporation (QCorp) since 2001 and served as the Chairperson of the Chronic Disease Data Clearinghouse.

Dr. Pettit served as Chair of the Electronic Health Records and Healthcare Connectivity Subcommittee for the State of Oregon, under the Oregon Health Policy Commission 2005.

She participated in the State of Oregon Evidence-based medication review process in three subcommittees, acting as Chair of the Triptan subcommittee.

She earned her Medical Degree from Medical College of Virginia and a Master's Degree in Health and Wellness Administration and a BS in General Science from the University of Iowa.

Mr. REICHERT. The Chair recognizes Ms. Diane Cecchettini.

STATEMENT OF MS. DIANE E. CECCHETTINI, PRESIDENT AND CEO, MULTICARE HEALTH SYSTEM, TACOMA, WASHINGTON

Ms. CECCHETTINI. Thank you, Mr. Chairman and Mr. Wu.

I'm Diane Cecchettini. I'm a registered nurse and I'm currently serving as President and CEO of MultiCare Health System.

To give you a frame of our organization: We're a not-for-profit, community-governed health care system who operates two adult hospitals and a pediatric hospital, 593 licensed beds, six ambulatory care centers, six urgent care, and we employ 200 physicians in our care system.

Over the past eight years, MultiCare Health System has invested over $50 million implementing an electric health record in our ambulatory center. Currently, we're implementing the electronic health record in our inpatient hospitals, and it's $50 million and counting. One of the huge barriers to the implementation is the huge training costs of all of our staff, plus the redesign of work flow so that we really achieve a transformation of the health care system, centered around patient, centered around information flow. We believe in these investments. We are funding this out of oper-

ating earnings and reserves because it's the right thing for the next level of care.

Our patients are already starting to see the benefit of this. Our patients now can see—they have access to their medical records through secure electronic access. They can view their medical problems, they can see lab work results, make appointments, review education specific to their disease, and even refill prescriptions. So we're on that first step of access.

Since we've been in the ambulatory clinics for so many years, we looked at what are the results of providing physicians with information technology tools to really better manage complex diseases. We've studied the 5,316 diabetic patients and have seen significant clinical outcome results. When you're able to provide physicians consistent data in terms of how they are achieving hemoglobin A1C—and that's how you manage and control blood glucose, how you manage blood pressure—we consistently monitor this with our patients and so it's a continuous stream of measuring outcomes. We know—and we've extrapolated the data—that we have prevented heart attacks, we have prevented ED admissions, and we have decreased morbidity and mortality from this disease.

Our goal is ultimately to establish one health record across the continuum and decrease the fragmentation that exists in health care with patients not having the data flow with redundant imaging tests, by being able to direct the patient at the right site with the right information needed for care of the patient. We're already seeing that impact in our emergency department. When people in our clinics come to the ED, we can immediately access the history, the medications, and expedite treatment.

We also see that we're able to recall patients when there are drug alerts, when we find more information about drugs that we need to change therapy. So with the recent Vioxx, we were able to immediately contact our patients and change therapy. We were able to address our 15,000 women with the hormone replacement therapy that were issues. With preventative measures, we're able to achieve a 100 percent childhood immunization rates in our clinics, and our mammogram compliance rate exceeds 97 percent.

We believe, with all the barriers and challenges, that payment incentives are key to the doctors of technology in order to achieve successful expansion. So we're very interested in payment incentives. We have concerns about pay for performance, but my concern is that pay for performance needs to be tied to clinical outcomes. We have a number of primitive efforts in Washington state, where the commercial insurers data is corrupted, and it's from claims history. So it really needs to be tied to clinical outcomes.

We also have concerns—We're ready to extend our electronic health records to smaller physician and independent physician practices and other hospitals. And so we encourage CMS to continue to examine its interpretation of the Stark Law in order to encourage connectivity in regional networks at a fair market value. That will allow us all to get there quicker.

And, finally, I think it's important to consider the implications of the electronic health record on access to and recovery of data during a disaster such as Hurricane Katrina. Of all the lessons learned, area hospitals that already had electronic health record

capacity lost virtually no patient data. So implementation and inter-operability standards facilitating safe information exchange and appropriate redundancy planning in case of another disaster is critically important.

Thank you, Mr. Chairman. That completes my statement.

Mr. REICHERT. Thank you.

[The prepared statement of Ms. Cecchettini follows:]

PREPARED STATEMENT OF DIANE E. CECCHETTINI

Thank you Mr. Chairman and Members of the Subcommittee. My name is Diane Cecchettini. I'm the President and CEO of MultiCare Health System in Tacoma, Washington, and I'm also a registered nurse. Thank you for inviting me here today to discuss the benefits of Information Technology (IT) to providers and consumers of health care, the impact of IT on quality and costs, and the incentives and barriers that exist to the broader adoption of IT in the health care industry.

MultiCare operates two adult and one pediatric hospital and we serve as a Level II trauma center for both children and adults. We have 593 licensed beds, five ambulatory surgery centers, six urgent care centers, and a certified home health agency and hospice program. We also employ 200 physicians in our MultiCare Medical Group. Over the last eight years, MultiCare has invested 50 million dollars implementing an electronic health record in our ambulatory physician practices. Currently, we are implementing the electronic health record (EHR) in our three inpatient facilities which will cost another 50 million dollars. We believe this is a critical investment to support improvements we've seen in patient care, but the costs are truly monumental. With the EHR we have a much greater ability to track our care processes using evidence-based guidelines, communicate among different providers who care for the same patient, and improve patient outcomes because of our ability to track and study data trends. Our patients also see specific benefits. Most importantly, they can participate in their care through secure electronic access to their medical record to view medical problems, see lab work results, make appointments, review educational materials specific to their diagnoses and even refill prescriptions.

In 2001–2002, MultiCare conducted a study of 5,000 diabetic patients in MultiCare Medical Group and estimated that as a result of implementing specific physician practice guidelines, which included tracking and reporting of certain lab values like blood glucose and cholesterol, along with blood pressure, 33 heart attacks and 28 deaths were prevented in one year. This of course has the downstream effects of less Emergency Department (ED) visits, less Coronary Care Unit stays and fewer cardiac catheterizations to name a few, all of which can cost tens of thousands of dollars each. The potential annual cost savings in this group of 5,000 diabetic patients alone had an estimated downstream savings to Washington State health care of 4.3 million dollars annually (Reed and Bernard, 2005). The journal article describing the study is attached to my written testimony. We believe firmly that while terribly expensive on the front end, EHRs save lives and will save the national health care system significantly over the long run.

Our mission is quality patient care. Because, ultimately, it is the patient who owns their clinical data, our goal is to establish one health record that spans the continuum of our services. Physicians in our EDs have access to medications and past medical history via the ambulatory record. Our ambulatory physicians and home health nurses are able to see the course of treatment when a patient is in the hospital. Our community physicians are able to remote into our system using a secure connection. Now, instead of relying on just faxes and mail, our medical records department is beginning to work with physician offices to access patient information electronically. This is much more efficient to the physician and to our hospital. Secure access for our providers can even be extended to them at home, meaning they can see important lab and radiology results as soon as they are available, even at night or on weekends. This is good for care continuity and it also saves money because duplicate lab tests or other interventions that might be repeated, are not. Another real advantage of an EHR is the ability to contact patients quickly when a drug is recalled or found to have ill-effects for certain populations. For example, as soon as we learned of the potential problems with the drug Vioxx, we were able to immediately contact our patients receiving the drug and schedule them to talk with their doctor. When concerns arose about hormone replacement therapy in 2002, information was targeted to 15,000 women. With traditional paper systems this would be extremely time intensive, if not impossible.

Our prevention programs have also seen tremendous improvements with the EHR. Childhood immunizations have reached 100 percent in some of our clinics. Our mammogram compliance rate exceeds 97 percent. In 2003, influenza administration reminders were mobilized in seven days for new CDC recommendations.

We feel strongly that Information technology provides our health system with several specific benefits. In particular, it allows us to:

- Practice evidence-based medicine;
- Implement disease management programs that focus on prevention and care of the chronically ill;
- Lengthen lives and allow patient participation in care;
- Prevent costly hospitalizations; and
- Support public health and biosurveillance.

We equally believe that payment incentives are key for the adopters of technology in order to achieve successful expansion throughout the country. Specifically, we would encourage the State and Federal Government to:

- Adopt a common set of operating standards to support inter-operability;
- Provide payment incentives for adopters of technology;
- Ensure protection of consumer privacy by enforcing encryption, user authentication and audit trails;
- Encourage a common set of measures to audit performance among all of the payers for health care; and
- Support a common, agreed-upon, and detailed vocabulary for all medical terminology, such as SNOMED.

A significant barrier will continue to be how to pay for information technology, especially for small hospitals, rural providers, and individual physician practices. While some federal and private grant money has been available for Health Information Technology (HIT) adoption, there simply is not enough to go around. We would like to extend the use of our EHR to smaller physician practices, and even to hospitals through application service provider arrangements (ASP). I would encourage CMS to continue to examine its interpretation of the Stark Law, in order to encourage connectivity in regional networks at a fair market value. We would also encourage CMS and other payers to ramp up efforts to expand pay for performance and reimbursement incentives for organizations that adopt information technology. Once payment is tied to the use of technology, the urgency of adoption will increase. However, hand in hand with these efforts need to be a uniform set of standards that vendors must adhere to in order to achieve the inter-operability needed to ensure patient records are always available when and where they are needed.

It is also important to consider the implications of the EHR on access to and recovery of data during a disaster such as hurricane Katrina. Hospitals, clinics and other care settings, along with the paper medical record information in those facilities were literally destroyed. As evacuees crowded into shelters with many in need of medical attention, doctors who treated the patients had to do so with only a rudimentary knowledge of their past treatments. However, area hospitals that already had electronic health record capacity lost virtually no patient data. Implementation of inter-operability standards facilitating safe information exchange and appropriate redundancy planning in case of another disaster can ensure that electronic patient information can be available much sooner, alleviating many of the challenges faced by care givers in difficult circumstances.

I have the honor of currently serving as the Chairperson of the Washington State Hospital Association. As a state, the health systems in Washington have actively embraced the Institute for Healthcare Improvement's 100,000 lives campaign. We firmly believe that technology can improve care quality in our hospitals and save money. While the return on investment is not immediate, EHRs are key to achieve the efficiencies and care management so crucial to patient safety in the hospital, and to address the needs of the chronically ill. The task of developing a National Health Infrastructure is extremely difficult and complex—it is a long-term endeavor. However, it is imperative that it be done and I appreciate the leadership of the Subcommittee.

Thank you. Mr. Chairman, this completes my statement. I will be happy to answer any questions that you or other Members of the Subcommittee might have for me.

ORIGINAL RESEARCH

REDUCTIONS IN DIABETIC CARDIOVASCULAR RISK BY COMMUNITY PRIMARY CARE PROVIDERS

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ABSTRACT

Objective. To evaluate a community-based, not-for-profit medical group's effectiveness with diabetic management while using an electronic medical record and financial incentives. **Design.** Descriptive retrospective study over 2 years with published reference standards. **Methods.** There were 5,316 diabetic patients in the medical group (MG) compared with 5,069 diabetic patients reported in the literature (CT). The main outcome measures included serum hemoglobin A1C (HbA1C), total (TC), low density lipoprotein (LDL-C) and high density lipoprotein (HDL-C) cholesterol, and clinic measures of systolic (SBP) and diastolic blood pressure. We determined a mean 10-year composite multivariable cardiovascular risk score based upon these parameters.

Results. The mean MG serum HbA1C (7.10±0.02; 8.18±0.23%), TC (193.2±0.64; 218.3±6.09 mg/dl), LDL-C (109.2±0.52; 137.8±4.24 mg/dl), and SBP (132.8±0.25; 141.6±2.36 mmHg) were below those for the CT ($p<0.001$). The MG mean overall coronary heart disease risk of 14.9±1.4% over 10 years was below that for the CT group of 22.7±2.3%, representing a 34.7±4.4% reduction ($p<0.0002$). The electronic medical record and the use of a financial award may have contributed to these results.

Conclusion. Improvement of cardiovascular risk variables can be achieved in the primary care setting. Electronic tools and incentives may facilitate this improvement. *(Int J Circumpolar Health 2005;64(1):26-37.)*

Keywords: Diabetic, cardiovascular, multivariable, community, medical group

INTRODUCTION

Only 54% of the providers in the United States meet the quality indicators for diabetic care (1) and, in general, only 65% reach well-known goals for hypertension and 49% for cholesterol management. Diabetic patients presenting for elective cardiac catheterization have similar poor control of cardiovascular risk factors (2). Particular populations living in circumpolar regions, such as the Alaska Natives, have a high risk for cardiovascular disease (3) and diabetes (4). Additionally, those peoples who live in both temperate and high latitude regions are at risk for winter increases in the incidence of hypertension, stroke and myocardial infarction (5). The clinical benefits for diabetic patients can be dramatic with improved attention to multiple risk factors (6). When patients improve glycemic control, lipid management, blood pressure regulation, and add aspirin therapy and other factors, they can be shown to dramatically reduce the risk of myocardial infarction, stroke, nephropathy and retinopathy (6-8). The improved outcomes are now recognized for both type 2 and type 1 diabetics (7), and these goals are rapidly becoming the new standard of international care for diabetic patients. The importance of this issue reaches even greater significance with the lifetime risk of diabetes in the United States now exceeding 30% for all children born in 2000 (9).

Many factors contribute when patients do not reach optimal goals for end-organ risk reduction management. Some of these limitations include patient compliance, insurance cost, medication cost, and lifestyle habits. However, reminders for patients and providers (10,11) have been highlighted as a principal tool for improving the success in reaching treatment goals. Electronic medical records and electronic databases have been suggested by some authors as the tools that may both improve clinical outcomes (1) and reduce medical errors (12). With intensive intervention, cardiovascular risk reduction can result in substantially improved outcomes; however, the cost associated with this intensive management can be extreme (6, 13). Offering provider incentives for delivering quality was reviewed recently (14). Many groups are now beginning to develop provider and institutional incentives to improve the quality of healthcare (15-17).

The Medical Group (MG) reported here had both an electronic medical record that can provide patient-specific reminders for diabetic target goals and an incentive program for rewarding achievement of diabetic care targets by our primary care providers. By comparing our 5,316 diabetic patients to diabetics treated with conventional therapy (CT) as a reference group, we can review the effectiveness of medical management. This comparison can be extended to predictions about the cardiovascular risk of these patients with regard to myocardial infarction rate, death rate, and end-organ damage (8, 18-21).

We report the risk of developing cardiovascular disease in diabetic patients treated in a fee-for-service, community-based medical group and compare these to the risks from published groups of conventionally-treated diabetic patients. These population risk scores are calculated using standard measures of glycemic, cholesterol, and blood pressure control.

METHODS

The electronic medical records were searched for diabetic patients (18-75 yrs) by using ICD-9-CM diagnostic codes (250.00-250.93). There were 5,316 individual diabetic patients registered with the MultiCare Medical Group between October 1, 2001 and September 30, 2002 who were eligible for the study. By using data fields for extraction, we retrieved values for the hemoglobin A1C (HbA1C), serum total (TC), low density lipoprotein (LDL-C) and high density lipoprotein (HDL-C) cholesterol, systolic and diastolic blood pressure, body weight, height, age and gender. Both type 1 (5.9%) and type 2 (94.1%) diabetics were used, but gestational diabetic patients were excluded from analysis (7). Patients were deidentified for analysis, and the study was approved by our Institutional Review Board.

Inclusion and exclusion criteria were used based upon the one-year period 2001-2002, diagnosis, patient age (18-75yr), and number of clinic visits to the Medical Group (at least 1 visit) at the end of the period of evaluation. A one-year period of data collection for HbA1C and blood pressure and a two-year period of data collection for lipid management were used in order to be consistent with the national recommendations at the time for monitoring of these parameters. The values for all parameters were selected as the last evaluation obtained prior to 30 September, 2002. The care was provided by a primary care provider who was a current member of the Medical Group. The provider description included 32% Internists, 64% Family Physicians, and 4% Primary Care Advanced Nurse Practitioners. The MultiCare Medical Group is part of an integrated not-for-profit, community-based healthcare delivery system, MultiCare Health System (MHS), Tacoma, WA. The medical group payment is composed of 18.5% government insurance, 2.24% self pay, less than 1% managed care and charity care, and the remainder in commercial payment. The cardiovascular risk and demographic parameters were reviewed again for a follow-up period between October 1, 2002 and September 30, 2003 to determine the stability of the values since the end of the initial study period. The serum values for the MG patients were measured by the MHS clinical laboratory in the course of managing care, and the LDL-C was calculated. To convert cholesterol to millimoles per liter, multiply by 0.02586. The values reported here for the MG were stable in the one-year follow-up period with slight, but not significant, further reductions in TC, LDL-C, HbA1C, and blood pressure control.

The combined effects of using multiple interventions can be predicted using published tools (19,21). These tools are supported by the Framingham Heart Study data (18) and the UK Prospective Diabetes Study group (UKPDS) data (8), respectively. The demographics of the UKPDS patients are included in our CT group and they are similar to the MG demographics; we therefore chose to use this newly-revised analysis tool, which includes glycemic control (21). The conventional treatment (CT) subjects have a mean age and gender ratio which are similar to our patients (Table I). Thus, whatever inherent differences exist within the model regarding the weighting of age, gender, and duration of diabetes, these will be similar between groups. The multifactorial tool (21) was used

to determine overall cardiovascular risk for standardized groups using mean and 95% CI data to generate models of high and low risk for the following categories of male smokers, female smokers, male nonsmokers and female nonsmokers. The high-risk analysis consisted of the high 95% CI measures for HbA1C, TC, SBP, and the low measure for HDL-C; by contrast, the low-risk analysis consisted of the opposite 95% CI favorable values. The mean risk was determined using the mean values for these parameters in the same four gender and smoking preference standardized patient types. The mean age of the populations and 8.06 years duration of diabetic disease was used in all calculations for a Caucasian population risk assessment. The ethnic distribution for our population was Caucasian (86.1%), African American (8.4%), Hispanic/Latino (1.5%), American Indian (0.3%), Asian (1.7%), Multiracial (0.1%), Pacific Islander (0.5%), and other (1.5%) with data available for 53.4% reporting ethnicity. The duration of diabetes was used as a standard normalization because of the presence of this reported value for the CT group. To compare the overall cardiovascular risk score, these patient types were then analyzed with an ANOVA. Because the presence of smoking has such a substantial weight upon cardiovascular risk, we elected to analyze this separately and equally for both groups. In order to model the individual populations for the more specific risk of smoking, we weighted the risk parameters according to accepted ratios of gender-specific smoking trends in the US (Figure 1). These average rates of smoking in the United States are 25.7% for men and 21.0% for women, as published by National Center Health Statistics (22). We understand that some of the CT group are not from the United States and that these data may not directly apply; however, we felt that using the same weighting for smoking allowed a more accurate comparison of the parameters originally chosen for the study.

We verified our main conclusions with a complete analysis using a second and less powerful multivariable risk model (19). These results are not presented here but they showed similar statistically-significant benefit of risk reduction in the MG compared with the CT patients.

CT data were obtained from two large (8, 23) trials as well as from two smaller groups of diabetic patients with cardiovascular risk intervention (2, 6). The definition of conventional therapy is the therapy that was in place at the time that the baseline data were obtained in the smaller studies. For the larger studies it is defined as the therapy that was in place for the group without specific intervention. The total number of patients used for the conventional analysis and the demographics of this pooled group are listed in Table I.

Since 1999, a Quality Improvement Program has been in place which awards a financial incentive of 5% of the production salary if certain criteria in the program are satisfactorily met. For our primary care providers, specific diabetic care guidelines have been included in the evaluation for scoring of this Quality Improvement Program. Providers are reviewed annually for their effectiveness in reaching diabetic targets, and the awards are published and given annually.

The individual risk factor parameters for each patient are sorted according to their primary care provider. These data are then re-

turned to the primary care provider in an electronic format and are used in the clinical care and improvement in risk reduction. Therefore, each patient who was part of the study group received benefit of the feedback of these data, and patients with multiple high-risk variables were targeted for interventions. These interventions included calling patients to the clinic for therapeutic modifications, recommending treatment changes over the telephone or during regular visits, and making referrals to dietary, diabetic education sessions, and specialty consultations.

Analysis was carried out using a multifactorial model of risk categorization (UKPDS risk engine v2.0) (21). Comparisons between the medical group and conventional therapy groups were by ANOVA, linear regression and, when appropriate, the Student's two-tailed t-test for population analysis using GraphPad Software Inc. (GraphPad.com) tools and Microsoft Excel, Microsoft Corporation, Redmond, WA. The standard error of the mean (SEM) is listed, and significance was accepted as $p<0.05$ unless otherwise stated.

RESULTS

The 5,316 MG patients had a mean age of 56.5±0.2 yr with an approximately equal male and female distribution, and the 5,096 CT patients had a mean age of 57.7±0.1 yr with 60% male patients. The MG patients had a slightly higher BMI and slightly lower proportion of male patients (Table I)($p<0.05$).

Table I.

The demographic data for the Medical Group (MG) and conventional therapy (CT) group are shown. The Body Mass Index is calculated from a subgroup of the patients who had a height measurement in the time frame of the study representing 20% of the MMG patients. The number of patients who had values available for the measurements are listed in parentheses.

Variable	Medical Group	Conventional Therapy
N	5316	5096
Gender (M/F) (%)***	49.4/ 50.6 (n=5316)	60.0/40.0 (n=4701)
Age (yr)***	56.5±0.2 (n=5316)	57.7±0.4 (n=5069)
BMI (kg/m^2)***	34.1±0.2 (n=1066)	28.5±0.2 (n=4701)

*** $p<0.05$

Table II.

The mean and ±SE, (95% Confidence Interval) values are provided for hemoglobin A1C (HbA1C), systolic blood pressure, diastolic blood pressure, serum total, low and hig density lipoprotein cholesterol for both the medical group (MG) and conventional therapy (CT). To convert cholesterol to millimoles per liter, multiply by 0.02586. The CT group values are pooled from literature sources (2,3,5,20) as described in the methods.

Variable	Medical Group	Conventional Therapy
Hemoglobin A1C (%)*	7.10± 0.02 (7.06-7.15)	8.18±0.23 (7.72-8.63)
Systolic Blood Pressure (mm Hg) *	132.8±0.25 (132.3-133.3)	141.6±2.36 (137.0-146.3)
Diastolic Blood Pressure (mm Hg) *	76.9±0.15 (76.6-77.2)	80.3±1.14 (78.1-82.6)
Total Cholesterol (mg/dl) *	193.2±0.64 (191.9-194.5)	218.3±6.09 (206.4-230.2)
Low Density Lipoprotein (mg/dl) *	109.3±0.52 (108.2-110.2)	137.8±4.24 (129.5-146.1)
High Density Lipoprotein (mg/dl) *	44.8±0.20 (44.4-45.2)	41.6±0.55 (40.6-42.5)

* $p<0.001$ compared with conventional treatment

The mean values for the MG HbA1C, systolic and diastolic blood pressure, and both TC and LDL-C, are all below the comparable CT values ($p<0.0001$) (Table II). The HDL-C values were slightly higher in the MG compared with the CT values ($p<0.0001$).

Multivariable risk assessments of developing cardiovascular disease over 10 years show a mean risk of 22.7±2.3% in the CT and 14.8±1.4% in the MG, representing a 34.7±4.4% reduction of cardiovascular risk in the MG patients ($p<0.0002$). This risk ranges from the highest category of the male patient who smokes and has unfavorable parameters of 37.1% in CT and 22.1% in MG patients to the lowest risk category of a female patient who does not smoke and has all favorable parameters of 12.1% in CT and 8.8% in MG patients (Table III). The mean change score in cardiovascular risk for these categories is –7.9±1.0 % (range: –3.3 to –15.0%) over 10 years ($p<0.0002$).

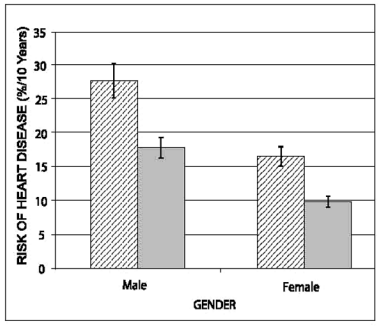

Figure 1. Comparison of the weighted smoking and gender specific risk of developing coronary heart disease between conventional therapy (CT) and medical group (MG) patients. The mean male and female pooled risk of cardiovascular disease over 10 years is represented for all male (27.6±2.5%) and all female(16.5±1.4%) patients in the CT group (▨) and in the MG (□)patients (17.8±1.5%) and (9.8 ±0.8%) respectively ($P<0.007$). The risk of smoking was weighted according to the methods section and favorable and unfavorable parameters are equally weighted in this comparison.

Table III.

The risk of developing cardiovascular disease over 10 years for several standardized patient categories. The high risk uses the unfavorable HbA1C, cholesterol and blood pressure measures at the 95% CI while the low risk measures uses the favorable HbA1C, cholesterol and blood pressure measures at the 95% CI assuming that all variable are present. The MG and CT groups are different (**$p<0.0002$) and the MG has a mean reduction in cardiovascular risk over all categories of 34.7±4.4% compared with the CT patients. The abbreviations are the same as for Table II.

Patient Category	Medical Group	Conventional Therapy	Difference
Male Smoker Mean Risk	21.7%	32.4%	10.7%
Male Smoker High Risk	22.1%	37.1%	15.0%
Male Smoker Low Risk	21.1%	28.1%	7.0%
Female Smoker Mean Risk	12.0%	18.6%	6.6%
Female Smoker High Risk	12.3%	21.6%	9.3%
Female Smoker Low Risk	11.7%	15.9%	4.2%
Male Non-Smoker Mean Risk	16.6%	25.2%	8.6%
Male Non-Smoker High Risk	16.9%	29.0%	12.1%
Male Non-Smoker Low Risk	16.1%	21.7%	5.6%
Female Non-Smoker Mean Risk	9.1%	14.1%	5.0%
Female Non-Smoker High Risk	9.3%	16.5%	7.2%
Female Non-Smoker Low Risk	8.8%	12.1%	3.3%
Mean (±SEM)	14.8±1.4%	22.7±2.3%	7.9±1.0%**

** $p<0.0002$

A cardiovascular risk score was determined and weighted for smoking rates in the United States for men and women. When this weighting was included, the mean male cardiovascular risk over 10 years continued to be lower in men (17.8±1.5%) and women (9.8±0.8%) of the MG compared with men (27.6±2.5%) and women (16.5±1.4%) of the CT group ($p<0.007$) (Figure 1).

DISCUSSION

We report our experience in Tacoma, WA, USA (47°15' N, 122°30' W) while managing major cardiovascular risk factors for diabetic patients. Both the risk of diabetes and cardiovascular disease are high in circumpolar native populations (3-5). Our population is geographically near Alaskan native populations such as in Kodiak, AK, USA (57°45' N, 152°29' W). We think the observations presented here are relevant to those who deliver community based medicine in many circumpolar regions. As a medical group operating within a not-for-profit, community-based, integrated, healthcare system, our diabetic population has mean values for HbA1C, total and LDL cholesterol and blood pressure control that are more favorable than similar populations reported in the literature (2,6,8,23). All of these modifiable MG parameter values are below, or within, 10% of the American Diabetic Association 2004 target goals (24). The medical group patients have an overall cardiovascular risk of 14.8±1.4%, while those patients treated with conventional therapy have a 22.7±2.3% risk. Compared with conventional therapy, this represents a 34.7±4.4% reduction in overall cardiovascular risk over 10 years ($p<0.0002$) observed in the medical group patients. We cannot determine from this report the precise causes for the difference; however, we speculate that the electronic medical record and financial incentives may play a role.

Each of the key cardiovascular risk parameters in the MG are more favorable than similar measures in the CT group. When these differences are used to calculate the weighted cardiovascular risk for the two groups, they differ by a mean absolute value of –7.9±1.0% ($p<0.0002$). This absolute difference between the groups ranges from the high risk categories of –15.0% to –3.3% in the lowest risk categories. All categories show an improved risk score. Additionally, when the data are weighted with a similar and representative smoking rate, the gender-specific differences continue to remain significant ($p<0.007$) (Figure 1). When adding this gender-specific smoking weight for the population, the male risk in the MG is reduced by 38.4% and the female risk by 40.4% below the CT group ($p<0.006$).

The continued high risk of cardiovascular disease in Alaska Natives is not declining with the same rate as cardiovascular disease in the other states of the United States (3). Even though Eskimos had a prevalence of diabetes in 1985 of 8.8/1000 which was lower than the general population in the United States (24.7/1000) in that year, there is a wide range of the prevalence of diabetes in Alaska. This diabetic frequency in Alaska Natives is influenced directly by Caucasian cultural involvement and genetics as seen in the Aleutian Islands and the peoples classi-

fied generally as "Aleuts". Generally the "Aleuts" had a prevalence rate for diabetes of between 69.2 and 20.0/1000 depending upon the subgroup. Those who are on the Alaska Peninsula and Kodiak Island have an intermediate prevalence of diabetes (24.4/1000) which is similar to residents in the other states including Washington as measured in 1985 (4). Therefore, because of the geographic proximity, and social, economic, and Euro-American cultural influences of the Seattle region upon Alaska residents, this report is relevant to Alaska Natives who have increasing risk from diabetes. The information and methodology provided in this report regarding relative risk calculations and diabetic management in community hospitals by primary care providers may have special importance for Alaska residents and other circumpolar populations. It may be especially relevant to those living in Kodiak, AK who have similar prevalence rates of diabetes as other parts of the United States and a cardiovascular disease rate that is not declining (3).

Many components may contribute to overall cardiovascular risk reduction in diabetic patients as recently described by Hurst and Lee (25). Smoking cessation, aspirin therapy, and beta-blocking medication administration are three major factors that were not evaluated in the present investigation. The emphasis of our report is to highlight major cardiovascular risk parameters that can be retrieved accurately from an electronic medical record and that, with intervention, can be quickly and effectively improved. Serum HDL cholesterol concentration is reported here and used in the risk calculation, but it is under substantial genetic influence and less altered by standard intervention. Future modifications of the electronic medical record will have improved reporting for smoking cessation and medication administration, but we felt that with the present version of our record, these values lacked the accuracy for reporting a group mean or median value.

A recently revised (20) multivariable-adjusted risk calculator tool (21) was used to develop a mean weighted risk for our population of patients. Although designed for individual providers to predict multivariant coronary risk in their patients without overt coronary disease, we used this to predict the risk of a population by using the mean values and 95% confidence intervals of the input variables. The UKPDS cohort population from which the tool was developed is similar to the MG and CT populations in age and gender distribution (8). Physicians and patients understand the tool and commonly use it or a similar one published by Wilson, et al. (18,19), or the National Cholesterol Education Program (NCEP)(26) to calculate individual risk scores. The older Joint National Committee (JNC-V) blood pressure risk categories are used in the model by Wilson, et al. (18) which also does not quantify glycemic control with specific hemoglobin HbA1C values, both of which weaken the risk evaluation. We completely analyzed our data using the tool by Wilson, et al. (19) as well as with the UKPDS tool (21), obtaining similar results. We report the UKPDS measures because they specifically weigh glycemic control individually with regard to cardiovascular risk category. We feel that

feedback to providers who are now using these measurements is meaningful, and reporting the risk helps stimulate individual patient-risk calculation and reduction. Comparison to the mean of their own medical group and other standard and conventional treatments facilitates peer-group change.

In order to develop a composite risk score, we have made several assumptions. We have initially weighted all risk categories and gender selections equally for comparison between groups. The 95% confidence intervals of the parameters were used to show population overlap and high and low risk categories.

We extended the analysis with specific weighting of the smoking risk based upon the U.S current smoking rates for men and women published by the CDC (22) and assumed that these same percentages are similar for diabetic populations. Our review suggests these rates to be similar to those reported by Gegore, et al. (2) for diabetic patients. We have, however, screened a sample of our current diabetic population and determined that within the last 24 months (2001-2003), approximately 9.0% of our diabetic patients were registered as smokers and approximately 10% had stopped smoking. Given these values, we feel that the present estimate of smoking likely overestimates the cardiovascular risk for our population.

Our population has 5.9% type 1 diabetic patients included. However, given the overall similar cardiovascular risk impact upon both type 1 and type 2 diabetic patients as reported recently by Collins, et al. (7), we felt that including type 1 diabetic patients would not substantially alter our projections. Our male (49.4%) and female (50.6%) gender ratio was nearly equal and thus we weighted them equally in the model projections. The CT patients had a slightly higher component of male participants which, when gender weighted equally at 50%, would improve that group's overall risk assessment and not make the two groups more different. The groups also differed slightly in BMI, with the MG patients having a higher BMI. This difference would theoretically make it a more difficult management problem with hypertension, and both glycemic and lipid control favoring similarity of the groups rather than exaggerating the difference we observe. In order to more specifically correct for the substantial risks of smoking on these populations, we weighted the analysis based on an accepted smoking rate determined in 2003 (22) (Figure 1).

This study is descriptive and therefore cannot determine precisely the cause of the improved glycemic control over the reported literature-based historical controls. Lacking our own group's historical controls before the interventions, we felt that patients who were demographically similar and recently reported in the literature could represent standard therapy. Those patients would have been similar to our own during a baseline therapy. The UKPDS (8) trial provides not only the tool for multivariable risk calculation but also is weighted heavily in our literature-based control group. This similarity provides further support that the cardiovascular risk we calculate is improved over similar groups treated with conventional means. The difficulty in achieving target goals remains a major regional, national and

international issue as recently reported in 2004 in the Seattle region (27), or in 2003 either generally (1) or for high risk groups receiving intensive management (6). It is also impossible to determine if diabetic care in the Seattle region is somehow special suggesting that our findings are associated with a regional focused improvement rather than any intervention. We would not think that there is regional improvement in diabetic control given the very recent report of poor glycemic control in a sample of patients reported from the Seattle region (27). These patients were outside our treatment population and when managed with conventional treatment had a mean HbA1C of 8% (27).

Unfortunately, we do not have specific cardiovascular outcome data to compare with our predictions. However, when the UKPDS risk information and the Framingham data have been compared with actual outcome data such as recently reported in other cultures, the risk predictions remain robust. The recent improvements in the UKPDS tool (21) by adding specific glycemic control has confirmed the accuracy of the model. We feel that the methodology of reporting the cardiovascular risk is as important as our particular findings. This method of reporting a population risk can be used with mean data from a pooled source by knowing and reporting carefully the variation of the measure and predetermining patient categories of risk. We think that both providers and patients will respond to this type of data presentation where the multiple variables are applied to a clearly understandable and predicted outcome such as risk of heart attack and stoke.

Finally, we cannot determine the specific mechanisms accounting for our results. However, we agree with the suggestion made by the Institute of Medicine that an electronic record will help to improve quality of care, and this likely contributed to our findings. The feedback to providers about the patient-specific cardiovascular risks offered by our electronic medical record combines peer-group competition and informed decision making. Additionally, provider incentives directed at improving quality care can be helpful as reported by Epstein, et al. (14). Our financial reward of 5% of the base production salary would be compared with total healthcare costs of reducing the HbA1C by 1%, or approximately $817 per patient per year (28). In a group of this size, the value has been reported as $4.34 M in Western Washington state (28). Although other estimates of healthcare costs are mixed, most agree that overall hospitalizations and long-term care of complications would be reduced if cardiovascular risk for diabetics was improved. Overall improvement in the quality of diabetic care throughout the United States should help reduce the growing financial burden to our healthcare system (29) with the current diabetic epidemic (9).

CONCLUSION

In conclusion, we report here a community-based medical group where major cardiovascular risk factors for diabetic patients are at or near target values and which are reduced below conventional therapy. These improvements to more favorable parameter mea-

sures would, on average, reduce the overall development of cardiovascular disease by 34.7% over 10 years. The reasons for these results may involve the use of an electronic medical record and financial incentives as used in the medical group.

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BIOGRAPHY FOR DIANE E. CECCHETTINI

Ms. Cecchettini has served as President and Chief Executive Officer of MultiCare Health System since 1999. Prior to the CEO role, she worked in various capacities at MultiCare Health System—Executive Vice President, and Vice President Patient Services.

Ms. Cecchettini's previous experience includes multiple leadership positions in 11 years at Sutter Health in Sacramento, and direct clinical experience at UCLA Medical Center in Los Angeles, California. Ms. Cecchettini received a Bachelor's degree in Nursing in 1970 from the University of California, Los Angeles, and a Master of Science degree in Human Resources Management in 1976 from the University of Utah.

In 1993, Ms. Cecchettini retired as a Lieutenant Colonel from the Air Force Reserve, having served 21 years as a Flight Nurse in Aeromedical Evacuation—serving in the Vietnam era and as a Troop Commander in Desert Storm.

Mr. REICHERT. And the Chair recognizes Mr. John Kenagy.

STATEMENT OF MR. JOHN JAY KENAGY, CHIEF INFORMATION OFFICER, OREGON HEALTH AND SCIENCE UNIVERSITY

Mr. KENAGY. Thank you, Mr. Chairman and Mr. Wu. I'm pleased to be here to present testimony.

We have a lot of people coming from very different perspectives, and what I'd like to do—I have a longer testimony, but I'd just like to highlight some of the things from my perspective as an IT professional.

I am the chief information officer for Oregon Health and Science University and have been in that role since 2001, and also serve as the Chair of the CIO council for the university health system consortium of academic medical centers around the United States. In 21 years' experience in health care IT, it's been a wild ride over those 20 years.

OHSU, as Oregon's only academic and research center, has sort of a unique perspective. We're really in the business, at its core, of knowledge—creating it through advanced research, imparting it to students through education, using it in the delivery of health care, and sharing it through our community service mission. What we feel is information is really the currency for knowledge. It is the way that it is developed and analyzed and used and stored. And as an institution, we've spent a lot of money, time, and resources into developing a very comprehensive IT architecture. Are we there yet? Far from it.

Since year 2000, we've spent about $25 million on different IT solutions. In 2003, we embarked on an electronic health record, like MultiCare, $50 million and counting. And I appreciate that comment. I think one way to express sort of what we deal with on a day-to-day basis, I brought a graphic, that you cannot see and cannot really read, but that's somewhat of the point I want to make. At OHSU, we have not one electronic health system or, like banking, where you have a core system; we have a significant interaction of about 100 different disparate islands of information that, every day, day in and day out, patient records are actually not in an electronic health record—it's sort of a misnomer in our industry; we actually have a significant number of these systems—that are woven together by people who work on my staff and, fundamentally, by paper. So what we've been—what we have been using in terms of our information system is an attempt to use these different islands of information.

The health care IT industry, for all intents and purposes, is a 40-year-old industry; but, still, the products are extremely immature, especially around a comprehensive longitudinal electronic record. In the paper environment, this situation is not bad; in fact, it is the way—This is not atypical; it is the way most health care organizations in the United States run—certainly, academic medical centers, in what we call a best of breed approach. As we approach the marketplace or approach a need, we actually look at the niche that is needed and buy an application that meets that niche.

A number of us were in San Diego for the national HIMSS conference, the annual health care IT marketplace. There were over 800 vendors there on the floor, showing their wares, showing different products. In many ways, that's a great—there's a lot of interest in this field, there are a lot of—there's a lot of progress being made in IT. On that floor, I could see systems that did diabetes care and cardiology care and intensive care and home care; but as an institution, we have patients who come in—a woman comes into our ED with chest pain complicated by diabetes, who needs to go to the ICU and then eventually be followed up at home. Is it really reasonable, logical, smart for us to have her record in four different systems, or six or eight? It's what we deal with every day, where standards and inter-operability is an issue. So one of the barriers, I would say, in adopting electronic health records is not the dearth of choice; it is the plethora. It is what we face all the time as an IT professional trying to pull these together.

A couple other barriers, finances and resources, of course, are mentioned all the time. We were both saying that we're investing $50 million of our own institution's money to put this in. Do I think the health care IT will make health more cost effective? I think that's debatable. It will certainly replace a lot of low paid file clerks with a lot of high paid IT professionals.

One—certainly some of the issues around the barriers of resources, one is clinician time, and I want to stress that point. As we implement our electronic health record at OHSU, and as research has shown throughout the U.S., the active involvement of physicians and nurses and members of the health care team to be involved in changing the work flow—it's not a deployment of a technology, but it's really the change in the way we practice medicine—requires their time and attention. As we've been implementing EPIC electronic health records, we're actually requiring physicians to spend 14 hours in classroom to learn how to use the tool effectively. That's just to use the tool, let alone designing and implementing the system.

As Medicare, Medicaid, the insurance company, who works towards cost containment and tries to deal with what is considered from the outside, run-away health care inflation, we have no extra time of our clinicians to engage in the change of their practice to adopt this system. That is a significant—I think it's the—what's under the tip of the iceberg is this clinician time.

The other one that I'm facing right now is the lack of IT professionals—few IT professionals who have this knowledge and experience to come into our field. As a provider organization, I and many of my colleagues, we sort of look at the consulting—consulting businesses to go to different companies to bring those resources. But

they also face the same problem, to bring in qualified IT professionals in order to do this.

The final barrier I would highlight, again, as maybe a defensive CIO, is what I would call the expectations gap. I think there's an expectation, certainly within our industry as well as outside, that IT in health should cost less and should be more effective, it should be easier and cheaper. Frankly, it isn't. And we face that all the time, trying to explain—going to the board to explain cost overruns and to explain why we are so far behind.

Congressman Wu, I appreciate your mentioning the point about the investment health care makes. And you'll see, we at OHSU spend a little bit less than three percent of our—as most institutions in this industry do, three percent in health care; but banking and finance, which are used as hallmarks of IT investment, are at 10—eight to 10 to 12 percent. It's my recommendation.

I think there are a lot of roles that the Federal Government can play. I think one is to continue and expand research in health care IT. We do a lot at OHSU, through our Department of Medical Informatics, which is a leading research institute for this field. I think there's a lot of additional study that needs to take place on how can these be effectively implemented successfully.

I think the other thing that the Federal Government can do is expand training programs for clinicians and for IT professionals, to really create the understanding and the body of the pipeline of people who can help. I think there are many economic disincentives to doing health care IT—like I said earlier, the lack of spare clinician time to be able to invest in this; and cost containment pressures from other parts of the Federal Government make that even more difficult.

Finally, I do think that there is a requirement for inter-operability. I could make comments about my sense of what the priorities are. I certainly think inter-operability between institutions is a critical priority; inter-operability within an institution, I think, is better served by integrated information systems and not a continuation of a hundred different disparate systems.

Thank you for letting me testify.

[The prepared statement of Mr. Kenagy follows:]

PREPARED STATEMENT OF JOHN JAY KENAGY

Chairman Ehlers and Members of the Committee on Science:

On behalf of Oregon Health & Science University (OHSU), I submit the following written testimony to the Environment, Technology, and Standards Subcommittee of the U.S. House of Representatives' Committee on Science. I serve as the Chief Information Officer (CIO) for OHSU, a position I have held since 2001. In that role, I am responsible for information technology (IT) strategy and implementation for all missions of OHSU, including health care, education, research, and community service.

As Oregon's only academic health and science center, OHSU provides high-quality health care to more than 150,000 patients each year. The OHSU health care system offers the most comprehensive health care services in Oregon, including many innovative clinical care and diagnostic services. It is nationally recognized for clinical research and education, helping to develop tomorrow's health professionals.

At its core, OHSU is in the business of knowledge: creating it through advanced research, imparting it through excellent teaching, using it in effective and safe clinical care, and sharing it in service to the community. Information serves as the currency for knowledge-the method to develop, analyze, store, and distribute it. Effective IT solutions therefore are fundamental to our organization. In 2003, OHSU

adopted the Strategic Information Plan that establishes a compelling vision for the IT-enabled organization and sets forth goals and objectives in ten key strategic areas. Among the key strategic areas are health care, business intelligence, information security and privacy, and technology and infrastructure. OHSU has an extensive IT infrastructure requiring significant, on-going investment to sustain and grow. The organization invests just under three percent of its operating budget in IT.

Health care IT has gained significant national attention since the beginning of the decade. The health care sector, one of the largest in the U.S. economy, lags other industries in the use of IT to enhance efficiency, improve effectiveness, and achieve quality. President Bush included it as one of his administration's goals in the 2004 State of the Union address: "By computerizing health records, we can avoid dangerous medical mistakes, reduce costs, and improve care." Landmark studies by the Institute of Medicine [*To Err Is Human: Building a Safer Health System* in 2000 and *Crossing the Quality Chasm: A New Health System for the 21st Century* in 2001] called for widespread adoption of IT solutions to enhance patient safety.

While calls for enhanced automation have increased, landmark research from OHSU demonstrates the lack of progress nationwide. In a 2002 study published in the *Journal of the American Medical Informatics Association,* Joan Ash, Ph.D., and the Provider Order Entry Team surveyed hospitals and found that fewer than ten percent had a fully implemented CPOE system. Of those, only one-third achieved a high penetration with more than 90 percent of orders entered through a health care IT system.

As a health care CIO, I believe that in the absence of a comprehensive health care IT infrastructure, our industry will be unable to achieve its goals of patient safety, clinical effectiveness, and operational efficiency. Health care is highly information-dependent. Clinical decisions are made minute by minute and require access to patient-specific data and expert clinical knowledge. An objective that resonates with our role as an academic health institution, we need to implement systematic tools so that all of us know what the best of us knows.

From my perspective within a provider organization, the health care IT sector is beginning to deliver comprehensive IT solutions that effectively meet our needs as users. Our industry traditionally has developed niche systems (patient financial, patient management/scheduling, laboratory, pharmacy, etc.) that were interfaced where possible and practical. While much attention is being paid to sharing information across institutional boundaries and among community providers, many systems have been limited in their ability to exchange information within the hospital's four walls. The goal of a comprehensive, patient-centered, paperless electronic health record (EHR) remains a futuristic goal for the vast majority of health care providers.

1. How does OHSU use health care-specific information technology? What benefits has OHSU realized so far? What future benefits are expected from this kind of technology?

OHSU's health care IT infrastructure supports its patient care functions (ancillary testing and reporting, pharmacy, digital radiology, order entry); safety and quality functions (infection control, data warehousing, trend monitoring); and administrative and business functions (admitting/discharge/transfer, scheduling, patient billing). OHSU has been a long-standing user of health care IT dating back to early internal development efforts in the 1970s. In the mid 1980s, OHSU became one of the first sites in the country to implement Shared Medical Systems' (SMS, now Siemens Health Services) Independence system, a platform we continue to rely on today. Through the Integrated Advanced Information Management System grant from the National Library of Medicine, we developed a physicians' workstation as an early attempt to combine disparate sources of information into one portal. In the mid 1990s, OHSU deployed the Siemens Lifetime Clinical Record which has grown to be one of the vendor's largest longitudinal repositories of clinical data. OHSU also implemented clerical order entry and communication, effectively eliminating paper order transmittal from outpatient clinics and inpatient units.

The Information Technology Group (ITG) maintains this extensive health care IT infrastructure. Roughly two-thirds of our annual $30 million budget supports the hospital's IT services. Nearly 120 IT professionals are dedicated to our health care mission. These individuals maintain over 100 different IT applications on a multitude of hardware and database technologies; design, code, and manage over 80 different interfaces that exchange critical clinical data among the disparate systems; install and support over 5,000 personal computers deployed throughout the institution; manage over 400 active health care IT projects; and train many hundreds of physicians, nurses, and other members of the health care team.

OHSU continues to make considerable investment in health care IT solutions building upon the core patient administrative and clinical repository system. Our model remains to implement commercially available software solutions ("buy" versus "build") and to make limited but necessary local modifications and customizations. Since Year 2000, OHSU has invested over $50 million in capital for both enterprise and departmental health care IT solutions. As is common with academic health centers, we historically have been "best of breed" in our approach to commercial software, seeking the optimal solution for each unique application and interfacing it to the common core. Supported by positive industry developments, however, OHSU is embracing a strategy that minimizes data interfaces and strives for integration.

Early this decade OHSU make the strategic decision to invest in an electronic health record (EHR), starting with ambulatory care and then proceeding to inpatient care and the emergency department. This strategy contemplates a fundamentally different use of IT in health care—rather than being a passive repository of clinical and administrative data, the delivery of health care itself will be transformed using IT. Members of the interdisciplinary health care team will document, order, and plan treatment on line. As significant as OHSU's past IT investments have been, health care practice is still based on paper charts. A single stay in the hospital may generate upwards of 100 pages of documentation, orders, vitals, and other relevant clinical data. To eliminate filing and improve ready access to information after the fact, OHSU implemented a document imaging solution to scan every piece of paper after discharge, but active inpatient care still relies on paper.

OHSU selected Epic Systems to provide our ambulatory EHR and have now deployed this advanced clinical IT solution in seven outpatient practices. Before the $22 million investment was approved, an extensive return on investment calculation was performed. The project showed a positive net present value considering only hard benefits. These benefits included transcription savings, staff savings (reduced charge entry, medical records, and support staff), supplies and storage savings. So far, the results have validated—and in some cases, exceeded—the anticipated benefits. For instance, Family Medicine showed a reduction in transcription lines per month from a pre-live high of 94,093 to post-live of 1,743.

Quality outcomes are difficult to quantify as hard financial savings, but present the real strategic benefits of EHR. As OHSU moves to implement an enterprise EHR across inpatient, outpatient and ED, we anticipate significant benefits to patient care. We will provide direct, secure, on-line access to records by patients. Clinical decision making will be supported by best practice guidelines. Decision support rules will provide timely, data-driven input to physicians when ordering tests and treatment.

A personal story (note: no HIPAA implications) may illustrate the real benefits to patient care of this IT investment. Not only am I OHSU's CIO, I am also a patient. Since 2000, one focus of our investment has been diagnostic imaging services, with advanced technologies such as an entirely digital enterprise repository (Picture Archiving and Communication System), voice recognition, digital radiography, and secure external communication. Each was a major IT and clinical re-engineering project. Overall, they have taken multiple years and countless hours of work. After all this effort, the results for patient care are clear. When I was recently referred for an X-ray exam, my physician was able to review and share with me the completed results just 11 minutes after the study (all digital capture and read, voice recognition transcription, and secure e-mail transmission of final results). Eighteen months prior, this normal exam would have taken at least 48 hours to be completed.

While OHSU's investments have been successful and the benefits real, we have yet to achieve what should be possible with a comprehensive EHR at OHSU. As early as 1970, Morris Collen, M.D., published a seminal paper on the characteristics of a medical information system. A third of a century later, our industry has yet to witness widespread adoption of IT.

2. What incentives and barriers exist to the broader adoption of information technology in the health care industry, and are these financial, technical, or of some other nature? What has been OHSU's experience with these incentives and barriers?

From my perspective from helping craft our strategic vision for health care IT, the most significant incentive to a broad adoption of IT is the strongly held belief that IT is essential for the practice of medicine in the 21st century. As this institution planned to build health care facilities for the future, there was near unanimous approval for significant investment in an EHR solution. A compelling question was posed as we began to design the space: Should we really carve out clinical space in 2006 for a large paper file room in each practice setting? The EHR also was seen as vital to patient-centered care. Our tech-savvy customers in the Pacific Northwest

are starting to expect the ability to e-mail their physicians, schedule an appointment, review their child's immunization record, and pay their bill on line. This was an important incentive for OHSU's strategic decision to direct scarce capital dollars into IT.

While not an incentive per se, another source of support for widespread health care IT adoption comes from our role as an academic health center. Today's medical, nursing, and dental students were born after the invention of the personal computer and have grown up in the high-speed information age. In fact, to our X-box-generation residents, our systems sometimes feel as antiquated as Atari PONG. A tech-savvy workforce makes IT-enabled clinical practice an expectation.

To date, there have been few financial incentives to adopt EHRs within an institution or share data through Regional Health Information Organizations (RHIOs). While health care IT may enhance clinical quality and effectiveness, cost containment continues to be a driving factor in health care. Pay for performance, Federal Government funding, and other programs have been debated, but nothing to date has translated into an economic support for this IT investment.

As studies have shown, only pioneering institutions have implemented comprehensive health care IT solutions—and some have resulted in significant failure. An article in the *LA Times* in 2003 reported the suspension of the multi-million-dollar computerized system for doctors at Cedars-Sinai Medical Center after significant physician complaints. A number of practitioner articles and scholarly studies have attempted to address barriers to successful implementation of EHR and health care IT solutions. I would propose that the major barriers include the expectations gap, technology barriers, and resource barriers—though the latter two may not be the traditional definition of these type of barriers.

In my opinion, a serious issue facing health care CIOs is an expectations and perception gap between the IT department and IT users and their senior leadership. Hospital leaders often believe IT should cost less and deliver more. It simply ought to be much easier; it is not. Complicating this gap is the extent of IT project failure or cost overruns. Any IT project has inherent risks and challenges; enterprise health care IT projects are extremely complex with competing requirements, multiple users, different data types, and complicated work flows and information needs. Looking broadly at all IT projects in the public and private sector, the Standish Group reported that only 16 percent of IT projects completed on time, budget, and scope. They estimated that U.S. companies and government agencies would spend $81 billion on canceled software projects in 1995 alone. Health care organizations may not recognize their extent of investment (time, resources, and capital) required or may not trust their IT department to deliver successfully.

OHSU is addressing this barrier in our ambulatory EHR deployment, though it is an on-going effort requiring continual dialogue. We have faced budget challenges—underestimating the complexity of system-to-system interfaces and the resources required to support such dramatic clinical practice transformation. We have built trust and mutual understanding, but this takes attention to sustain the relationship.

Another major barrier relates to technology. It is evident in the focus on interoperability standards and data exchange. I argue however that this focus addresses the symptom and not the underlying condition. From the perspective of a provider organization CIO, our industry suffers from too many "choices" rather than too few. Hospitals and physician groups face a staggering array of options for health care IT. IT units are often confronted with the Herculean task of trying to tie together these islands of information. At the Health Information and Management Systems Society (HIMSS) exposition in San Diego last week, there were over 800 different vendors showing IT software. You could purchase individual systems tailor-made to support diabetes care, cardiology care, intensive care, and home care. But what about the patient admitted with chest pain and complications from diabetes who requires an ICU stay and follow-up back at home? Should her record really be in four different systems (at best)? Can I guarantee that relevant clinical data from each is readily available to all?

With the paper record as the common denominator to all, this situation was not uncommon or particularly troublesome. Each system printed final documents and these were all filed in the integrated paper chart. (Relevant documents from outside providers were handled in the same manner.) Yet as we embrace the EHR, we are faced with the option of implementing a comprehensive, integrated platform or managing and interfacing multiple disparate solutions. Both paths have their challenges. As I stated earlier, OHSU is now starting to support the concept of global optimization, though sometimes sacrificing local customization. Changing our health care IT paradigm, however, is difficult—clinical users can make strong cases for

their targeted, niche solution. Fortunately, the vendor marketplace is now producing products where integration does not require significant trade-offs in functionality.

Resources present another significant barrier to adoption and diffusion of health care IT. On the surface, one barrier is simply the cost of the software and hardware itself. Health care organizations face the challenge of diverting funds from facilities and clinical technology to invest in IT—often with a significant leap of faith. This investment is indeed significant. For OHSU, it was over $7 million.

The more significant resource barrier in my opinion is human resources: the clinician time to help design, develop, and implement a successful tool and the IT professionals to build and maintain the technology. Many studies of health care IT successes and failures have pointed to the need to engage clinicians in all aspects and phases of the project. EHR represents a significant modification to the work of all clinicians; they must be actively engaged to adopt the new tools. At OHSU, physicians must participate in 14 hours of classroom training just for the ambulatory EHR. We have found that this participation alone is not adequate. It requires a rethinking of the outpatient clinic encounter, their interaction with data, and their workflow. Each clinical specialty also requires up front design and build effort as well. Extensive work also will be required for our inpatient implementation, especially around nursing care.

With constant pressures to cut costs, there is little spare time for physicians, nurses, pharmacists, and other members of the health care team to engage in designing and implementing health care IT solutions. This may be a major hidden cost of implementation. As OHSU deploys our EHR to more ambulatory practices, we continue to find this barrier to success.

The other human resource barrier is finding IT professionals to assist with implementation. With more organizations planning for major EHR implementations, I have personally witnessed a growing shortage of qualified health care IT professionals to fill vacancies and hit the ground running. Hospitals turn to vendors and consulting firms to help, though they appear to face the same problems with recruitment and retention. OHSU's role as an academic health center may help—our department of medical informatics and clinical epidemiology can build the staff pipeline and I hope to develop with them some innovative programs to train individuals for advanced health care IT roles. However, I see a very significant problem looming as the industry at large embraces IT solutions.

Finally, I would like to make a comment about the barrier to RHIOs and sharing data across organizational boundaries. There are a host of technical, financial, legal, and regulatory barriers. Who benefits and who will pay? Is funding a duplicate, though clinically necessary, CT scan a disincentive to sharing clinical data? How do we ensure patient security under HIPAA's generally defined guidelines? How do I know that this "John Kenagy" is the same as that "John Kenagy"? With the right attention, priority, investment, and perseverance, these barriers can be overcome.

The more critical barrier today is that I cannot exchange what I do not have electronically in the first place. While the Portland market (and the Pacific Northwest in general) represents some of the most advanced IT systems in the U.S., we each have major EHR projects underway that will last through the end of the decade and serve as the core foundation piece for extensive data interchange. We need to proceed with our internal IT implementations in order to have the data to share. Nonetheless, the health care CIO community here is engaged in active dialogue to take demonstrable steps forward.

3. To what extent have the Department of Health and Human Services and the National Institute of Standards and Technology reached out to institutions like yours in an effort to develop a national strategy on Health IT?

OHSU has contributed significantly to the body of knowledge in health care informatics research and our Provider Order Entry Team *(www.cpoe.org)* has been awarded a number of grants for evaluating, interpreting, and disseminating evidence of computerized provider order entry success.

Apart from these research programs, OHSU's "production IT unit" with responsibility for implementing and maintaining our health care IT infrastructure has had little direct input into HHS or NIST efforts. Through a partnership with the Oregon Chapter of HIMSS, OHSU has been involved with several local efforts to understand and contribute to efforts such as the Certification Commission for Healthcare Information Technology (CCHIT) and other initiatives. However, these have mainly focused on education and awareness.

As a CIO who relies on the commercial marketplace for health care IT solutions, I believe that HHS and NIST needs to focus attention on the vendor community for standards adoption. As an institution, OHSU will not adopt the standards per se, but will look toward our product suppliers to be compliant and take advantage of

the functions. Nonetheless, I recognize my power as a consumer—vendors are more likely to adopt standards if they feel it is an important requirement that makes a difference in product sales.

From my perspective at a major tertiary referral site, I am most keenly interested in basic data exchange between disparate information systems, especially as more hospitals and physician groups adopt EHRs. OHSU needs to receive relevant clinical data that led to a referral to our site and we need subsequently to transmit the results and follow-up plan of care to the referring physician. Exchange standards should be set to a lowest common denominator—even using Adobe portable document format and a manual process to match patients to enable information exchange now. My concern is that our industry will attempt to design the "perfect" IT solution that either cannot be implemented or assumes too much technology overhead (e.g., a regional or national patient index).

Developing standards for inter-operability of health care data is an unbelievably complex undertaking and is fundamentally driven by expectations and requirements. For instance, does inter-operability mean that I can begin my nursing documentation in a stand-alone ED system, continue it in an OR system, and add to it in an inpatient EHR? Is the allergy I document in one system replicated to everything else? Is that the desired level of inter-operability? In implementing OHSU's ambulatory EHR, I face this problem today. Interfacing systems for simple demographic information (e.g., keeping patient address in synch) has been challenging and a resource drain. We were unable to address data exchange for patient allergies and stepped back to paper documentation on the inpatient side. With this experience, I have strongly encouraged OHSU to move toward a single integrated system. Even between sites with the same core vendor (Kaiser Northwest, OCHIN, and OHSU all have Epic) we cannot exchange data electronically. I am challenged to think that complete inter-operability is possible, even if desirable.

It would be worthwhile for provider institutions like OHSU to play a more active role in establishing requirements and priorities, sharing our perspectives from the front line of dealing with multiple systems. I suggest that our involvement with HHS and NIST is not due to their lack of interest or mechanisms for input, but our time constraints and challenges at the local level. Standards seem so far off and I have end users needing attention now. Piqued by this question, however, I encourage HHS and NIST to make a greater concerted effort to seek provider CIO input. I will do my part to share my perspective as well.

4. What specific measures can the Federal or State governments take to help the broader adoption of health information technology?

The Federal and State governments play many roles in the health care sector. I suggest several important steps to enhance incentives to adopt health care IT.

- Continue and expand research funding in health care informatics. As EHRs and CPOE become more prevalent, these offer unparalleled opportunities to study the antecedents of and barriers to success.
- Expand support for training programs to develop clinical and IT professionals in the field of health care informatics. If the 90 percent of U.S. hospitals that do not have CPOE start to implement these systems, I fear we do not have the human resources to meet the need.
- Address the economic disincentives to invest in health care IT. The constant pressure to cut health care costs by reducing payments to hospital and doctors stands in direct opposition to requiring these entities to invest millions of dollars of capital and, more importantly, scarce clinical time in designing, testing, implementation, and using advanced IT systems.
- Work in partnership with the vendor community to address exchange of data among disparate EHRs and with emerging standards of personal health records (PHRs). I personally do not think strong government regulation of this industry is needed (e.g., FDA regulation of EHRs), but believe the market cannot and ultimately will not sustain the number that currently exist.

Thank you for the opportunity to share my perspectives as a provider-institution CIO. With 20 years experience in health care IT, I am very encouraged by recent developments. There is increasing attention and awareness of the important role IT must play in health care quality, safety, effectiveness, and efficiency. At the same time, the marketplace is maturing and products are emerging that can deliver comprehensive, patient-centered electronic health records. Barriers and challenges remain, but the ultimate goals compel us to strive ahead.

BIOGRAPHY FOR JOHN JAY KENAGY

John Jay Kenagy, MHA, FHIMSS, is Chief Information Officer at Oregon Health & Science University (OHSU), in Portland, Oregon, serving in this role since July 2001. His responsibilities include developing the information technology strategy and directing the IT department for the health care, academic, research, and community service missions of the university. From 1999 to 2001, John served as Associate CIO for OHSU. The Information Technology Group has an annual operating budget of $30 million and a capital budget of $10 million. The department of 325 staff maintains a complex information technology and telecommunications environment.

As an academic health system CIO, John has served on a number of national and regional IT bodies. He serves as the Chair of the University HealthSystem Consortium Chief Information Officer Council (2005–2006). He was elected as president of the Oregon Chapter of the Healthcare Information and Management Systems Society (2003–2004). He has served on the board of Siemens Customer Health Information Executive Forum.

In 2003, John was appointed to Fellow status in the Healthcare Information and Management Systems Society. He is also a Certified Professional in Healthcare Information and Management systems.

John is pursuing a Doctor of Philosophy degree from Capella University's School of Business. His doctoral research is focused on health care information technology implementation success. John earned his Bachelor of Science degree in electrical engineering at Stanford University. He was awarded a Master's degree in Healthcare Administration at University of Southern California and received the Alexander Cloner Outstanding Student Award at graduation.

In addition to the IT operational responsibilities, John has enriched his experience and knowledge through teaching and mentoring. He has an appointment as Assistant Professor in the Department of Medical Informatics and Clinical Epidemiology in the OHSU School of Medicine. John has taught at the University of Oregon and University of Southern California.

Prior to joining OHSU, John worked for thirteen years at the Department of Veterans Affairs, most recently as Chief Information Officer for the VA Desert Pacific Healthcare Network in Long Beach, California. John directed major IT projects and strategy for this extensive network of health care facilities and served on several national IT committees.

Notable awards include a U.S. Department of Veterans Affairs Commendation and American Legion Medal of Valor for deeds following the 1994 Northridge Earthquake and the 1999 Emerging Leader Award by the USC Health Services Administration Alumni Association.

Mr. WU. Thank you.

Mr. REICHERT. Thank you. Now we're going to just pause for a minute while we play musical chairs. The Chair recognizes Dr. Chin.

STATEMENT OF DR. HOMER L. CHIN, MEDICAL DIRECTOR, CLINICAL INFORMATION SYSTEMS, KAISER PERMANENTE; NORTHWEST CHIEF INFORMATION OFFICER, OREGON HEALTH AND SCIENCE UNIVERSITY

Dr. CHIN. Good afternoon, Mr. Chairman and Congressman Wu, ladies and gentlemen.

My name is Homer Chin. I'm the Medical Director for Clinical Information Systems for the Kaiser Permanente northwest region.

Kaiser Permanente serves over eight million members in eight separate regions. My comments today about our experience relate specifically to the northwest region.

In 1998, Kaiser Permanente Northwest completed the implementation of a comprehensive electronic medical record that allows physicians to document, prescribe, order, refer, and to message other health care providers. We no longer create, move, or file paper medical records. We also provide patients direct, secure

Internet access to parts of their medical record and the ability for them to directly message their physicians.

Along with the usual benefits of IT systems that were mentioned by Diane earlier, our system embeds clinical decision support to help guide physicians as they deliver care, provides a comprehensive database that allows us to monitor and to provide care across the population, and allows for modalities of care such as self-service appointing and additional ways for patients to access care and communicate with their physicians.

What distinguishes Kaiser Permanente from other health care organizations is, number one, our integrated comprehensive health care system where all services for our members, both inpatient and outpatient, are delivered under one umbrella; and, number two, prepaid capitated health insurance. These two aspects of Kaiser Permanente provide both a structure and incentive for us to fully leverage information technology in the delivery of health care services.

In my view, there are two significant barriers to the adoption of IT in health care. The main barrier is the lack of incentives to be efficient and effective at producing the product, health. Organizations may be efficient at producing office visits, radiology tests, laboratory tests, procedures and prescription, but they're not incented to produce health and they're certainly not incented to work with other organizations that they compete with, to reduce the overall cost of health care.

A second barrier is the information intensive and complex, subjective and changing nature of health care itself. Unlike other industries that are relatively more static, medical knowledge, practice, regulation, and technology are constantly changing, making it necessary to build complex yet flexible and modifiable systems to meet the different and constantly changing environments. As a consequence, there are few well-charted paths to implementing health care IT, at least in the clinical arena. Unlike installing a refrigerator, where you buy it, you bring it home, plug it in and derive refrigeration, implementing health care IT is still more of an art than a science.

Although health care IT holds great promise, we must remember that the systems are not ends in and of themselves.

A good implementation will improve things; but a bad implementation may fail, may yield few benefits, or make things worse. We must remember that health care IT is just the enabling means and not an end in and of itself.

Finally, what can the federal and state governments do? Number one, and I would say most importantly, they should—they should provide incentives for health care organizations to implement IT and to share that information between institutions. And, number two, they should require standards or at least facilitate the means to allow the identification of individuals between health care entities; that will allow you to aggregate information between individuals, across organizations. Any further standards should be evaluated in terms of the benefits and costs of developing and imposing that particular standard. At a minimum, standards that require each piece of information to be indexed by date and the type of in-

formation, will allow at least the merging of information between separate entities into a single view.

Thank you for allowing me to testify today. I'd be happy to answer any questions.

Mr. REICHERT. Thank you, Doctor.

[The prepared statement of Dr. Chin follows:]

PREPARED STATEMENT OF HOMER L. CHIN

Introduction:

Good afternoon, Mr. Chairman and Members of the Subcommittee. My name is Homer Chin. I am the Medical Director for Clinical Information Systems for the Kaiser Permanente Northwest Region, which is one of eight Kaiser Permanente Regions that together make up the Kaiser Permanente Program.

Kaiser Permanente is the Nation's largest nonprofit health plan. Over 140,000 employees and 11,000 physicians serve 8.4 million members in over 30 hospitals and 430 medical office buildings.

Kaiser Permanente is actually made up of two separate but closely aligned entities: Kaiser Foundation Health Plan and Hospitals, which is responsible for administering the prepaid insurance and for running much of day-to-day operations, and The Permanente Medical Groups, who are responsible for the delivery of professional medical services.

What distinguishes Kaiser Permanente from most other health care organizations is:

1. Integrated comprehensive health care where primary care, specialty care, inpatient outpatient and ancillary services are delivered under one umbrella, and
2. Prepaid health insurance—which encourages us to keep our members healthy, prevent disease, and improve the effectiveness and efficiency of our care delivery system.

These two aspects of Kaiser Permanente—comprehensive integrated care and prepaid health insurance—provide both the structure and incentive for us to fully leverage information technology in our delivery of health care services.

Kaiser Permanente Northwest and Health Care Information Technology:

Although some of my comments today are about the Kaiser Permanente Program as a whole, many of the more specific examples and comments relate specifically to our experience here in the Kaiser Permanente Northwest Region.

In 1994, KPNW embarked on the implementation of a single integrated EMR for all members of this region. This system is not only an electronic version of the outpatient medical record, it also automates all information transmission processes in the outpatient setting. Physicians use this system to document, prescribe, order, refer, and to message other health care providers. By 1998, we had completed our implementation of an entirely electronic medical record throughout our region, and from that point forward we no longer created a paper medical record for members that joined our program. In 1999, we created an Internet portal for members to provide them with a wealth of health information along with the ability to request appointments and refill their medications on-line. In 2002, we provided patients direct access, through a secure Internet connection, to parts of their medical record along with the ability for them to directly electronically message their physicians. That system, KP HealthConnect Online, is now being used by over 100,000 members in this region—roughly 20 percent of our membership.

Over the years we have studied and published results of the many benefits of having an integrated electronic medical record. Benefits can be general classified into:

1. Integrated and Comprehensive Lifetime Clinical Record. All medical information from all sources is accessible electronically in an integrated system.
2. Multiple users in multiple locations can simultaneously access the chart.
3. Time and location independent interaction between providers, and between providers and patients.
4. Embedding of best practices and guidelines into the processes of care.
5. Embedding alerts and reminders into the care process.

6. Identifying patients for specific interventions, such as identifying all patients that were given Phen-Fen weight loss treatment, and requesting that they come in for a screening cardiac ultrasound.
7. Ability to carry out systematic population care strategies, such as notifying all patients who are overdue for screening mammography, or identifying all patients with diabetes that need more aggressive treatment of their cholesterol.
8. Improved new modalities of care, such as self-service appointing and electronic methods of communication.
9. Databases that can effectively monitor and improve overall organizational performance.

In 2003, The Kaiser Permanente Program embarked on the implementation of an integrated health care information system called KP HealthConnect, at an estimated cost of over $3 Billion over ten years. This system is envisioned to be a comprehensive integrated system covering practice and hospital management, inpatient and outpatient electronic medical records, data warehousing, health plan administration, and patient self-service and communication systems. All eight Kaiser Permanente Regions have already implemented significant portions of this system.

Incentives and Barriers to the Adoption of Information Technology in Health Care:

There are three significant barriers to the adoption of IT in Health Care.

One of the main barriers to the adoption of information technology in health care is the lack of incentives for organizations to be efficient and effective at producing the product "health." Organizations may be effective at producing office visits, radiology tests, operations, prescriptions, but they are not incented to produce "health," and are certainly not incented to work with other organizations that they compete with to reduce the overall cost of health care.

A second significant barrier to IT adoption is the relative immaturity of the field of health care IT. There are few well trodden paths that organizations can follow to get from here to there in the implementation of electronic medical record systems.

A third significant barrier is the inherent complex, subjective, and changing nature of health care. Unlike other industries that are relatively more static or certain, medical knowledge, practice, regulation, and technology are constantly changing. The implementation of an Electronic Medical Records is not like installing a refrigerator, where you buy it, plug it in, and derive the benefits. The implementation of an EMR is currently still more of an art than a science. A good implementation will improve the efficiency of a functional process, but a bad implementation may fail, have unintended negative consequences, or worsen existing processes. Because medicine is inherently uncertain, changing, and not well defined, a good implementation of IT in health care requires a certain skill-set and the right conditions. Although there are many instances of health care IT systems that have been successfully implemented with significant benefit, there are also many instances of implementations that failed or resulted in little or no benefit.

Reasons for Successful Health Care IT Implementation at Kaiser Permanente Northwest:

KPNW was successful because it had:

1. Aligned incentives to maximize effectiveness and efficiency in maintaining health.
2. One unique patient identifier (the insurance number is also the health record number), allowing for the easy aggregation of information across systems.
3. Minimal issues with terminology or data standards. In most cases, KPNW had a single instance of most systems—for example, a single Pharmacy System, Radiology System, Lab System, etc. The terminology that the particular single system used became the defacto standard for the enterprise. There was no need to impose a terminology or data standard or translate data between the various systems.
4. An integrated implementation team partnering physicians, project management staff, and IT professionals.

Implications for other health care systems:

There must be incentives for health care organizations to share information. KPNW has contracts with several non-KP hospitals in the community where we hospitalize our patients. All transcribed information on our patients in those facilities is electronically sent to us and integrated with other information in our Elec-

tronic Medical Record. The incentive for organizations to send us this information is clear—it is a requirement for us to do business with them.

A minimum requirement to support the interchange of health care information between entities is to be able to identify specific individuals between health care entities. This implies either a unique patient identifier, or demographic standards that will allow the identification of the same individual between health care entities with reasonable certainty.

The optimal level of information standardization, beyond that minimum requirement of patient identification, is unclear. At one end of the spectrum, scanned images of the paper record could be electronically transferred from one health care entity to another. That would require minimal changes in each system but would not allow for any significant integration of data between the two entities. At the other end of the spectrum, a very rigid and detailed standard at a very atomic level could be defined that would allow for complete integration of information between entities, but would require significant work in each organization, and would require significant on-going maintenance and organizational adaptation.

Such a rigid detailed atomic standard for all data in medical care is unlikely to be successful because of the changing nature and variation in the practice of medicine between locations and over time, and the enormous cost involved in migrating existing systems and terminologies into a rigid standard and the cost required to adapt to ongoing changes. Because of the inherent uncertainty and subjective "fuzzy" judgment involved in health care, requiring adherence to a rigid detailed standard in all areas may also introduce more problems than it will solve.

On the other hand, imposition of higher level standards will greatly increase the ability to integrate information between health care entities at a relatively low cost. For instance, the requirement to date stamp and label pieces of information into broad categories such as: Lab Result, Radiology Report, Progress Note, Medication, etc., would allow the merging of the information between institutions into separate electronic "tabs" and display that information in chronologic order.

Within each area of medical data, there are varying levels of cost and benefit to the various levels of standardization, so the optimum level of standardization will vary depending on the specific area and situation.

Summary:

In summary, the key to improving information sharing between entities is to provide incentives for organizations to share that information.

At a minimum, a mechanism to identify specific individuals between entities is needed. Beyond that, minimal further standard specification will allow the merging of clinical information between entities in a useful way at minimal cost.

Thank you for allowing me to testify today. I would be happy to answer any questions.

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Mr. REICHERT. The Chair recognizes Mr. Machuca.

STATEMENT OF MR. LUIS MACHUCA, PRESIDENT AND CEO, KRYPTIQ CORPORATION, HILLSBORO, OREGON

Mr. MACHUCA. Mr. Chairman, Mr. Ranking Member, and colleagues, good morning—or afternoon, I guess. I'm honored to offer my thoughts on health care IT adoption. I'm particularly grateful to you and your committee staff for taking on this very important topic.

My testimony will illustrate three major points: That the lack of data mobility in health care is at the heart of the cost and quality issues there; that the standards-based clinical messaging represents the best opportunity to modernize the system; and that the technologies to accomplish this are neither complex nor expensive.

Locally, we have recently witnessed a media frenzy regarding the theft of medical records, but where are the voices of outrage regarding the errors that occur due to the lack of timely patient information? Preventable medical errors are a greater risk to patient health than car accidents, breast cancer, or AIDS. The average Medicare patient sees more than six physicians per year, and their care is not coordinated. And chronic conditions now account for a majority of health care expenditures, yet 70 percent of patients who have hypertension, diabetes, or severe asthma are not in treatment compliance. We get e-mails from our car dealer about our car needing an oil change, but where are the e-mails from our doctors saying we're overdue for a blood pressure check? The price we pay for not having data mobility is unsafe care, high cost, and productivity loss.

And we created Kryptiq to solve that problem.

In just three years, our customer base has grown to over 700 organizations in 48 states. More significantly, the number of secured clinical messaging customers grew by more than 200 percent last year alone. Every one of those clinics that purchased connectivity software did so with a specific intent to collaborate with other clinics, and did so in some cases to collaborate in sharing information also with their patients. And we also know from the CITL, the Center for Information Technology Leadership, study that two thirds—that at least two thirds of the potential savings from IT adoption can only be realized through collaboration, as opposed to internal office automation.

Much attention has been given to the President's goal to enable EHR adoption; however, EHR adoption alone does not result in collaboration. In fact, experience suggests that most EHR implementations create islands of automation no more capable of sharing information than the paper records they replaced. We really need to look at how we move the data, not just how we store it.

As highlighted by Forrester Research, efforts spearheaded by ONC to create RHIOs for information sharing have largely stalled, and largely stalled on issues regarding governments, infrastructures, standards, and sustainability. We believe there's a smarter approach. The concept of an organic and incremental RHIO, which is defined as the exchange of data between providers, using e-mail and the Internet, enables immediate data mobility in a self- sustaining model. Forrester has coined this concept "managed clinical messaging." This approach includes any clinic that has e-mail ac-

cess, not just those that have EHR; and collaboration begins on day one, not in a multi-year program.

Personally, I know this model will succeed. I spent 15 years in Intel at the critical time of PC adoption, and I can tell you that the transition from early adoption to widespread business use really happened because of e-mail. More importantly, I know that the organic approach works because I see our customers doing it every day.

Oregon has been the home to many health care IT breakthroughs. Continuing this tradition, Providence and the Oregon Clinic recently transitioned to electronic referrals, saving a combined $10 per referral. And further, a comprehensive study at Providence revealed a 58 percent improvement in diabetes clinical outcomes through increased patient interventions, with no additional staffing costs.

There are dozen examples—dozens of examples of Kryptiq customers like these across the country, realizing the gains of the organic approach. Some are informal RHIOs and some are just RHIOs without telling anybody about it. Examples such as these illustrate that the market is creating the standards for baseline inter-operability; the next step is a common interchange standard for patient medical records, such as CCR or CDA, clinical data architecture. This standard should be accessible by both health care providers and patients, and should also work in both an EHR and in a non-EHR environment. This should help mediate between these approaches.

We want to continue to build the success that will drive collaboration. To this end, we recommend the government's funding for health care IT address the following among more recommendations that we have in our full testimony.

Number one, prioritize organic RHIO expansion while limiting any additional spending on centralized or federated models.

Number two, the government is in the business of public health, and as such it should fund the implementation of electronic collaboration technologies in the public health settings.

Number three, mediate a standard—a standard for patient medical records as above.

And number four, combine any changes in Stark laws with collaboration mandates that ensure the technology recipients be in an open network.

We have shown that the benefits of electronic collaboration are real. We are on the eve of a major breakthrough of technology adoption to make health care industry safer, most cost-effective, and more competitive.

Thank you very much.

Mr. REICHERT. And thank you.

[The prepared statement of Mr. Machuca follows:]

PREPARED STATEMENT OF LUIS MACHUCA

My name is Luis Machuca and I am the CEO of Kryptiq Corporation based in Hillsboro, Oregon. I am honored to offer my thoughts and perspectives on the opportunities and barriers for health information technology adoption. This testimony will illustrate that secure clinical messaging represents the single biggest opportunity to quickly and cost effectively modernize our health care system.

As residents in the Portland metropolitan area we have just witnessed the media frenzy regarding the theft of medical records. We have heard the raised voices of outrage that personal data may have been exposed due to this incident. An Oregonian editorial indicted the health system for its failure to manage health data appropriately.

But where are these voices of outrage regarding the errors in clinical judgment and decision-making that occur in every health system in every city, in every state, every day of the year, due to the lack of clinical information being available at the right time. Why is this not the target of our outrage and concern as a society?

To cite the Institute of Medicine (IOM) Report published in 2000 "To Err is Human," our U.S. health system, which is capable of the most miraculous acts of life-saving, is frequently the source of patient harm. Between 44,000 and 98,000 patients die in hospitals each year from preventable medical error. Preventable, but unprevented, medical errors are a greater risk to patient health than motor vehicle accidents, breast cancer, or AIDS. In terms of lives lost, patient safety is as important an issue as worker safety. Every year, over 6,000 Americans die from workplace injuries. Yet this number is exceeded by the 7,000 Americans who die annually from errors in medication prescription or administration.

In addition, our health care system is overwhelmingly expensive. Health care in the U.S. is estimated to cost up to $2 trillion per year, consuming 13 percent of the GDP. Centers for Medicare and Medicaid Services (CMS) estimates predict this will rise to $3 trillion and close to 20 percent of GDP within the next 10 years, or an average of $10,000 per American resident. Employers will not be able to afford health benefits approaching $40,000 per year for a family of four, while remaining competitive in a global economy—nor can they continue to afford the staggering (yet unmeasured) productivity loss from subjecting workers to an inefficient health care system.

The decentralized and fragmented nature of the health care delivery system contributes to unsafe conditions for patients, and serves as an impediment to efforts to improve safety. Even within hospitals and large medical groups, there are rigidly-defined areas of specialization and influence. The average Medicare patient sees more than six physicians in the course of a single year, but their care is frequently "silo-ed," and lacks coordination and communication. At the same time, the loose affiliation of most provider groups makes it difficult to implement improved clinical information systems capable of providing timely access to complete patient information across all providers. Unsafe care, high cost and productivity loss is the price we pay for not having data mobility in our health care system.

The IOM followed their 2000 report with a 2001 report that boldly stated that between the health care we have and the care we could have lies not just a gap, but a chasm.

A highly fragmented delivery system that largely lacks even rudimentary clinical data mobility results in poorly designed care processes characterized by unnecessary duplication of services and delays. There is substantial evidence documenting overuse of many services—services for which the risk of harm may outweigh the potential benefits.

Meanwhile we are stuck in a health system that pays for quantity not quality and is centered on a 400 year model of treating patients when they are acutely sick, rather than ensuring the services needed to maintain their health. For the last four decades, the needs of the American public have been shifting from predominantly acute, episodic care to care for chronic conditions. Chronic conditions are now the leading cause of illness, disability, and death; they affect almost half of the U.S. population and account for the majority of health care. Yet these conditions are seriously under managed when it comes to ensuring Americans get the most appropriate evidence-based care that they should expect.

For example, hypertension affects nearly one in three American adults. It is called "the silent killer" due to the strong link between unmanaged hypertension and later incidents of coronary vascular disease. Yet only 23 percent of diagnosed hypertensives have their blood pressure under control, despite readily available and cost-effective medications. Diabetes was referred to in a recent *New York Times* article as a disease of epidemic proportions, and yet more than 70 percent of diabetics have unmanaged cholesterol levels, despite readily available cholesterol management treatments. Diabetes is the leading cause of non-traumatic lower limb amputations in the U.S., but barely one in five patients with diabetes receive the recommended annual foot exams that can expose loss of sensation. Additionally, almost 70 percent of our children with severe asthma are not receiving appropriate medications.

A 737 stays grounded due to safety risks if a tray-table won't stay in it's locked and upright position, but the equivalent of a 737 load of people die every day from preventable medical errors.

Many of us would not dream of letting our cars go more than 7,000 miles without an oil change, and in fact get regular notifications about servicing so they don't break down on the side of the road. However, we may go years without a blood pressure or cholesterol check, and the first sign of coronary heart disease is when our bodies break down and we are rushed to hospital with a heart attack or stroke.

As a society, we are outraged about a single occurrence of data being stolen, but ignore the daily health care crisis when opportunities for continuous and appropriate care are missed due to the lack of basic information systems with data mobility.

The relevant technologies to address these problems are neither complex nor expensive. We don't need 4–D CAT scanning devices to ensure children receive immunizations and the elderly receive flu shots. We don't need to solve the genome code to notify patients in a timely and traceable manner when their lab results are normal or abnormal.

We created Kryptiq to solve these problems.

Today, more than 100 employees at Kryptiq Corporation are focused on enabling secure connectivity in health care. Last year alone our customer base grew 120 percent to over 700 health care organizations in 48 states. More significantly, the number of secure clinical messaging customers grew by more than 200 percent in that same time frame. Every one of these clinics who purchased Kryptiq connectivity software did so with the specific intent to collaborate with other clinics and in many cases also with their patients. The primary application of Kryptiq software is "provider-to-provider" communication for referrals, lab results, consultations, admissions, and prescriptions. These products also allow "provider-to-patient" communication to deliver secure online access to medical record summaries, lab results, and administrative data. They enable patients with chronic diseases to ask questions and provide home monitored data to their physician office, and support eVisits to provide necessary care without the patient coming into the practice. The growth and adoption of Kryptiq software tells us that connectivity is not just a "nice to have" capability—it is the best way to unlock the value that is trapped in the information silos of health care.

Much attention has been given to President Bush's goal to enable Electronic Health Records (EHR) for nearly all Americans by 2014. The creation of the Office of the National Coordinator for Health Information Technology (ONC) has advanced the cause and awareness of EHR. Among other tangible benefits, Dr. David Bralier's efforts have been a positive and significant step forward in moving us away from paper and establishing a foundation for data storage and management. EHRs are of great value in organizing and maintaining the accuracy of patient information, while eliminating the burdens inherent in a paper system. However, EHR adoption alone does not result in collaboration. In fact the evidence to date suggests most EHR implementations create islands of automation, no more capable of sharing information than the paper records they replace.

Efforts spearheaded by the ONC to create Regional Health Information Organizations (RHIOs) for information sharing have largely stalled. Yet Kryptiq customers are delivering significant and measurable gains by combining the EHR systems that already exist with a readily available and affordable messaging infrastructure to share information across their communities. Secure clinical messaging represents the greatest opportunity to modernize and improve health care. Therefore, we believe that in order to truly lower costs and improve quality, we need to look at how we MOVE patient information, not just how we STORE patient information.

We all know about the growing cost of health care and the burden it is placing on our citizens, our businesses and our economy. Several studies have shown the tremendous potential for cost savings and qualitative improvements that can be realized through health care IT adoption. A recent study by the Center for Information Technology Leadership (CITL) at Partners HealthCare reported that if all information exchange between physician, hospitals, pharmacies, radiology centers, and public health facilities were fully automated in a standardized way, the U.S. health care system could save in excess of $77 billion dollars each year. The study specifically, and in my opinion rightly, points out that 70 percent plus of the savings opportunities exist through inter-office collaboration as opposed to internal office automation.

The recent RHIO initiatives are an attempt by the government to address the data mobility issue. However, the "typical" RHIO (not unlike it predecessor, the CHIN) has a fatal flaw—it essentially requires that all infrastructure, governance, funding, and standards be agreed to and deployed BEFORE it can be of any use.

This is analogous to building an entire road system before anyone can drive. In addition, questions about their sustainability have yet to be answered. This leads me to conclude that the current RHIO concept will require ever-increasing and ongoing financial support from the government.

There is a smarter approach. The concept of an "organic" or incremental RHIO fueled by secure messaging technology provides immediate data mobility in a self-sustaining model without the centralized high cost infrastructure and bureaucratic governance. Forrester Research, reflecting on the early and modest results from initial RHIO efforts, has coined this concept as Managed Connectivity and it is gathering support among industry leaders. Dr. Brailer illustrated this point in a recent article in Health Data Management, "Most [people] will want to make local decisions on how data will be shared. . .the less centralization there is, the more value people will see. . .." The Managed Connectivity concept is predicated on peer-to-peer workflow-based collaboration. The technology foundation is e-mail and the Internet, which is already universally available at a minimal cost.

By definition, this approach includes any clinic that has e-mail access as opposed to only those that have EHR. At the same time, it will serve to stimulate EHR adoption because electronic records are a place to store and manage data that is sent and received. The big benefit however is that collaboration begins on day one—there are no multi-year implementation projects.

I know that this model will succeed. I spent 15 years at Intel at the critical time of Personal Computer adoption. As many of you may recall, the transition from early adopters to widespread business use occurred because of e-mail. Collaboration drove PC adoption, which in turn drove richer applications, and created the industry that made every industry more competitive and productive. This was referred to as a "virtuous technology spiral."

More importantly, I know that the "organic" approach works because I see our customers doing it every day.

Oregon has been the home to many health care breakthroughs, both in the private and public sector. The Oregon Health Plan, the early electronic medical record developed by Dr. Mark Leavitt, and the wide deployment of EHRs by both Providence Health System and Kaiser Northwest Permanente are examples of national leadership in health care.

Recently, in partnership with our customers, Kryptiq has established that connectivity solutions significantly improve care delivery and reduce costs. For example, by transitioning patient referrals from paper-based systems to secure electronic communications, Providence Health System and The Oregon Clinic were able to save an approximate combined $10 per referral. Faxes and phone calls were replaced by electronic messaging in a matter of weeks. This was achieved without the need of external forces or government subsidies or multi-agency committees arguing about every last technical and business detail. In addition to reducing costs, moving to electronic referrals eliminated the time lag inherent in paper systems and ensured that relevant information was where it needed to be when it needed to be there.

Meanwhile Providence Medical Group recently released the results of a comprehensive one-year study of significant improvements in patient outcomes using Kryptiq's CareManager Diabetes Module. Their ability to unleash the data stored in their EHR and use it to proactively communicate with chronic patients regarding their health status, instead of waiting for the next office visit, has lead to remarkable improvements in treatment compliance. They have demonstrated a 58 percent increase in the number of patients with diabetes who achieved control of their cholesterol and blood pressure levels, significantly reducing the risk of disease complications. They also documented a 250 percent increase in foot screenings, helping to stem the rate of later amputations. All of this was achieved without any additional staff requirements, and the extra revenue from providing necessary and medically appropriate care in a timely manner allowed the medical group to pay for the necessary IT investment, while undoubtedly saving the economy many millions of dollars in hospital visits and other longer-term care costs.

Similar examples exist throughout the country in physician offices adopting connectivity solutions at their own investment to improve their care services and generate additional revenue at a lower overall cost. Family Medical Specialists of Texas (FMS) believed that their busy patients would receive better care if they could have online consultations with their primary care physician to resolve medical questions and issues without an office visit. Rather than waiting on all the local health plans to support "eVisits," FMS now charges individual patients $40 per year for their eCare program. Patients believe it pays for itself by avoiding co-pays; employers and employees save time by avoiding unnecessary office visits; FMS generates

additional revenue without increasing staff costs; and the health plans save money by shifting office visits to more cost-effective and efficient forms of care.

Memorial Hermann Healthcare System (MHHS) in Houston, Texas has adopted messaging technology for similar reasons. Dr. David Bauer, Residency Director for The Family Medicine Residency Program, cites a typical pre-messaging scenario of a patient calling in with a question regarding a medication she had been prescribed the previous day. "She left me a message to call her back. But when I called her back she was in a meeting so I got her voicemail. When she returned my call I was busy seeing patients. Over the next 24 hours she spoke to three of my nursing team without reaching me, having to re-explain her issue each time, and we left each other seven voicemail messages." Dr. Bauer's scenario is a common one, happening all over the country every day, but for him it's now a thing of the past. "Now we use secure messaging, which allows me to communicate with patients and other providers without our needing to be available at the same time."

Examples such as these illustrate that the market is creating the standards for baseline inter-operability. The next logical step in the evolution of such standards is a common interchange structure for patient medical records that is simple to deploy such as the ASTM Continuity of Care Record (CCR) or the HL7 Clinical Document Architecture (CDA). The standard should be accessible by patients and health care providers and *work in both EHR and non-EHR environments.* By contrast, emerging concepts, such as Cross Enterprise Document Sharing (XDS), promote collaboration but require significant infrastructure, are more complex to deploy and assume certain market outcomes that are still in question.

Because there are competing definitions of a common interchange structure for patient medical records, health care IT vendors are reluctant to develop inter-operability solutions based on either standard. We believe that it is time for the government agencies such as NIST to help mediate between these competing approaches. We are also encouraged by NIST's involvement in developing reference implementations for the XDS standards. These efforts help promote the validity of standards and their applications.

A common interchange structure for medical records will be a great leap forward for everyday collaboration. However, other standards will need to be developed to address more specialized health care-related homeland security needs such as the aggregation of emergency room data to identify pandemics.

We've made great progress in a short period of time and this has led us to a solid foundation for the critical work that remains to be done. Clearly, we want to continue to build on the successes that will drive collaboration and improve the quality and delivery of care, while achieving critical cost savings. To this end, we recommend that the Government's continued and future funding for health care IT follow this direction:

1. Prioritize "organic" RHIO expansion while limiting any additional spending on centralized or federated models unless they demonstrate scalability and broad community participation.
2. Fund the implementation of electronic collaboration technologies in public health settings. Public health is largely funded by the government at a federal, State and local level. To preserve the viability of the public health clinics, they should be the recipients of targeted resources specifically for this purpose.
3. Mediate a definition of a common interchange structure for patient medical records to facilitate collaboration. Specifically, settle the debate between CDA and CCR. CMS could provide incentives for the adoption through its reimbursement processes.
4. Combine any contemplated changes in Stark laws with collaboration mandates that ensure that any recipient of technology can participate in a fully collaborative and open community-wide network.
5. Continue work towards differential reimbursement to physicians who can prove better outcomes of care for their patient population.

As we have shown, the benefits of secure electronic collaboration are undeniable. We are on the eve of a major breakthrough of technology adoption that will make the health care industry safer, more cost-effective and more competitive. We advocate a network of collaboration that maximizes provider and patient participation, and provides immediate and secure data mobility in a self-sustaining model without the high cost and complexity of a centralized system.

Thank you.

BIOGRAPHY FOR LUIS MACHUCA

Luis Machuca is the President and Chief Executive Officer of Kryptiq Corporation, the leading provider of inter-operability and workflow connectivity solutions for health care. Mr. Machuca received his BSEE in 1980 and MSIE in 1981, both from Purdue University. In 1981, he joined Intel Corp., where over a 15-year career, held a variety of roles in management before becoming co-General Manager of the OEM Products & Services Division where he established Intel as the number one motherboard supplier in the world. In 1996, he became the Executive Vice President of the NEC Computer Services Division of PB–NEC Corp. In 1999, Mr. Machuca joined eFusion Corp. as President and COO and subsequently merged the company with ITXC. Mr. Machuca currently serves on the Oregon Health & Science University Foundation Board of Trustees, Lifeworks NW Board of Directors, the Boy Scouts of America Cascade Pacific Council Executive Board, Catholic Charities of Oregon and the Jesuit High School Board of Trustees. Mr. Machuca has also served on the Portland Metropolitan Family Services Board of Directors, and was a finals judge for the 2005 NewVenture Championship business plan competition sponsored by the University of Oregon's Lundquist Center for Entrepreneurship. In 1999, Mr. Machuca received the Outstanding Industrial Engineering Award in from Purdue University.

Mr. REICHERT. Lastly, we recognize Mr. Urali.

STATEMENT OF MR. PREM URALI, PRESIDENT AND CEO, HEALTHUNITY CORPORATION

Mr. URALI. Thank you, Chairman Congressman Reichert, Congressman Representative Wu, ladies and gentlemen.

My name Prem Urali. I am the founder and CEO of HealthUnity Corporation, a 17-month old health information technology company based in Bellevue, Washington.

First let me start by thanking you for giving me the opportunity to present our company's views in front of the Subcommittee and in front of the general public here today.

HealthUnity was founded with the singular vision of providing the solution for getting the right clinical information to the right person at the right time. We had two earlier deployments underway: One in the Seattle east side, namely, Bellevue, Washington; and another one in Baltimore, Maryland. In both of these locations, we have had early successes in enabling health information exchanges to flourish.

HealthUnity's approach and early success can be summarized in the following key points: Our approach is targeted at the grass roots, namely, we target the clinicians first. They are the knowledge workers who need to be introduced to health information technology right from the outset. If the clinicians are not on board, we will not achieve the national vision we seek, despite the involvement of others, so that's why we started the grass roots with the clinicians.

Secondly, we provide an affordable solution that is also the best in its class.

And, thirdly, we take care of all the external integration and communication needs, which is a critical piece, as Luis was pointing out, in our national health IT strategy.

Finally, we believe we have a business model that is scalable and sustainable.

Now, let me summarize my thoughts on what role health information plays in improving care. Health care is essentially a local, at best a regional, activity; hence, any approach to solving health information sharing, it should start at the local or regional level.

There are three goals which are central if any of this is to happen. The first goal is improving quality of care. Now, I will limit my—the value proposition discussion from a clinician's perspective. And I'm sure there are various other perspectives on value and how a network could be beneficial. But, you know, like I said, we have to start at the grass roots level; and unless the clinicians are up to it, it doesn't matter who else is interested in it.

The often quoted figure is that 96,000 avoidable deaths happen, in the U.S. Alone. By electronically recording, communicating, and archiving health information and then analyzing de-identified information—meaning the patients identify information that has been removed from it—we can both benefit the patients as well as the community and the population health needs and how we can improve quality of care.

The second goal is addressing provider inefficiencies. Information technology has the power to reduce cost of doing business for all the providers involved. Today there is still a ton of paperwork, papers, faxes, phone calls, that keep passing between care providers. At HealthUnity, we have recognized this as another important area where our solutions should help improve those inefficiencies.

The third goal is to improve patient experience. We—in our earlier—in other testimony, it came out that we all go through the frustrating experience where we go see a doctor and we have to—the first thing we do is we have to fill out the clipboard. Additionally, the patients who see multiple providers have to take it upon themselves the act of coordinating the health information, and, physically, in many cases, transporting data between the various care providers.

Now, let me turn to the topic of incentives and barriers. The key barriers hampering technology adoption in the physician practices. Deployment of IT systems requires up-front capital and it also causes short-term disruption in practice efficiencies. So any solution should address squarely, number one, how to help physician practices raise the capital they need in order for deploying and operating such; and then, secondly, how do you promote the mass education of our general public and the IT people so that adopting these systems can be very inexpensive and the talent to do that is ubiquitous and it's widely available.

Here are some practical suggestions on how incentives can be targeted at these two barriers. Number one, let any interested party finance physician practice adoption of technology, with no strings attached. So far, we have had a lot of discussion on why physicians do not have technology; but any solution or every policy solution keep coming back has strings attached to it, and hence the adoption is not being what it needs to be.

Number two, we need to fund education and training so the best practices on how to implement these technologies become affordable and common knowledge: So we can walk to a community college and get the graduates that are coming out or have been through the program, and they have the knowledge how to help the physicians implement the IT solution in their practice.

Now, let me turn to the topic of Federal Government departments and agencies and the role that they have played in health IT. HHS, the Health and Human Services Department, as well as

the Office of the National Coordinator, have done a phenomenal job in raising the awareness in the industry and setting a national agenda in terms of the appropriate goals and strategies. This was done in record time. We commend them for serving the Nation well in doing so.

In the area of execution we believe we can share some of our experience which might help all of us achieve national goals in a capital as well as time efficient manner.

Our nation owes much of its economic success to its numerous entrepreneurs, inventors, and workers. Equally importantly, our nation owes its success to the right policies enshrined in our Constitution, in our laws, and in various administrative and legislative bodies. Government intervention in the free market should be one of last resort. We are all for government incentives and removal of barriers, but we are not for government picking winners and losers in the health information technology market. We are not that particular about government massively spending and indirectly funding health IT projects, either from Washington, D.C., or the state capitals.

We understand the urgency within our government and public officials to get things done quickly. We also think there has not been sufficient progress in creating the right policy environment and right incentives environment and then letting the private sector innovate. I think that is where we have had deficiencies and we can definitely use a lot of help from Washington, D.C. We would also like to see more of the Health and Human Services Department as well as the Office of National Coordinator's resources targeted towards addressing these policy and incentive issues.

Addressing the topic of standards in the health care environment, the scenario that is most important at the national level may be quite different than what is most important at the regional level. And we've only seen that based on some of the recommendations and incentives that are coming from Washington, D.C. Our focus needs to be at the regional level, the regional scenarios, the barriers, the incentives, and the policy and legislative needs, at the grass roots level.

We thank you for the opportunity, and I look forward to answering some questions. Thanks.

Mr. REICHERT. Thank you.

[The prepared statement of Mr. Urali follows:]

PREPARED STATEMENT OF PREM URALI

Good afternoon, Chairman, Members of the Subcommittee, ladies and gentlemen.

My name is Prem Urali. I am the Founder and CEO of HealthUnity Corporation, a 17-month-old health information technology company based in Bellevue, Washington.

First, let me start by thanking you for giving me the opportunity to present our Company's views in front of this subcommittee.

HealthUnity was founded with the singular vision of providing a solution for getting the right clinical information to the right person at the right time. We have two real-world deployments underway: one in Bellevue, WA, and the other in Baltimore, MD, where we have had early successes in enabling regional health information exchanges to flourish.

HealthUnity's approach and early successes can be summarized in the following key points:

1. Our approach is targeted at the grass-roots—we start with clinicians. They are the knowledge workers who need to be introduced to the health tech-

nology world right at the outset. If the clinicians are not on board we will not achieve the national vision we seek, despite the involvement of others.

2. Secondly, we provide an affordable solution that is also the best in its class.
3. Thirdly, we take care of all of the external integration and communication needs—a critical piece that has been missing till now. Clinicians want to communicate electronically with other clinicians, labs, radiology centers, hospitals and patients. Facilitating this communication is what we do best.
4. Finally, we have a business model that is scalable and sustainable, and which produces the best solution for the clinical communication and collaboration problem.

Let me now summarize my thoughts on the role health information plays in improving care.

Health care is essentially a local, or at best regional, activity. The patients and their providers (hospitals, labs, physician practices, etc.) are all located within a given locale or region. Hence any approach must start at the regional level. There are three goals that are central to regional care providers that also align perfectly with the national vision. I am limiting my analysis to goals that are relevant from a provider's view-point because that is where I believe all discussions around information technology adoption in health care should begin.

The first goal is improving quality of care:

The often quoted figure is that 96,000 avoidable deaths occur in the U.S. each year. By electronically recording, communicating, and archiving health information and analyzing de-identified health information, we can help reduce the incidence of errors and improve quality of care. This can be achieved by providing patient-specific, as well as population-wide, interventions.

The second goal is addressing efficiencies:

Information technology has the power to reduce the cost of doing business for all the providers involved. Today, there is still a ton of papers, faxes and phone calls passing between care providers. At HealthUnity we address inefficiencies by automating major workflows, such as patient demographics exchange between health care entities, automation of the referral process, clinical information sharing, distribution of lab and radiology results, and several other frequently recurring processes. These savings lower the operating costs for care providers and help them run their businesses better. In addition, by making historical data seamlessly available to care providers, we reduce the practice of defensive medicine. If prior data is available and easily accessible, providers are less likely to reorder tests and procedures. This reduces the level of waste in the system. Providers need not be concerned about overall revenues falling. We need to keep in mind that there is no dearth of growth in demand for health services with our aging population. By reducing wastage and reducing the unit cost per visit or procedure, providers can treat and meet the needs of more of our citizens at a lower unit cost to the system.

The third goal is to improve the patient experience:

Today, as patients, we often have frustrating experiences when we visit our doctors and the dreaded clipboard is handed over for us to fill out. Often patients who see multiple providers may have to fill out the same form multiple times over the course of a single day. Additionally, patients who see multiple providers appreciate what it takes to transport medical data between their various care providers, and consequently they themselves act as coordinators of their own care. Technology can help the system do what it is supposed to do and make the care delivery process considerably more patient friendly. Clinicians would love to see this happen at an affordable cost to them.

I hope I was able to illustrate the core benefits of a connected health care environment. Now, let me turn to the topic of incentives and barriers.

The key barriers hampering technology adoption are in physician practices. The other health care providers are typically larger and can easily afford new investments or have already made investments in health information technology. Deployment of an electronic medical record system, or EMR, requires up-front capital and causes a short-term drop in practice productivity. Furthermore, an EMR, coupled with a practice management system, or PMS, does not completely address the three goals I spoke of earlier. The third missing piece is the bidirectional external communication solution. Any real solution should squarely address: 1) How to help physician practices raise capital for deployment and operation of an IT solution that addresses EMR, PMS and the bidirectional communication need. And 2) How to pro-

mote the education of the market on the best practices for adopting those solutions in a way that minimizes disruption in practice productivity.

In summary the barriers are 1) Capital for deployment and operations and 2) Practice disruption during implementation. Here are some practical suggestions on how incentives can be targeted at these two barriers: 1) Let any interested party finance physician practice adoption of technology, with no strings attached or with only a minimal requirement that the physician practice match the interested party's funds with their own funds, or match the funds in kind. 2) Provide incentives for standardization and commoditization by implementing the solution such that there are hundreds of people who have the expertise to implement these technologies for a low price.

Let me now turn to the topic of the Federal Government departments and agencies, such as the Department of Health and Human Services and NIST, and the role they currently play and could play in the future. HHS and the Office of the National Coordinator have done a phenomenal job in raising the awareness in the industry and setting a national agenda in terms of appropriate goals and strategies. This was done in record time and we commend them for serving the Nation well. In the area of execution, we believe we can share some of our experience, which might help all of us achieve the national goals in a more capital and time efficient manner.

Our nation owes much of its economic success to its numerous entrepreneurs, inventors, and workers. Equally importantly our nation owes its success to the right policies enshrined in our constitution, our laws and the various administrative and legislative bodies. When a major challenge such as the adoption of Health IT stares at us, we go back to the formula that has worked for over 200 years, and that is that the Government does what it is best at—setting the right legal and policy environment, and the private sector does what it is best at—innovating and creating the best health information infrastructure in the world, one that is constantly innovating and keeping us at the fore front. Government intervention in the free market should be the last resort. We are all for Government incentives and removal of barriers. But we are not for Government picking winners and losers in the free market by massively spending the public's money on direct Health IT projects managed from our national and state capitals. We understand the urgency within our government and public officials to get things done quickly. We also think there has not been sufficient progress in creating the right policy environment and the right incentives environment and then letting the private sector innovate. We would like to see more of HHS' and the Office of the National Coordinator for HIT's resources targeted towards solving the policy deficiencies and the incentives for private sector development.

Addressing the topic of standards, NIST has a role to play as standards emerge. Standards make sense when a value proposition can be clearly articulated and there is strong consensus around that value proposition. Let me give you the example of my ATM card. When I travel to Europe, I can withdraw cash from most ATM machines there. However, I cannot call up my bank statement from Europe. The value proposition here is very clear. When traveling out of your home country, you want to be able to get cash. However, you don't particularly care if you are able to get your last month's bank statement. Translating this analogy to the health care environment, the scenario that is most important at a national level may be quite different than what is most important at the regional or local level. Our first goal is to set in motion a policy and incentive framework that will identify the scenarios that are important at the regional level. When a clear picture emerges at the regional level, we can then identify a subset of the regional scenarios that would be important at the national level. At this stage our focus needs to be on the regional scenarios. When a clear value proposition emerges for a given regional scenario then we can move forward to standardize it at the national level. NIST can play a key role in this process.

Our observation is that the national standards are being worked on without first letting the local and regional standards sufficient time to emerge. Again, I clearly understand the urgency of our government and public officials to achieve tangible progress. We want to help by providing our candid feedback so that the national debate includes the voice of a firm which is making progress on the ground at the regional level.

We thank you for the opportunity again. I look forward to taking some questions.

BIOGRAPHY FOR PREM URALI

Prior to founding HealthUnity™ Corporation, Prem was a Group Manager in the BizTalk Server division of Microsoft, responsible for the BizTalk Accelerator line of server products including the HL7 and HIPAA Accelerators (integration engine).

Prem incubated these initiatives from concept to $10 million in incremental revenue in three years. Prior to Microsoft, he founded a B2B software company Commercia Corp, which was acquired by Microsoft in 2000. Prior to that Prem held the position of CTO of Petopia, now a division of Petco Animal Supplies (NASDAQ: PETC). Under his leadership, Petopia was ranked by InfoWorld in its e-Business 100 list in 1999. Previously, Prem worked for four years in the consulting services division of Microsoft, where he was one of the youngest persons to be elevated to the position of Principal Consultant in 1998. In this capacity, Prem lead the program that launched the very first electronic commerce presence for Gap, Baby Gap and Gap Kids. Prem, has founded companies in India and U.S. in the software consulting and product areas.

He earned a Master of Science degree from Iowa State University in Computer Engineering. He also earned an MBA from the Wharton School of the University of Pennsylvania. Prem has three patents pending in the area of message-oriented middleware systems.

About HealthUnity Corporation

HealthUnity was founded with the singular mission of providing the right clinical information to the right person at the right time. HealthUnity is the "RHIO in a box" company. HealthUnity's affordable solution can be used to build regional health information networks that support organic growth from as little as two entities to hundreds of entities. Our tag line is "Trust is Earned" which reflects our commitment to protecting security and privacy of patient data.

DISCUSSION

Mr. REICHERT. Would the other witnesses come up and try to find a seat? I know it's a little crowded.

You know, these hearings, when I—this is my first term, by the way, in Congress. I was a law enforcement officer in the sheriff's office in Seattle, and I was a sheriff in Seattle for eight years. And I find these things to be very formal and people are a little bit nervous.

Are you nervous out there? Are you nervous up here?

See, we can relax a little bit now. You've got your testimony out of the way, and Mr. Wu and I will ask a few questions.

I, personally, am not an IT expert and I'm not a health expert, but what I've noticed is some similarities in the field that I came from, my 33-year career in law enforcement. When you talk about inter-operability—and I think, you know, you were mentioning that, first, hospitals and doctors' offices need to build sort of a system within their own operation before they can kind of reach out and be inter-operable. Law enforcement has the same problem. I think back to—oh, by the way, I'm supposed to say, before I start to talk, that I'm recognizing myself for five minutes. That's part of the rule. So I've now recognized myself, and I've used up some of my time. Since there are only two of us, we'll be liberal with our time today.

Mr. WU. Absolutely.

Mr. REICHERT. I would just like to draw a couple of comparisons to law enforcement, because we're all going through this struggle of just this massive increase in technology and the number of vendors mentioned, 800 vendors. We all are dealing with the fastest moves.

But in 1982, I was 31 years old, I started to work on the Green River murder investigation, which brought me to Portland, back to the Oregon area again. Do you know that in 1982, when I started to work that case, there were no computers? And what we used—and I've talked to young children about this in grade school and

junior high, and even high school students, they will raise their hand and say, when I say, "This is on Rolodex file," they'll say, "What is a Rolodex?" And that's so far—and then DNA and automated fingerprint identification systems, all those things.

So what's exciting, though, is the Northwest is really leading the way in a lot of these areas, and in the health IT area, the Northwest once again is leading the way. What you've heard from the expert witnesses today is that we are far ahead.

I've had the opportunity to travel to New Orleans and Houston, and after Katrina and Rita, and interact with the people there. They are making progress too, don't get me wrong, but—you know, we're a little bit biased here in the Northwest—we are doing a great job, but there's so much more we can do. And I'm just happy to see that all of these bright people are on this problem, because it is one that needs to be solved.

The other thing that I find very interesting in these discussions within the Federal Government and state government are all these acronyms. Let's see, I just jotted a few down. So we're just going to have a little bit of fun.

HHS. NIST, N–I–S–T. ONC. IEEE. HITS. PCC. IH. IT. EHR. OPI. RTI.

Does everyone know what all those mean? You do? That is scary.

Well, you know, it's good that you all know what they mean.

Mr. WU. What we have is an inter-operability issue.

Mr. REICHERT. Exactly right.

Mr. WU. It's a new language.

GOVERNMENT ROLE IN HEALTH IT

Mr. REICHERT. But what I've—What my question, now, I lead up to is: I recognize that some of the problems that were listed were turf wars, partnerships, and standards, incentives; those are some things that have been talked about.

What I'd like to know, first of all, what are the three most important things that the Federal Government can do to help? Now, I've heard a lot of suggestions; but if we can just maybe—anyone in the panel, the three most important things that we can do. I know there's a lot.

Dr. PETTIT. I think, as a start, this was a great experience trying to figure out in writing this testimony, really, and I think everyone is nodding their head. What can the government do to help us.

Mr. REICHERT. Yeah.

Dr. PETTIT. And I see bringing attention to the matter has done a tremendous amount in the past year, I believe. Funding is another thing. Supporting legislation is another. And one more—what was it? Nancy, help me. Programs.

Yeah. Those are the—Those are the four things I see. Oh, and providing incentives through the government's role as a payer.

Mr. REICHERT. Yeah.

Mr. MACHUCA. If I could, I'm just going to give you one. I really believe that embracing an organic approach not only has the benefits that we stated, but I think there's a paralyzing effect when clinicians and professionals in health care think that somebody else is figuring out, somebody else is going to pay for it, and in ten years we're just going to plug our PC into the wall and all the

health information is going to come out. Not only is that a fallacy, but it's a paralyzing and chilling effect. And people moving in an incremental way to get the great benefit they can go with immediately, and so I would focus very much on incremental, high yielding steps as opposed to the big vision in the sky ten years from now.

Dr. CHIN. I would—You know, I would agree with that. And one of the big things in health care IT is "don't let perfect be the enemy of the good." You know, we've got to start somewhere; and rather than trying to develop the perfect system and the perfect standards, we've got to start somewhere.

The number one thing for the Federal Government is really incentives to incent people to put their information into an electronic form and to be able to share that information. One of the examples of that is Kaiser Permanente, here in the northwest region, actually contracts out services, hospital services, to four or five hospital organizations. And we do get that information back, we do get that information back electronically. And the incentive for those organizations to provide that information is that, unless they provide that information, we do not use their services. And so that's certainly a big incentive for them to provide that information.

The issue is not a technological one; the issue is one of incentives and making it attractive and reward organizations for engaging in this behavior of sharing information.

Ms. CECCHETTINI. I agree on the—I agree on the incentives for early adoption, but also sharing the best practices of early doctors, because it is about the work flow and how we do change practice within health care.

Mr. KENAGY. I just want to add, though, the point earlier about highlighting the issue is important. I think the Federal Government plays a huge role in educating itself, educating the industry, and educating consumers about how complex this is. And I think that's critically important. I agree with the incentives.

I think the focus on inter-operability between institutions is a huge—you know, we have keen interest within OHSU to automate our records, to improve care, to improve quality, to improve efficiencies; but as was said by many of the people here today, there are few incentives to sharing the information.

I think Dr. Chin mentioned it great. There's a lot of incentive around being effective in one area, but around health. So I think that focusing the incentives around sharing information, being able to export it to the patient themselves, who are ultimately the greatest beneficiaries of this, and between institutions, is a good focus area.

Mr. REICHERT. Dr. Jeffrey.

Dr. JEFFREY. Well, as the Federal Government representative here tasking ourselves, I'd like to echo some of the things I've heard, which I completely agree with.

One is the leadership role that the Federal Government can have in terms of exactly what you just said, increasing the awareness and the importance of issue at all levels.

Second, it was mentioned the need to provide incentives for technology adoption in policy, especially sort of market-based policy incentives. And one of the things that the Department of Health and

Human Services—I'll try to avoid the acronyms—under. Dr. Brailer's leadership, they just put out the contract recently to George Washington University, Massachusetts General Hospital, and I think it's the Harvard Institute for Health Policy, to specifically examine government policies and how they may be used to more effectively help the adoption of some of these technologies. So, hopefully, that would be one mechanism to try to get more of this kind of input.

And then the third area is on the same obstructions to interoperability, I agree, across institutions is a critical piece. And that's a place where the Federal Government is not mandating but working with the private sector and plays sort of a little bit of the referee and a little bit of the convenor (unintelligible) to try to get to the right answers.

Mr. REICHERT. Great. You noticed I asked for three and I think I counted about eight, so that's good.

The Chair recognizes the ranking member, Mr. Wu.

Mr. WU. Thank you very much, Mr. Chairman.

You know, I tend to be a "glass is half full" kind of person; but after the challenges that we've heard today, I think the glass is kind of a quarter full. But I think that we have some success stories here, or at least some good starts, with Kaiser based here in the Pacific Northwest, with our local V.A. Hospital, and with the efforts at OHSU. And I'd like to get into some of the specific reasons for that, and it'll probably take several rounds of discussion to get into that.

But we really have a critical mass of providers, payers, innovators, suppliers, quality organizations, here in the Northwest—in the Portland metro area in Oregon, in the Puget Sound area in Washington state; and it's not just because the businesses exist here and the health care providers exist here, but because, I think, there's a spirit of innovation.

And before we let other folks get too far out ahead, as Mr. Reichert referred to the loss of memory of Rolodexes, which were so important to us in our prime, you know, in my intellectual property practice, we represented all different sorts of folks, including financial institutions. And I remember helping financial institutions transition from their in-house IT service to outsourcing their out—this is before "outsourcing" was a bad word; this was outsourcing to a nice company in the Puget Sound—and this transition was typically done over a weekend. That is, you shut the bank down on Friday afternoon and you click over from your in-house service to this new service provider. And the theory was that you did all of that work over the weekend and you open up on Monday and nobody notices the difference. And just in my legal career, I've got to tell you that one of these transitions, well, you know, the client shut the service down on Friday afternoon and on Monday morning the tellers were using shoe boxes and paper records. So there have been a lot of challenges to a lot of different industries, just in our very short professional life, and so I think that there's real room for optimism.

And focusing on the positive first, with Dr. Chin.

Kaiser is an integrated operation. You've gone to a paperless system. There have been tremendous problems in giving incentives to

health care providers. My understanding is that at Kaiser it's a bit tough. It's basically, if you want to work here, you're going to use this paperless system.

But, Dr. Chin, as the designer of the system, you must have made many decisions to try to make your system more provider friendly. Could you talk about some of those things in addition to the stick of "if you want to work here," what are some of the carrots that you offer.

TRAINING ON IT SYSTEMS

Dr. CHIN. There is a learning—certainly a learning curve for clinicians to learn how to use systems. And I would say, initially, number one, is the amount of training that we provide them. So we've provided them with 20 hours of training in order to get them to be used to the system, and then we actually reduced their schedules, initially, when they started using the systems, to enable them to really learn how to use the system effectively.

After you do that, once you get 90 percent of the clinicians on board and using the system pretty effectively, then it's relatively easy to get the other 10 percent on board and to make—and to mandate the use of the system; otherwise, they don't work for Kaiser Permanente.

And one of the interesting things is that we did send a survey out after we implemented the system, and we said, "If we gave you the opportunity to go back to a paper record system, would you take that opportunity?" And over 90 percent of the clinicians said no, they would not, because they could see the advantages of the information system.

So I would say, Congressman Wu, that, initially, you do sort of need a stick and you need to coach people and you need to train them and you need to make it part of their job; but once they convert over to the electronic systems, the clinicians see the advantages of doing that, and they naturally continue to use it rather than fall back into paper. So that's the approach that we've taken.

And then, also, if you develop these systems intuitively and well enough, it can actually make their lives easier, because, number one, they have access to all the information to all of their patients, not only in their practices but from other people's practices. And physicians recognize the benefit of doing that. And then, secondly, if you make the system intuitive enough, you can actually build in things, automated things, that actually make it easier for them to practice medicine and easier for them to practice good medicine. And physicians will appreciate that as well. And so those are the different approaches we've taken.

Mr. WU. Your training was about 20 hours per clinician. Mr. Kenagy mentioned 14 hours at OHSU. So we're beginning to get a bracket, if these hours of training did work, and you also reduced clinical hours.

And, Mr. Kenagy, did you want to add something to this.

Mr. KENAGY. Yeah. Just one thing, before, sort of, I think one key element to our success, I think, was involving clinicians at every phase of the selection process. I think you need a tool—to be successful, you need a tool that will work for physicians and nurses. They need to be involved in selecting what that is. You

need to buy and implement a product that is good. And I would argue that our industry is only now emerging with three or four or five vendors that can actually meet the needs. And then have clinicians involved every step of the way.

So to answer your question about, you know, what has been successful—and I think the Pacific Northwest is remarkably successful in adopting EHRs. We sort of say, "We're very wired, and it's not just the coffee." I think that—but having—and I'm a non-clinician, and so having the clinicians engaged throughout that process has been absolutely critical to our success.

Mr. WU. Well, both of you talked about training the health care providers and training folks up on the system. I wanted to ask a follow-up about training in general, training both for the clinicians and the providers, but also of—I think someone referred to a shortage in personnel in health care IT—because you need to be proficient not just in IT but in health care; and if you're proficient in health care, you need to be proficient not only in health care but in IT.

Do you see a role here—there was a parallel situation, I believe, in data security, several years ago, and the Federal Government provided some sprinkling of funding to train IT professionals in security protocols and to develop an additional personnel in that. Is there a federal role here to work on that crossover between health care and IT.

Mr. KENAGY. I would say absolutely, first on just what we're facing in trying to find good professionals.

I think it's a good sign that the Pacific Northwest economy is recovering, that when we have positions—I mean, two years ago or three years ago when I had a vacancy, it was easy for us to have 100 or 150 people looking for that vacancy sort of just saying, "Well, I never really wanted to work in health care because it's such a backwater of technology, but it's a job." Now we're having the problem that people—we don't have that, we don't have that lecture anymore. I think people, good people, have jobs now.

At OHSU we do have a program where we are training health care IT professionals for the future. It's part of the pipeline development that, as the operational side of OHSU, I want to work with the academic side of OHSU to continue that. I think that is a problem. I think understanding the nuances of health care IT.

What can the Federal Government do? I think, as you mentioned, incentives. It's expensive to train computer professionals. I think recruiting them, retaining them, and understanding that health care is an unbelievable career for a health care—for an IT professional. I think that we just need to have more programs.

The American Medical Informatics Association has a program called "Ten by Ten" to train 10,000 clinicians by 2010. Again, OHSU is a part of that effort. I think that's great. We need a significant number of people in our industry, both to support it—the ongoing support and the like.

Dr. CHIN. You know, as part of my written comments, not my spoken comments, one of the things that I mentioned is the reason for our success was really the partnership of physicians, IT professionals, and project managers working closely together. Certainly, if you have somebody who's got medical knowledge and the IT

knowledge, that will go a long way to ensure the success of a project. And I think that's very important.

One of the problems with health care IT is, it is a very specific body of knowledge and it's not really acknowledged as such. Unlike medical care, where you have neurosurgeons that are board-certified, internists that are board-certified in internal medicine, within health care IT, it's difficult to know who's qualified and who's not qualified. And just like you wouldn't have neuro—an internist do neurosurgery, you shouldn't get somebody who's knowledgeable only in IT in a certain area, necessarily, involved and feel that they're going to be completely competent in health care IT; because there are a lot of issue in health care IT that are very specific to that field, that are not specific to other IT fields.

Mr. URALI. Again, kind of representing sort of the small clinician practices. I'd like to kind of narrate a recent story we heard from one of our customers.

We had a big storm about a month back, in the Seattle area. The DSL connection—basically, the Internet connection—failed for this physician, and she couldn't get the connection back up and running for almost four days. And she had to get the consultant to come in and spend almost like $150 an hour to get something as basic as an Internet connection back up again. That just goes to show how expensive it is to even get something basic as an Internet connection going.

One of the benchmarks should be that, you know, I can open my community college, you know, class schedule and see a ton of courses there that I can go take for a hundred dollars that, you know, I can gain the expertise over a two or three week period, maybe it's three evenings for a four-week period or like or something like that.

You know, health IT is not that difficult, you know, honestly. I mean, I come from a technology background—used to work for Microsoft for eight and a half years, did not have that much of a health care IT background up until about four or five years back. And, you know, we built two products within Microsoft within a literally short time to pick something up. It is possible to get that knowledge out there in a pretty common manner, and I do certainly believe that. And the more people we have trained that way, I think it's going to bring down the cost of that option. We cannot have $150 consultants coming in just to fix my Internet connection. Physicians cannot just afford that sort of expensive services. They've got to be able to have their own office staff trained, or maybe they should be able to hire people who they can pay $20 or $30 an hour and have them full time on staff and maybe help them run most of the technology infrastructure.

ROLE OF PATIENT IN HEALTH IT

Mr. REICHERT. Okay. Now we're back to recognizing the Chair. Thank you, Mr. Wu. And I have a couple of questions.

I've noticed, Dr. Pettit, in your testimony, you referred to—and this might be kind of a commonsense statement, but an answer would be a commonsense answer. What do you mean by "put the patient at the center"? I know what it means to me, but what does

that really mean, when we try to bring that into the whole health IT world?

Dr. PETTIT. I'm glad you—I'm glad you asked that.

Mr. REICHERT. We need somebody with some IT experience.

Dr. PETTIT. I really am very, very glad you asked that question, because it's something that's been—a definition that's been sort of elusive, and I think you will find different answers from different people.

Some say, "Well, we offer a portal to our information, and that's patient-centered." But I think the way that I'm defining "patient centered" is illustrated by this: A friend of mine just today said, you know, "Where is my medical record?" Where is my medical record? And then he realized, he goes, "Well, I don't have it." So he said, "Is it at this clinic and that clinic and that clinic."

And I said, "Yes. It's in fragments in different places." And so that's really sort of institution-centric, meaning the record exists there, and if you want it, you need to retrieve it, as opposed to having the patient be able to see it, in its entirety, either, you know, virtually or directly.

I mean, even as I start to explain this, it does get kind of confusing in a hurry, because there are technical ways to bring the information together even though it might exist in different places, and then there are other ways where you can put it all in a single database and then it's essentially right there.

Did I answer your question?

Mr. REICHERT. So is this part of your—because you followed up in your testimony with a comment about shared data ownership, so is that kind of what you're talking about when you talked about "patient centered" when you share the—that the patient has ownership of the shared data? Am I following you right?

Dr. PETTIT. Yes. Yes.

Mr. REICHERT. Okay.

Dr. PETTIT. What we don't want to do is just make what we're already doing just a little bit quicker, you know, because to get a record from one place to another, you know, we can mail it or we can fax it or we can e-mail it. But we need to rearrange things so that you don't have to go out and get it every time you need it, so that it's in a single nonredundant structure, you see.

Because when you seek health care, you have, generally, a history and physical. And in the emergency department, when you're admitted to the hospital, in the outpatient setting, there's a ton of redundancy in that. I mean, how many times are you asked, "Have you had any surgeries? Are you allergic to any medications?" You hear the same thing over and over. That should be documented one time, and one time only, in her life. If you had an appendectomy in 1972, document that once; and then it will save health care people unbelievable amounts of time in reasking all those questions.

PRIVACY ISSUES

Mr. REICHERT. Of course the follow-up question to that would be, and, again, to the entire panel: When you document that once and the record goes out to all these other entities, then there certainly is this concern about the whole HIPAA and privacy issue.

Do you feel that the technology that's out there today is a technology that does protect the privacy of patients?

Dr. PETTIT. I would say not adequately at this point. And there are other issues that the—the record is still so undifferentiated, if you—if I dictate a note on a patient, it might include issues about their depression and their prostate and their hypertension. It's just all in one thing and you can't really separate it out. But, you know, the ultimate goal in this patient-centered way is that the patient can control it, item by item. I mean, we're a long ways from this, believe me. But, you know, a person should really be able to say, "Don't share the results of that test with this person." Because your orthopedist may not need to see some embarrassing things you had, you know, across town.

UNIQUE PATIENT IDENTIFIER

Dr. CHIN. And the technology certainly exists to secure it and make it private, so the technology isn't an issue.

The technology is there. But the first step—building on what Dr. Pettit said, the first step is really being able to identify a person as the same person in another institution. And even that basic functionality does not exist. So I don't know whether the John Smith that I admitted at Providence is the same John Smith that was admitted at OHSU the day before. And that would really be the first step, is to say, "Okay.

I'm seeing somebody in my institution. What other institutions does this person have information about? And if I pull that information, is it the same person or is it a different person."

Some people have called this the unique patient identifier. And I would say it doesn't really have to be a unique patient identifier; you just need a mechanism to be able to clearly identify a person as the same person across institutions. Now, whether it's a unique patient identifier or some other functionality, it doesn't make any difference as long as you have that functionality to be able to identify that person. And that's the basic thing that we do not have.

Mr. REICHERT. A follow-up, then, with one other question. If I've heard correctly, Doctor, you've said that a unique patient identifier is a first step in this process.

Mr. Machuca, you talked about, in your statement, making incremental high yield steps. So would this be one of those incremental high yield steps?

Or anyone else on the panel, is there an incremental step that you see as a high yield, other than this patient identifier? I would see that as one. What would be some others?

Mr. MACHUCA. Well, along those lines, I think we tend to look at this through the prism of acute care, which is a 400-year-old model, and maybe we should start looking at this through the prism of chronic disease management and chronic care, which is an entirely different growth path in terms of consumption of resources and health care.

And through that model, identification and data—the incentives for the publication of data, whether they're coming from the patient or another provider, are based on the value associated with that activity, as opposed to some financial or regulatory incentive I have to post or publish my data to some unified place. In other words,

if you look at this through the point of view of—through the prism of acute care, you now have to solve also the problem of you created a burden, yet another burden, on an already overburdened health care system and a clinician, to not only take the data down for their own benefit but to publish it to—I don't know how many entities, but let's just assume there's one that collects all of that. And so you at least have to solve that incentive.

And I'm much more at looking into this problem from the—if you look at it just as an example from the prism of chronic disease management, where the data that you're going to enter into the system of managing that has a very immediate and relevant step on how you get to compliance, whether it be in your blood pressure or whether it be in cholesterol or whatever it be in, whatever the parameters are.

I think the other issues, the notion that I have to have all the data at my fingertips, all the time, for any possible reason, is a notion that, in my experience so far, I have found as many clinicians rejecting as too much information is worse than not enough information. And so I would be very careful of trying to wrap everything around a unified patient identifier. I think the efforts that are being taken to that are adequate and should move forward, but I would much more focus on the value associated—what is the data that needs to be there and what's the value associated with that data.

Mr. REICHERT. Sounds like that was Dr. Pettit's point a little bit earlier.

Are there other steps that—incremental steps that are high yield steps? Anyone?

Dr. PETTIT. I will just say one thing about patient identification. I think that is definitely one of the first steps. There are a couple of ways to accomplish it and it doesn't have to be done through the use of a unique personal identifier, in the fact that I know that's been politically a very difficult discussion for a long time.

Mr. REICHERT. Yes.

Dr. PETTIT. I think there was unique patient identifiers options done like in 1997 and it was shut down practically in the afternoon after it was presented. But there are technical ways to accomplish the same thing.

There's a lot of discussion about record locator services and matching algorithms and all that sort of thing. So the good news is that even in the past year, going to HIMSS, seeing real progress in the technology to do these sort of things, and things that were more of a theory a year ago are now becoming at least sort of real in the exhibition booth. But it's a step. I think someone here described it as a concept car: You can see them but you can't drive them yet.

Mr. REICHERT. Yeah.

Dr. PETTIT. But they're on their way.

Mr. REICHERT. Good. Thank you.

Dr. CHIN. You know, the next incremental step would be to simply take information, medical information, on a patient and label each piece of information as to the date the information was generated and the type of information. So if it was a medication, label it as a medication; if it was a radiology test, label it as a radiology

test. And that way, when you download information from one institution to another, and you say, "Well, I want to take a look at all the radiology tests somebody had," you could then filter that information and look at all the radiology tests in reverse chronological order. That would be relatively easy to do in terms of developing a standard for that and yet produce enormous benefits. So I would say, next to being able to identify the patient as the same patient across institutions, that would be the next step, is to label each piece of information as to date and the type of information.

Mr. REICHERT. Mr. Kenagy had a comment.

Mr. KENAGY. Just a couple things. One, I think, I can't exchange anything electronically if I don't have it electronically in the first place. And I think the earlier point that only 10 percent of hospitals and 5 percent of physicians' offices have anything electronic in the first place is a much more significant barrier to exchange.

When we—This panel represents very different views.

We do not share the same idea that either a very large national database of all patient information is either a good or a wise objective or technologically feasible. I don't know if I think—actually, I do know that I don't think an electronic—a unique patient identifier would be the first step. I do think we need incremental ways to get information out of our systems. That is a significant—even if it were just a PDF, the ability to extract what is either in paper or electronically, at first, would be important. Right now, it's an extremely manual process. Some technology would help that.

Mr. WU. Would the Chairman yield to me for a moment.

Mr. REICHERT. Yes, Mr. Wu.

Mr. WU. I wanted to go back to the subject of a patient identifier.

Are we overthinking this a little bit? I mean, you know, if you get the patient in the loop, you know, there may be 50 David Wus in the United States but I can look through that—I mean, if you say, you know, "Is this you?" If you have a conscious patient, you know, "Well, I never had a hospital visit in Des Moines." I mean, a lot of this can be simplified, can't it? I mean, am I missing something here?

Dr. PETTIT. Well, when you look at Denmark, they've had a universal patient identifier since 1963.

Mr. WU. Yeah, but they're Danish.

Dr. PETTIT. I know. That's the issue. You know, that's—yeah, and we're not. Yeah.

Mr. KENAGY. Your earlier point—your earlier point, Jody, about putting the patient at the center, I think, is the key of what you're talking about. And I think in Oregon where we are very individualistic, and the like, if we look at the patient—Intel is very interested in the digital—the personal digital health record. If there was a way that I could identify that this is, "I am John Kenagy, I give you access to this information," and I collate it, I'm the arbiter, whether that's the same, I think, is potentially a better way to approach it than thinking of a large national repository.

Mr. URALI. If I can question that a little bit further from my viewpoint.

There could be 50 David Wu's, but once you start looking at the date of birth and the gender and maybe some other types of information such as your current address, you can actually narrow it

down to potentially even just one person. And there are certain other identifying information that are already available like, for instance, the state in which your driver's license was issued and the driver's license number is pretty unique. And then, again, maybe social security number is another additional piece of information that can help hone in on that.

One of the things we have done is we have, you know, looked at those types of information and we've also tried to make it much more automated. In other words, if there are five institutions that want to start automatically sharing information based on those criteria that I mentioned, where we can uniquely identify David Wu's data residing in three of those 15 institutions and automatically share the data.

So that's the sort of technology that's already available. And then so, you know, now we are looking at how, you know, what are the adoption barriers and just going through the process of implementing it in the Seattle area.

Mr. REICHERT. Mr. Wu.

QUESTIONS FROM THE AUDIENCE

Mr. WU. I just wanted to follow up on the earlier discussion about adoption of technology and the personnel that it takes. I want to recognize Dr. Bill Hirsch there who's training a lot of folks. And as we talk about adaptation and flexibility, I have to note that instead of having our table adapt to our people, we've had our people adapt to the table that we have available.

And the other thing that's happened here—and, Mr. Chairman, I don't know if there's anything that we can do at this point, although we do have multiple microphones and I'd be willing to, you know, flip one of ours out into the audience. We have a lot of experts in the audience; and instead of adapting this the Northwest, we've done the classic Washington thing where there's a panel of members of the House of Representatives asking an expert panel to testify, rather than having a more interactive process. And most of you all know more than Mr. Reichert or I do about this field. You're also learning something by looking at our learning curve right here. And while that might be an interesting experience for you, if there is some way that we can quickly work out a way of sharing microphones, I think that it would be very valuable to get all of you all participating in this.

And while we're spreading that out, I just wanted to comment that in two other adoption arenas, banks and schools, they both had this experience initially of having a box on a desk. Initially, when banks computerized, they shoved a box in front of employees, and they probably didn't spend enough on training, and they didn't integrate it into their core operations.

When schools first, quote, unquote, computerized, again, a box on the desk. And the curriculum was not integrated around the computer—or, actually, the computer system wasn't integrated into the curriculum. And over time, banks have changed, schools are changing, and I think that what many of you all have addressed is the challenge of having the health care system and this technology integrate with each other. And that is a great challenge of every transition.

Are there folks who—I think the microphone is back there; we'll bring it up here momentarily.

UNIDENTIFIED SPEAKER. Chairman Reichert, Congressman Wu, and panelists——

The COURT REPORTER. Excuse me. Excuse me, sir. Would you mind coming down here and stating your name?

Mr. REICHERT. We want to make sure you're on TV.

UNIDENTIFIED SPEAKER. I don't go for that.

Chairman Reichert, Congressman Wu, and panelists, I thank you for your presentation——

The COURT REPORTER. Would you please state your name?

Mr. BOUCHARD. My name is Mike Bouchard, a former IT wonk, as it were, and also a patient consumer of health services.

I think the gentleman here who mentioned about the recent loss of data—it's an old media that was actually lost, with poor security applied. Trust is an issue for patients. I didn't see anyone here advocating patient rights. I think that is very important. The patient is actually the grass roots person being involved here, other than the health care providers.

Secondly, OnStar. You push a button, someone contacts you, they have all your data, it's kind of a centralized database. With Katrina, we had loss of a lot of information. There's no hardened infrastructure if something happens, like the person who lost their DSL contact, how to back it up. We have wireless technologies. We have jump drives. We have many new cards with data chips embedded in them. Biometrics is a big thing.

You mentioned the 50 David Wu's. Now, with biometrics, encryption, and other such stuff, other than addresses and social security numbers—which I lost recently, with Providence, thank you—it is not always secure. Data security is probably going to be the biggest thing that will also get the patient involved.

Now you have baby boomers—I'm a late stage, not an early stage, baby boomer—generations X, Y, Z, and Aa, Bb, you know, they'll be coming down the road. You have to have ease of operation scalability, vertical as well as lateral use. That's going to be very important. Because my seven year old son is going to be able to out-Blackberry me and yet I can outdo how to turn on a computer and double-click, right-click with computers better than my grandparents were. So that has to be scalable also, ease of use.

And, lastly, one of the barriers I'm finding is, there is lack of budgeting. I have contacted many health care operations. I do e-waste and computer destruction. One of the things that we focus on is how to get rid of the data in a manner that does not pollute our environment or in whole drive form being sent to foreign countries, dumped in their landfills, or accidentally falling into the ocean. If one hard drive has 365,000 records—and I think it was a tape or a drive or something of that nature—any enemy can garner that information through data mining and computer forensics. Big business right now. So I would not want OHSU's information to be garnered and then used against me.

And, also, with the NSA issues—you have other acronyms, CIA, FBI, et cetera, et cetera—how is that information going to be protected from privacy issues, as well? You guys have opened up a panoply of—a veritable cornucopia of subjects that, as an entre-

preneur, I'm seeing many opportunities that they use as—that also has to be opened. How can the small business entrepreneur get involved in this, become a part of the process, as well as capitalize on it to actually generate new incomes, make new jobs, and actually reap some of the rewards. Thank you.

Mr. REICHERT. Thank you. And back to the kind of the Washington, D.C., format—the Chairman thanks the gentleman for his statement.

Anyone want to ask a question, we would ask that maybe you limit yourself to a question, two minutes, so that we can have a number of people ask questions.

Yes.

Ms. SCHOENE. Sir, go ahead and come down. I'll meet you right down here. And, again, please state your name for the record.

Mr. LEAHY. My name is Mike Leahy. I'm with a group called the Oregon Community Health Information Network. And we do have a common community health record that we're building, so I was hopeful that maybe some of our friends, like my board member, Dr. Chin, or my buddy, Luis Machuca, or Jody, or John, could comment on this, because I think there are some specific things we could be doing.

And then just the general statement, in Oregon we have about 3.6 million people, and while I appreciate all the private initiative type stuff, the reality is we have about a million people that are either Medicaid or uninsured. And so, eventually, we have to talk about kinds of patients and what—who's covered and who isn't.

And then regarding the reluctance of the governmental leadership, I would only say that there's another 800,000 people who are either Medicare or who get their, quote, commercial insurance paid for by local, State, and Federal governments. That's about half of the folks in this state you're currently talking about, already depend in some way with leadership or the lack of leadership in terms of coherent federal, State, and local policies.

So I guess my question to, maybe, your experts is if you could comment about efforts like what we're trying to do with common community health record, where we already have 15 Oregon organizations. Most of them are small organizations in rural clinics in this area. And if you could maybe comment about some of the ways that the representatives could help us build the common community health record. Thank you.

Mr. REICHERT. Thank you.

Dr. CHIN. Certainly, organizations like OCHIN provide a great opportunity, because OCHIN provides services for the medically indigent, for the medically underserved. And the interesting thing about OCHIN is that institutions that treat members that are medically indigent actually lose money on those patients, and so there's an incentive—there's a built-in incentive for them to actually share that information.

If they see a patient that comes in, for whom they are not going to be able to bill and get any revenue, the incentive for them is to review all the other information and review all the other medical records that the patient has, so that if the patient needs a radiology test and they've had one at another institution, they don't have to repeat that test and therefore lose money. And so that's

one of the big promises, I think, in terms of incentives, is in organizations like OCHIN that serve the medically indigent.

The way the Federal Government could promote that is really to support organizations like OCHIN, that are providing services to the medically underserved. And it's a win-win situation, because, in the end, it will cost the government less money to do so.

Dr. PETTIT. Just a brief follow-on comment. But as a clinician, I can say pretty unequivocally that the patients that OCHIN serves, the people that are on and off insurance, that suffer the most from discontinuity and those handoff misses/errors occur routinely; because when people don't have insurance, they often don't seek medical care. They don't get primary care. They might get care, intermittently, through an emergency department; and we all know that's not a good way to care for patients.

Mr. MACHUCA. If I could expand, I think, on the earlier point. I think it's problematic to think of patients as a single persona in only one context. And I think that's where we get our head wrapped around the asphalt on this issue.

I may be a member of Dr. Chin's practice, I'm also an employee. My employer may want to have a community of its employees who have diabetes participate in a diabetes compliance improvement. So in that context, I'm a different person than the person I may be at Kaiser. I'm going to present myself as a patient to multiple places.

And to follow up Mr. Leahy's question, who's doing an admirable job with a set of that community: Those folks are going to be moving in and out of that community, and at times they're going to be employees of somebody else who may have a program to help them move along. And so our emphasis and the incremental approach of the collaboration in making sure the information gets to establish at least some level of secure electronic continuity—maybe not in a record, but the ability to know, at a context level, who are all those people that—who is the network of this patient and who's involved in the care of this person, and you have access to those people and those resources. I think it's a much more real-life approach than sort of say, "Take everything else out of your desktop and just leave Google. And just put your name in, and out comes everything else." And so I think we need all the tools in our desktop, not just Google.

Mr. REICHERT. Thank you.

TOP-DOWN OR BOTTOM-UP APPROACH

Mr. WU. Mr. Chairman, if I may, I wanted to shift to one topic that I think we may be at a fork in the road, and it's pretty important that we get some discussion on this topic so that we guide the Federal Government down what I hope many of us believe to be a proper choice at that fork in the road.

Many of you mentioned the temptation to develop an overarching or perfect IT solution, and we might have difficulty implementing that because it assumes too much technology or too much training or too much overhead. And I just wanted to throw open to you all the discussion of, is this the direction that you see HHS headed in? Are they looking at a perhaps overarching solution that will someday look like Esperanto in the rear-view mirror? Or is the effort, you know, sensitive to the bottom-up approach which Mr. Machuca

is advocating, an incrementalism and adaptive approach? And I would like the panel to address that, and I would also invite Dr. Jeffrey to address what NIST has been doing since signing the memorandum of understanding with ONC in September of 2005.

Mr. MACHUCA. Thank you. To be candid, there are mixed signals coming from HHS. If you analyze them on a trend basis, Dr. Brailer and the office seem to be much more embracing of the incremental approach of late. But if you also look at the work of the four contracts that were awarded for the large national infrastructure, if you look deeper into that, as to the output that is expected and the consultants that have been engaged, it is troubling in that effect, because it looks like more of the same will get the big consultant-driven needs, so we can spec out something that costs a lot more and has an unlimited thirst of funding before it can be seen.

And so, to be quick to your question, is that there are mixed encouraging signals in this direction.

Dr. CHIN. You know, I would definitely support an incremental approach, because our experience is that an overarching approach that solves every problem is, for the most part, not successful. And if you map out the key things that are needed, and I think members of this panel had discussed this, one of the key things is to make that information accessible electronically. If you don't have it accessible electronically, it's very difficult to move it.

The second thing is that you have to identify a particular person in one organization as the same person in another organization. And however you do that would be fine; it doesn't necessarily have to be a single patient identifier. You could use other pieces of information.

And then the third thing that would be useful, that would be relatively low tech and easy to do, is to label each piece of information with the date in which it was generated and the type of information it was. Once you have those three standards, then you can pull information together and integrate it into a single medical record, and that's all you really need. All the other stuff is good to have, but there's a cost associated with implementing those standards. So those are the three things that I would emphasize.

Mr. KENAGY. Maybe a different perspective on this. At the ground, grass-roots level, I don't have time to pay attention to what HHS does.

When you asked—one of the questions that was asked in this testimony is: Has NIST or HHS contacted us at OHSU to get engaged? And the answer is no. And the first thing I was going to say was, "Well, it doesn't really matter, because it will be so long before it has any impact on me, positively or negatively." But I think that it's a great—it was a very thought provoking question. I think all of us reflected on all the questions that you asked for the testimony. But I'm not—there are many people who are directly engaged.

I'm not a commercial, off-the-shelf deployer of technology, so I look to my vendor to have the standards or whatever. And the inter-operability that they're working on, I don't know if it's going to have a positive impact or not.

I don't know if it's well directed or not. I just know that day in and day out, we have serious concerns.

I do want to make one positive comment about the point that Mike Leahy made. One of the things that they have addressed sort of in trying to get all these systems together is not doing that through inter-operability but actually one single database. And we are working on integrating that large database with ours, but a lot of the efforts around inter-operability, I don't know if they're correctly addressed. I think there would be a lot more input from providers to see if HHS is moving in the right direction.

Dr. PETTIT. Do you have time for one more comment.

Mr. REICHERT. Yes. Go ahead.

Dr. PETTIT. I think I've been criticized as being an idealist at times, but when you think about how you spend your energy and what you're working towards, you want to make sure you're working towards something that is really going to change the way we do things. And to avoid all this redundancy, I still believe you have to work towards a unified—and that doesn't mean a single, but a unified collection of information about a single person, that is accessible and controllable by them.

I think an analogy in this case might help. Because our world is changing and we—let's say, for example, you go to a class reunion and you take pictures with your digital camera. And now you've got a picture of each of your 150 classmates and you have given them your e-mail address. And you go back home and you get e-mails from all of your friends, saying, "Hey, could you send me that picture that you took?" Instead, how about if I have—we have sort of a shared workspace. You've probably dealt with some of those shares—Ofoto, Shutterfly, Snapfish—all of these different services, where you can post your photos and then you're out of the loop and they can get what they want when they want, and you don't have to respond all the time.

So I think shared workspace is kind of analogous to a shared chart. I mean, right now in this hospital, we use a shared chart. If you're—every inpatient here has a single chart, and if you want to know what the pulmonologist thinks or the cardiologist thinks or the home health person thinks, you read the chart, because it's—you have this singular sort of point of contact. And so we don't have that in the outpatient setting.

I think that there's absolutely a place for the work that both of these gentleman do. I mean, there's always going to be a need for encryption and sending information in a safe, unidentifiable way. And some of the—some of the models that are being promoted, the (unintelligible) models, include that sort of point-to-point contact—I think the Markel model, for example.

Anyway, I could—I'm sort of going off. But I just want to say I think there's room for all of us in this workspace. I mean, there's so much to be done and there's room for all of our work.

Mr. REICHERT. Thank you. Dr. Jeffrey was going to respond to this question, and Mr. Wu has another follow-up question or two, and then we'll conclude.

Dr. JEFFREY. A quick answer to the first part of the question, which is, basically, "is better the enemy of good enough," on that.

One of the purposes of Secretary Leavitt's setting up the American Health Information Community, which was actually to get the representatives from the community, including not—it's not just

government, but private sector at all phases of the health care industry, in there to help set the priorities, to help identify some of these issues. And so I think that's a very important mechanism by which people in this room and others can interface and make sure that we're getting a good enough solution and not waiting for perfection. So I applaud Health and Human Services for that.

In terms of what is NIST doing specifically, since the September '05, so now just about six months into the memorandum of the agreement. We're working on several specific issues that have been identified as potential impediments. And one of them has been mentioned already, that physicians can't electronically share information, and it's both internally and externally across that. And so that's where all of the usual things that NIST does—the standards, the conformance, harmonization between different standard setting organizations—so that you don't have to worry about which one your vendor picked, so that all the vendors will work together. Those are important areas that we're working on, and that's something that's sort of our bread and butter.

The second is something that we haven't yet mentioned yet today, which is the issue on medical terminologies. There are inconsistencies and ambiguities in the way that some of the medical terminologies are recorded, and that's actually a very hard problem in getting that consistency. So it's, essentially, not just a thesaurus and a dictionary equivalent, but it's functionally getting the equivalent.

And you don't want all of the—again, in terms of training, you don't want every clinician to have to be forced to a very specific set of terms. And so one of the things that we're working on is a program to automatically identify ambiguities, cross-correlations, and the like, that would eventually be able to band into that. And, obviously, we talked a lot about securing privacy. And we're supporting Dr. Brailer in a lot of the programs that he's put together and the contractors that he's put forward to ensure that a lot of the security and privacy features are being incorporated in the validation of those.

Mr. REICHERT. Mr. Wu.

HIPAA

Mr. WU. Thank you very much, Dr. Jeffrey.

I just wanted to assure our previous commentator that the issues of privacy and security are not at all ignored by those of us in Congress, or I doubt that they are ignored by anyone on this panel.

I did want to follow up on that, because—besides the incident that we all know about here in the Portland Metro Area about loss of records, Consumer Reports this month also ran an article on some of the hazards of electronic health records. And Consumer Reports was actually quite critical of HIPAA for being inadequately protective of patient records, primarily because of the potential for sending health care information to health care affiliates.

You all have talked about changing the Stark Law, doing a couple of other things. I'd be very interested in your views on the concerns about HIPAA, any potential loopholes.

My understanding is that HIPAA is actually much less protective of American patients than, say, European law is, European privacy.

At least that's been the assertion. I'd be interested in your comments about consumer and patient protection and privacy.

Mr. MACHUCA. Well, I would start by—make sure everybody understands that paper is not the stalwart of security and everybody let's just stay on paper because it's secure, kidding themselves every time something goes in a fax machine.

Mr. WU. Well, the thing is that it's inconvenient to look in all those files.

Mr. MACHUCA. Right.

Mr. WU. And the inconvenience is—it's like inefficiency in the Federal Government, it guarantees our liberties.

Mr. MACHUCA. And that's true as long as the paper stays in the chart.

Mr. WU. That's right.

Mr. MACHUCA. But the moment it gets in a fax machine, you have no idea what's at the other end.

Mr. WU. That's right.

Mr. MACHUCA. And that—And let me say also for the record, and I don't have a precise number of this, but we have, in a little bit over three years, tens of thousands of clinicians sending secure electronic e-mail—which, actually, Providence doesn't get enough credit for this.

They were the first provider to provide secure, encrypted e-mail, in the Greater Northwest, which is now followed by everybody, and I echo your point.

But in millions and millions of e-mails—and we don't have a precise count—we have yet to have a single incidence of any kind of a problem along those lines. So we take this issue very, very seriously, but we reject the notion that people should be afraid and use privacy and security as the reason to not implement technology. That—I think it's going away, but it has been resonant in the early days. And so I think the technology is absolutely there to ensure, far beyond paper and far beyond anything we have, with very low cost means, absolute privacy and security, provided, of course, that there's the will in the organization to implement it.

I'll say one more thing on this topic. Sometimes we trip over the pedestrian to look at the big thing with the shiny lights. I got the call from your staff about testifying, and we had our meeting. And immediately, within hours, I had two e-mails from your staff, one with a full charter of the hearing and another one with an attached Power Point of the work between NIST, ONC, and the other organizations. I had that on my desktop. I took off, I started preparing. I left for San Diego. I came back on Thursday of last week. On my regular mail was the letter inviting me to the hearing, with the charter—no presentation on what NIST is doing.

So had I gone to—had I lived in that system, where I reject the use of e-mail for business productive use, I would have prepared—I would start preparing for this hearing on Friday of this week, probably ruined my weekend, and it would have been an entirely different situation, than the context and the information being readily available.

And when you asked—I think you asked a very, very profound question. I don't think we've really given you a sharp, crisp answer. If you wanted to hang on to one thing that could modernize the

system tomorrow and make a quantum leap—not solve all the problems that we have, but do the quantum leap—look at the physician use of e-mail in the routine part of their practice. And that, in and of itself, as every other industry would suggest, and as your own, I would bet, experience in your daily work flow would suggest, could move that step forward. That first little baby step would give you a tremendous amount of benefit. So I would leave that as my comment on that.

Dr. CHIN. I would just say that it's a very, very complex area. You know, Kaiser Permanente does take privacy very seriously and we do monitor access to the medical record, and we've had to let people go in some cases because of breaches of privacy. So we do take it very seriously.

But it is a very complex question, and I think the only solution to this would be to give individuals control over their medical information and somehow say, "Okay. You can see this, you can't see this; you can see this, you can't see this." And one of the reasons why there is this issue with privacy in the United States is precisely because of payment mechanisms: In order for payers to pay, they need to know what they're paying for; and because of that, there are issues where payers can see information that otherwise would be private in other organizations. And that's one of the key reasons why there is this issue with HIPAA and the lack of security around HIPAA.

Dr. PETTIT. You bring up a very good point about—and someone had mentioned to me last week at HIMSS about how people are compelled to share their information, whether they really want to or not; because if they don't, they don't get services. And it's like we all have done on the Internet, where you sign that EULA, the end-user's licensing agreement, that you don't want to sign because you can't read it, but you scroll through it and you hit "agree," even though you have no idea what you just signed. And there are some analogies to that in health care. Because you come into the emergency department and you sign because you want service or—and if you want a health plan to cover you, you sign what you need to sign. But I really do believe that the American public has no idea how many people see their information; and I think when they do find out, that there's going to be some change.

Mr. REICHERT. Now they all know.

Mr. URALI. I tend to take privacy and security very seriously. In fact, we came up with a tag line, "Trust is Earned," to indicate that we take it very seriously, and through our actions we will show that we will honor the trust of the public in how we approach it.

It fundamentally boils down to a central principle we have, which is the part of the network that we make it available is only accessible to the clinicians; and so right there, we are restricting access to information, even in the community setting. And then we give hundred percent opt-out capability for any patient that has not consented. So I can say I don't want to be part of the network, and hence none of my data will be electronically shared.

The problem with having patients decide which piece of information that they want to share or which piece they don't want to share is that they can make very serious mistakes. None of us are experts at health care. We've talked to literally hundreds of doc-

tors, and they say a certain psychiatric condition may be important even for treating the foot. And it's not something that I can personally understand, but we've had those types of conversations. So having nonsophisticated patients making decisions as to which medication information they will share, or which problem they will share, and who's the physician—that is going to build a very complicated system.

I think we're all looking for simple systems that work. If you think about your banking system, the ATM card, you know, how simpler could it get? I just get a card, I can go into a machine, put it in, I put a four-digit PIN code and I can get my money out. That is a simple system. That system works. Of course we can't use the banking standards for health care data. We have to come up with a lot more security and privacy solutions; but at the same time, we can make it so difficult that the system doesn't actually work.

Mr. REICHERT. Go ahead.

Mr. URALI. So in our model, the first step we took is restrict data access to only clinicians. We saw some survey that said more than 95 percent of patients trust their primary care provider and their doctors, you know, to do the right things in terms of protecting their privacy.

Mr. REICHERT. The Chair will recognize Mr. Wu for the final question.

Mr. WU. Mr. Chairman, I think that, given the tremendous forbearance and attention of both—well, all of our guests and panelists here, I'm going to forego this last question, because there are—there's never a last question; there's just so many more to ask.

I'll just take a moment to thank—Mr. Reichert, you, and I always get the honor of being the talking face and being in front of the microphone; but there are many, many people who work very hard to make these things happen, and work behind the scenes.

And first and foremost, I want to thank Marshall Jeffrey from our office, who has taken the lead in organizing this field hearing today.

From the Science Committee staff, the majority side, Jamie Brown has really done heroic work. And supervising Jamie's work is Olwen Huxley. On the minority staff, Mike Quear. Thank you, all, for making the long trip from Washington, D.C. and our Science Committee.

Staffers Stella Ma, who has also worked very, very hard on this, along with Dan Whelan and John Wykoff of our district staff. And I'd also like to recognize Kevin from the NIST congressional liaison office, who was so helpful with information about Dr. Jeffrey. Ralph Hall's Legislative Director who has joined us from Texas and Washington, D.C., and Chairman—Mr. Chairman, I believe that your district director is also here today.

Mr. REICHERT. My deputy district director, Sue Foy.

Mr. WU. And I want to thank you all for attending. And I thank the staff for their very, very hard work to bring this together. As we all know, for every person who's in front of the microphones, there are probably five or ten people who are behind the microphones or behind the camera, making the system work.

And with that, Mr. Chairman, I yield back to you for a closing.

Mr. REICHERT. Thank you, Mr. Wu.

Well, it's been a pleasure being here this afternoon. We have a little bit of a drive back now to Seattle, and I'm also on the Transportation Committee, and so we'll have a chance to have firsthand experience with the commute between Portland and Seattle, which I've experienced in the past. Today will be special.

I just, too, want to echo the words shared by Mr. Wu.

All of you in the audience, thank you so much for everything that you do. And the panelists, thank you for being here. I know it's not just appearing for two or two and a half hours, responding to questions and giving testimony, but there is preparation time. And, fortunately, you were fully informed with the e-mail service and better able to prepare.

One of the things that I think that a forum like this provides, certainly for those of us who can't—some who can't travel back and forth to Washington, D.C., and attend a forum like this, you kind of get a flavor for what it's like back in D.C. and how business is sort of conducted. It can be a little bit awkward and formal, I'm discovering. But it also, I think, more importantly, provides an opportunity for all of us to visit, person to person, to have a discussion, to interact with each other on a personal level and to hear from people who are involved every day in trying to solve our health care IT problems.

And so, you know, when you talk about e-mail and you talk about IT and you talk about the changing world that we're living in, you know, a year ago, I used to reach and I would have my badge. Now I have a—this is, yeah, I'm stuck with this Blackberry, but——

Mr. WU. It will respond to all functions.

Mr. REICHERT. Right. I think it has a "beam me up" button on it.

Mr. WU. Right.

Mr. REICHERT. The point I want to make here is that—and Dr. Pettit, you know, I appreciate your comments on the personal issue. Because doctors can look at a record, you can read the record—and I was wondering, and somebody did mention, I think—Doctor, I think you mentioned the inconsistency of recording data and information. And so as you read data and information, as you read e-mails and you don't know what you're signing and the data is inconsistent, there is this importance for us to interact as human beings; we can never let that go. And so I just want to leave us with that thought. We all have that access to e-mails and technology; but, please, never hesitate to pick up the telephone or walk down the hallway and knock on someone's door and have a little visit with someone.

So there's a closing statement I need to read. Before we bring the hearing to a close, again I want to thank everyone for being here. This has been highly educational, and our witnesses have given this committee a lot to consider about the potential role of information technology in the health care industry.

And if there is no objection, the record will remain open for additional statements from other Members and for answers to any follow-up questions the Committee may ask of the witnesses.

Without objection, so ordered. The hearing is now adjourned. Thank you.

[Whereupon, at 2:32 p.m., the Subcommittee was adjourned.]

Appendix:

Additional Material for the Record

United States Government Accountability Office

GAO

Report to the Chairman, Committee on the Budget, House of Representatives

May 2005

HEALTH INFORMATION TECHNOLOGY

HHS Is Taking Steps to Develop a National Strategy

GAO-05-628

GAO Accountability•Integrity•Reliability

Highlights

Highlights of GAO-05-628, a report to the Chairman, Committee on the Budget, House of Representatives

May 2005

HEALTH INFORMATION TECHNOLOGY

HHS Is Taking Steps to Develop a National Strategy

Why GAO Did This Study

To prevent medical errors, reduce costs, improve quality, and produce greater value for health care expenditures, President Bush has called for the Department of Health and Human Services (HHS) to develop and implement a strategic plan to guide the nationwide implementation of health information technology (IT) in both the public and private health care sectors. The Departments of Defense (DOD) and Veterans Affairs (VA), along with other countries, have already taken steps to improve health care delivery and administration by implementing IT solutions. GAO was asked to provide an overview of HHS's recent efforts to develop a national health IT strategy for realizing the President's vision, and to identify lessons learned from DOD's, VA's, and other countries' experiences in implementing health IT.

What GAO Recommends

To accelerate the adoption of interoperable IT for health care, GAO recommends that the Secretary of Health and Human Services establish and follow detailed plans and set milestones for each phase of HHS's framework for strategic action.

In commenting on a draft of this report, DOD, HHS, and VA concurred with our results; HHS agreed with our recommendation. Technical comments were incorporated in this report as appropriate.

www.gao.gov/cgi-bin/getrpt?GAO-05-628.

To view the full product, including the scope and methodology, click on the link above. For more information, contact David A. Powner, (202) 512-9286, pownerd@gao.gov.

What GAO Found

The Secretary of HHS appointed the National Coordinator for Health IT in May 2004. In July 2004, the national coordinator released a framework for strategic action, which outlines four goals and 12 strategies to guide the development of a full strategic plan for national health IT adoption (see table below). The framework builds upon already-existing work in federal health IT and includes plans to identify and learn from agencies' experiences. It also describes actions to be taken by both the public and private sectors to achieve interoperability in health IT across the nation.

HHS plans to address the goals and strategies of the framework with a three-phased approach over a number of years and is currently implementing phase I of the framework. However, HHS has not established milestones for the completion of phase I activities nor has it made detailed plans or set milestones for the completion of activities for phases II and III.

Goals and Strategies of HHS's Framework for Strategic Action

Goals	Strategies[a]
Goal 1: Inform clinical practice with the use of electronic health records (EHR)	1. Incentivize EHR adoption **2. Reduce risk of EHR investment** 3. Promote EHR diffusion in rural and underserved areas
Goal 2: Interconnect clinicians so that they can exchange health information using advanced and secure electronic communication	**1. Foster regional collaboration** **2. Develop a national health information network** **3. Coordinate federal health information systems**
Goal 3: Personalize care with consumer-based health records and better information for consumers	**1. Encourage use of personal health records** 2. Enhance informed consumer choice 3. Promote use of telehealth systems
Goal 4: Improve public health through advanced biosurveillance methods and streamlined collection of data for quality measurement and research	1. Unify public health surveillance architectures 2. Streamline quality and health status monitoring 3. Accelerate research and dissemination of evidence

Source: HHS.
[a] Phase I strategies are shown in bold type.

GAO identified lessons learned from DOD and VA that could provide valuable insight to HHS as it works toward implementing a national health IT infrastructure. DOD and VA operate the largest health care delivery networks in the nation, and important lessons can be taken from their experiences in health IT. Additionally, other countries have begun initiatives to establish national health IT infrastructures. DOD, VA, Canada, Denmark, and New Zealand provided GAO with valuable lessons learned that can be applied to the United States's efforts. Among other lessons learned, they reported the need to

- obtain the endorsement of top leadership,
- define and adopt standards,
- address the needs of stakeholders, and
- deploy IT solutions in small increments and build on successes.

Contents

Abbreviations

AHRQ	Agency for Health Research and Quality
CDC	Centers for Disease Control and Prevention
CHI	Consolidated Health Informatics
CMS	Centers for Medicare and Medicaid Services
DOD	Department of Defense
EHR	electronic health records
FDA	Food and Drug Administration
FHA	Federal Health Architecture
HHS	Department of Health and Human Services
HRSA	Health Resources and Services Administration
IHS	Indian Health Service
IT	information technology
NCVHS	National Committee on Vital and Health Statistics
NHIN	National Health Information Network
NIH	National Institutes of Health
ONCHIT	Office of the National Coordinator for Health IT
VA	Department of Veterans Affairs

United States Government Accountability Office
Washington, D.C. 20548

May 27, 2005

The Honorable Jim Nussle
Chairman, Committee on the Budget
House of Representatives

Dear Mr. Chairman:

According to the Institute of Medicine, health care delivery in the United States has long-standing problems with medical errors and inefficiencies that increase health care costs. The U.S. health care delivery system is an information-intensive industry that is complex and highly fragmented with estimated spending of $1.7 trillion in 2003. In April 2004, President Bush announced a health information technology (IT) plan that calls for the development and implementation of a strategic plan to guide the nationwide implementation of health IT in both the public and private health care sectors to prevent medical errors, improve quality, and produce greater value for health care expenditures.

Also in April 2004, the President issued an executive order that required the Secretary of Health and Human Services to appoint a national coordinator whose role is to provide leadership for the development and nationwide implementation of an interoperable health IT infrastructure to improve the quality and efficiency of health care. The National Coordinator for Health IT was appointed in May 2004; in July 2004, the coordinator released a framework for strategic action, the first step toward a national strategy. The framework builds upon already-existing work in federal health IT and includes plans to identify and learn from agencies' experiences, including those of the Departments of Defense (DOD) and Veterans Affairs (VA), which operate the largest health care delivery networks in the nation and have experience with developing and implementing IT solutions throughout their systems. Additionally, other countries have begun to develop and implement strategies to improve health care delivery through the nationwide adoption of IT and can provide valuable lessons for the Department of Health and Human Services (HHS).

You asked us to (1) provide an overview of HHS's efforts to develop and implement a national health IT strategy, (2) identify lessons learned from DOD's and VA's experiences with implementing electronic health records, and (3) identify lessons learned from other countries' efforts to modernize health IT infrastructures. We conducted work at HHS, DOD, and VA—the federal agencies that play major roles in supporting and providing health

care delivery in the United States and that are promoting the use of health IT. We reviewed and assessed HHS's framework and plans for developing a national health IT strategy to understand the role of the new office for national coordination of health IT. We supplemented our assessment by discussing with officials throughout the department their involvement in national efforts to implement health IT and the integration of current health IT initiatives into the national strategy. We analyzed DOD and VA documentation and prior GAO reports discussing the two departments' implementation of health IT (see app. I). We supplemented our analyses by discussing with DOD and VA officials the lessons that they learned from implementing health IT solutions in two of their major information systems. We selected examples of other countries' efforts to modernize health IT infrastructures based upon literature reviews and discussions with health care IT experts. We discussed with Canada, Denmark, and New Zealand their initiatives to modernize national health IT infrastructures and identified lessons learned from their experiences that could be meaningful to the United States's efforts. We conducted our work from October 2004 through March 2005, in accordance with generally accepted government auditing standards.

On April 1, 2005, we provided your office with a briefing on the results of this review. The purpose of this letter is to provide the published briefing slides to you, which appear as appendix I. The information in these slides has been updated to include additional information requested by your office.

In summary, we found that HHS, through the Office of the National Coordinator for Health IT, is taking initial steps toward developing a national strategy for health IT and has released a framework that describes actions to be taken by the public and private sectors to develop and implement such a strategy. The framework defines goals and strategies that are to be implemented in three phases. Phase I focuses on the development of market institutions[1] to lower the risk of health IT procurement, phase II involves investment in clinical management tools and capabilities, and phase III supports the transition of the market to robust quality and performance accountability.

[1]According to HHS, market institutions include certification organizations, group purchasing entities, and low-cost implementation support organizations that do not currently exist but are necessary to support clinicians as they procure and use IT.

HHS is in the initial phase of implementing activities to achieve the goals of the framework and, as a result, has made progress toward coordinating federal health IT efforts and reaching out to private industry. For example, in November 2004, the department issued a request for information seeking public input and ideas for developing a national health information network; a task force of federal agencies is evaluating over 500 responses to this request. HHS is also working with the private sector to develop standards and certification procedures for health IT interoperability. However, HHS has not established milestones for the completion of phase I, nor has it defined plans for phases II and III. Without defined milestones, it remains unclear when the important activities of phase I will be completed to provide the building blocks needed to support the activities of the subsequent phases.

We identified lessons learned from DOD and VA that could provide valuable insight to HHS as it works toward implementing a national health IT infrastructure. DOD and VA operate the largest health care delivery networks in the nation, and important lessons can be taken from their experiences in health IT. Among other things, they reported the need to

- obtain full endorsement of top leadership,
- define and adopt common standards and terminology,
- recognize and address the needs of the varied stakeholder communities, and
- deploy in small increments and build on success.

We also reported additional lessons learned from other countries' experiences in modernizing health IT infrastructures. Canada, Denmark, and New Zealand have begun initiatives to establish national health IT infrastructures with government support and identified lessons learned from their experiences, such as

- focus on creating standards first,
- establish a central organization to lead health IT efforts, and
- implement solutions incrementally.

Recommendation for Executive Action

As a result of our work, we recommend that the Secretary of Health and Human Services establish detailed plans and milestones for each phase of the framework for strategic action and take steps to ensure that those plans are followed and milestones are met.

Agency Comments

We received written comments on a draft of this report from the Acting Inspector General at HHS and the Deputy Secretary of VA. We received oral comments from the Chief Enterprise Architect for Military Health System at DOD. DOD, HHS, and VA concurred with our results and provided technical comments, which we have incorporated in this report as appropriate. HHS agreed with our recommendation and described additional actions that the Secretary is taking to achieve specific goals of the framework and to benefit from lessons learned from DOD and VA. HHS also provided additional information about the steps that the department is taking to lead the nation in health IT efforts. This information is provided in HHS's written comments, which are reproduced in appendix II. VA's written comments are reproduced in appendix III.

We are sending copies of this report to the Chairmen and Ranking Minority Members of other Senate and House committees and subcommittees having authorization and oversight responsibilities for health care IT. We are also sending copies to the Secretary of Health and Human Services and to the other agencies that participated in our review. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at http://www.gao.gov.

Should you or your office have any questions about matters discussed in this report, please contact Dave Powner at (202) 512-9286 or by e-mail at pownerd@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Major contributors to this report also included Tonia D. Brown, Pamlutricia Greenleaf, M. Saad Khan, Valerie C. Melvin, M. Yvonne Sanchez, Teresa F. Tucker, and Jessica D. Waselkow.

Sincerely yours,

David A. Powner
Director, Information Technology
Management Issues

Linda D. Koontz
Director, Information Management Issues

Appendix I

National Health Information Technology Strategy

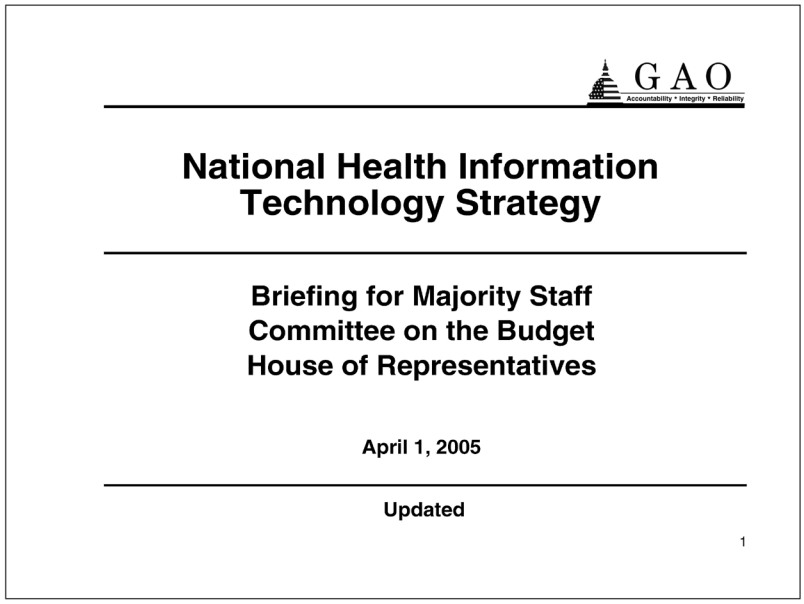

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Table of Contents

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Introduction

- The United States health care delivery system is an information-intensive industry that is complex, inefficient, and highly fragmented, with estimated spending of $1.7 trillion in 2003.
- Calling for transformational change in the health care industry, the Institute of Medicine pointed out that health care delivery in the United States has longstanding problems with medical errors and inefficiencies that increase the cost of health care.[1]
- The President's health care information technology (IT) plan calls for the development and implementation of a strategic plan to guide the nationwide implementation of interoperable health information technology in both the public and private health care sectors that will prevent medical errors, reduce costs, improve quality, and produce greater value for health care expenditures.

[1] Institute of Medicine, *To Err Is Human: Building a Safer Health System* (Washington, DC: November 1999) and *Crossing the Quality Chasm: A New Health System for the 21st Century* (Washington, D.C.: March 2001).

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Objectives, Scope and Methodology

Objectives and Scope

Objectives

- To provide an overview of the Department of Health and Human Services' (HHS) efforts to develop and implement a national health information technology strategy
- To identify lessons learned from the Departments of Defense's (DOD) and Veterans Affairs' (VA) implementation of electronic health records (EHRs)
- To identify lessons learned from other countries' efforts to modernize health IT infrastructures

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Objectives, Scope and Methodology

Objectives and Scope

Scope

- Conducted work at HHS components that play major roles in supporting health care IT, including the Agency for Healthcare Research and Quality, Centers for Medicare and Medicaid Services, Food and Drug Administration, Health Resources and Services Administration, Indian Health Service, National Institutes for Health, and Office of the National Coordinator for Health IT in Washington, D.C., and the Centers for Disease Control and Prevention in Atlanta, GA
- Conducted work at DOD's Office of Health Affairs in Falls Church, VA and VA's Veterans Health Administration in Washington, D.C.
- Selected and reviewed examples of health care IT infrastructure initiatives from Canada, Denmark, New Zealand, and the United Kingdom.

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Objectives, Scope and Methodology

Methodology

- Reviewed HHS's framework and implementation plans for developing a national health IT strategy and held discussions with agency officials about their involvement in national efforts to implement health IT and the integration of current health IT initiatives into the national strategy
- Analyzed agency documentation and GAO reports discussing DOD's and VA's implementation of EHRs as part of the Composite Health Care System II and the Veterans Health Information System and Technology Architecture
  - Supplemented analyses with interviews of DOD and VA officials regarding the agencies' practices, processes, and outcomes in implementing EHRs, and identified related lessons learned that could be useful in the implementation of a national health care system
  - Consulted with a private health care consultant currently studying EHRs to assess the validity of the identified lessons and their applicability in federal and private health care settings

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Objectives, Scope and Methodology
Methodology

- Conducted literature reviews of other countries' efforts to implement health IT and held discussions with officials in Canada, Denmark, and New Zealand to gain information about experiences related to costs, benefits, time frames, and challenges
  - We held discussions with health care IT experts and reviewed literature to identify countries that are modernizing health IT infrastructures and were willing to discuss their initiatives and lessons learned with us.
  - We obtained information about the United Kingdom's health IT modernization project by reviewing publicly available documentation.
- We conducted our work from October 2004 through March 2005 in accordance with generally accepted government auditing standards.
- We collected systems descriptions and cost information from agency officials and did not independently verify data provided to us.
- We requested comments from HHS, DOD, and VA on a draft of these briefing slides.

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Results in Brief

- In July 2004, HHS delivered a framework for strategic actions as a first step toward a strategy to implement a nationwide health IT infrastructure that involves both the public and private sectors' participation.
  - The framework builds upon ongoing work in federal health IT and includes plans to identify and learn from agencies' experiences.
  - The framework defines goals and strategies which are to be implemented in three-phases.
- HHS is in the initial phase of implementing the framework's strategies but has not defined milestones for completion of this phase or later phases.
- In November 2004, HHS issued a request for information seeking public input and ideas for developing a national health information network; a task force of federal agencies is evaluating over 500 responses.

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Results in Brief

- DOD and VA operate the largest health care delivery networks in the nation, and their experiences in implementing EHRs offer important lessons learned that could be applied to a national health records system. These lessons include:
  - Obtain full endorsement of top leadership
  - Define and adopt common standards and terminology
  - Recognize and address needs of the varied stakeholder communities
  - Deploy in small increments and build on success
- Other countries have begun initiatives to establish national health IT infrastructures with government support and also provided valuable lessons learned that can be applied to the U.S.'s efforts, such as:
  - Focus on creating standards first
  - Establish a central organization to lead health IT efforts
  - Implement incrementally
- As a result of our review, we recommend that HHS establish plans and milestones for fully implementing its framework for strategic action.

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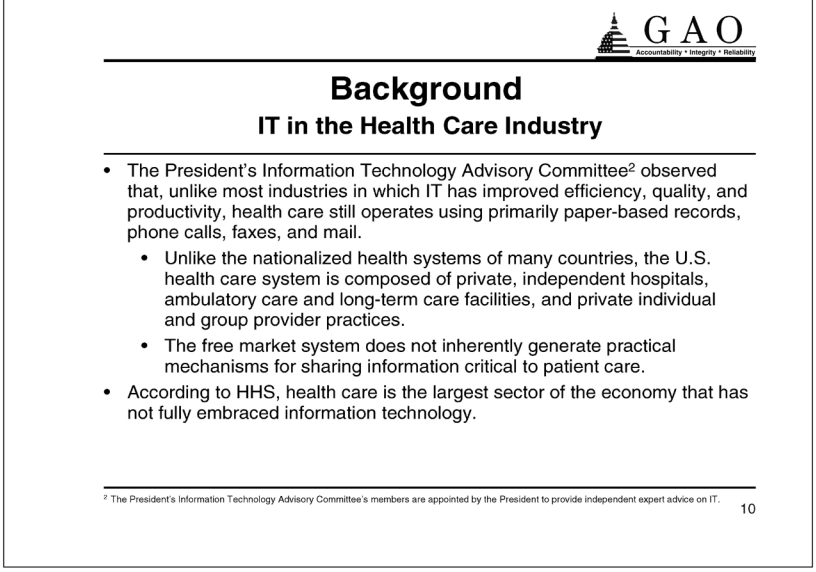
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Background
IT in the Health Care Industry
• The President's Information Technology Advisory Committee[2] observed that, unlike most industries in which IT has improved efficiency, quality, and productivity, health care still operates using primarily paper-based records, phone calls, faxes, and mail.
• Unlike the nationalized health systems of many countries, the U.S. health care system is composed of private, independent hospitals, ambulatory care and long-term care facilities, and private individual and group provider practices.
• The free market system does not inherently generate practical mechanisms for sharing information critical to patient care.
• According to HHS, health care is the largest sector of the economy that has not fully embraced information technology.
[2] The President's Information Technology Advisory Committee's members are appointed by the President to provide independent expert advice on IT.
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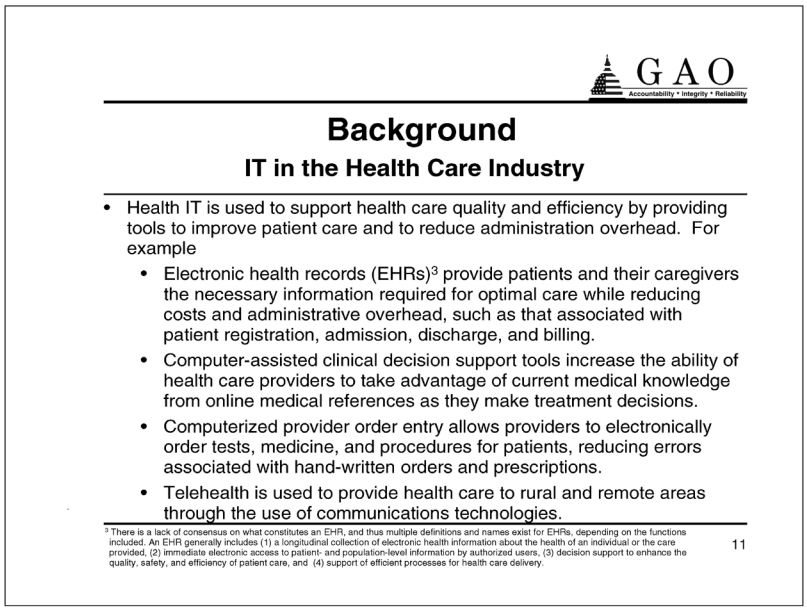
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Background
IT in the Health Care Industry
• Health IT is used to support health care quality and efficiency by providing tools to improve patient care and to reduce administration overhead. For example
• Electronic health records (EHRs)[3] provide patients and their caregivers the necessary information required for optimal care while reducing costs and administrative overhead, such as that associated with patient registration, admission, discharge, and billing.
• Computer-assisted clinical decision support tools increase the ability of health care providers to take advantage of current medical knowledge from online medical references as they make treatment decisions.
• Computerized provider order entry allows providers to electronically order tests, medicine, and procedures for patients, reducing errors associated with hand-written orders and prescriptions.
• Telehealth is used to provide health care to rural and remote areas through the use of communications technologies.
[3] There is a lack of consensus on what constitutes an EHR, and thus multiple definitions and names exist for EHRs, depending on the functions included. An EHR generally includes (1) a longitudinal collection of electronic health information about the health of an individual or the care provided, (2) immediate electronic access to patient- and population-level information by authorized users, (3) decision support to enhance the quality, safety, and efficiency of patient care, and (4) support of efficient processes for health care delivery.
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Background

IT Adoption Rates in Health Care

- We recently reported that current health IT adoption rates in the United States are varied and increasing the rates of IT adoption is critical to achieving significant benefits.[4]
  - Respondents to a recent survey conducted by the Medical Group Management Association reported that only 31 percent of physician group practices use fully operational EHRs.
  - The Healthcare Information and Management Systems Society reported that 19 percent of hospitals use fully operational EHRs.
  - According to a study by the Commonwealth Fund, approximately 13 percent of solo physicians have adopted some form of EHR, while 57 percent of large group practices (50 or more physicians) have adopted an EHR.
- According to the Commonwealth Fund, gaps in adoption rates are further widened by barriers and challenges to implementing health IT that are greater for solo and small group practices.

[4] GAO, *Health and Human Services' Estimate of Health Care Cost Savings Resulting from the Use of Information Technology*, GAO-05-309R (Washington, D.C.: February 16, 2005).

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Background
Challenges to Implementing IT

- While there are proven benefits to implementing health IT, the Medicare Payment Advisory Commission[5] identified other factors that present financial, technical, and cultural challenges.
  - Investment in IT can be costly and must compete with other investments, and depends on the organization's ability to access capital.
  - Integrating new IT with other systems can further increase costs and system maintenance requirements.
  - Maintaining full operations when making system changes presents additional challenges.
  - Implementation of IT often requires changes in work processes and culture.
  - Physicians' reluctance is a major hurdle to implementing IT, and overcoming it is key to successful projects.

[5] The Medicare Payment Advisory Commission is an independent federal body established by the Balanced Budget Act of 1997 (P.L. 105–33) to advise the U.S. Congress on issues affecting the Medicare program.

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Background

Recent Studies on Cost and Benefits of Health IT

- Studies by the Center for Information Technology Leadership identified savings from the widespread adoption of health IT.
  - *The Value of Healthcare Information Exchange and Interoperability* identified $78 billion in annual savings based on electronically sharing health care data between providers and stakeholders, which resulted in saving time and avoiding duplicate tests.
  - *The Value of Computerized Provider Order Entry in Ambulatory Settings* estimated $44 billion in annual savings based on avoidance of unnecessary outpatient visits and hospital admissions, as well as more cost-effective medication, radiology, and lab ordering.
- The center and other health care experts acknowledge that these estimates are based on limited data and a number of assumptions and, therefore, are not necessarily complete and precise.
- In October 2003, we reported significant financial benefits realized from the implementation of health IT, including cost savings at VA and expected savings at DOD (GAO-04-224; see appendix I).

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Background
Administration's Health IT Agenda

- The President's health care IT plan calls for the widespread adoption of interoperable EHRs within 10 years.
- In April 2004, the President issued Executive Order 13335[6] to "provide leadership for the development and nationwide implementation of an interoperable health information technology infrastructure to improve the quality and efficiency of health care." Among other things, the order called for
  - the appointment of a national coordinator for health IT who is to report to the Secretary of HHS regarding progress on the development and implementation of a strategic plan.
- The Secretary appointed a national coordinator in May 2004 whose responsibilities include coordination of programs and policies regarding health IT across the federal government, and outreach and consultation between the federal government and the private sector.

[6] Executive Order 13335, *Incentives for the Use of Health Information Technology and Establishing the Position of the National Health Information Technology Coordinator* (Washington, D.C.: April 27, 2004).

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Background

HHS's Role in Health IT

- As a regulator, purchaser, health care provider, and sponsor of research, HHS is taking steps to promote the use of IT in public and private health care settings.
  - The Agency for Healthcare Research and Quality (AHRQ) aims to translate research findings into better patient care and provides funding for state and regional IT demonstration projects and a national resource center for grantees and organizations that are engaged in health IT activities.
    - According to HHS officials, over half of AHRQ's funding goes to rural and small communities.
  - The Centers for Medicare and Medicaid Services (CMS) administers the Medicare program and works in partnership with states to administer the Medicaid program and the States Children's Health Insurance Program; CMS has established pilots to promote the adoption and effective use of health IT in physicians' offices and to improve beneficiary telephone customer service using web-based call centers.

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Background

HHS's Role in Health IT

- Indian Health Service (IHS) provides health services to American Indians and Alaskan Natives and reportedly uses a hospital information system that provides order entry, results reporting, encounter documentation, and other clinical functions.
- The Health Resources and Services Administration (HRSA) aims to expand access to high-quality health care and provide grants for community-based activities in informatics, EHRs, and telehealth.
  - HRSA awarded 65 grants and over $30 million for telehealth in 2004.
- The National Institutes of Health (NIH) works to apply scientific knowledge to extend healthy life and provide research grants for computer technologies to facilitate access, storage, and use of biomedical information, for training of informatics researchers and developers, and access to informatics resources.

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Background
Role of the National Committee on Vital and Health Statistics

- The National Committee on Vital and Health Statistics (NCVHS) was established in 1949 as a public advisory committee that is statutorily authorized to advise the Secretary of HHS on health data, statistics, and national health information policy, including the implementation of health IT standards.
  - The committee is responsible for developing recommendations to HHS for standards to enable e-prescribing and delivered its first set of recommendations to the department in September 2004 with additional recommendations to be provided in March 2005.
  - The committee is also responsible for making recommendations to the Secretary of HHS for transaction and code set standards.

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Background
Role of the National Committee on Vital and Health Statistics

- In November 2001, NCVHS called for federal leadership to accelerate and coordinate progress on a national health information infrastructure.[7]
  - NCVHS intends to continue to address issues related to health IT and a national health information infrastructure and provide comments and recommendations to the Secretary as appropriate.
- NCVHS reviews results of HHS agencies' standards-setting initiatives, along with government and nongovernmental requirements and issues, and makes recommendations to the department secretary regarding the adoption of health IT standards, as appropriate.

[7] NCVHS, *Information for Health: A Strategy for Building the National Health Information Infrastructure* (Washington, D.C.: November 2001).

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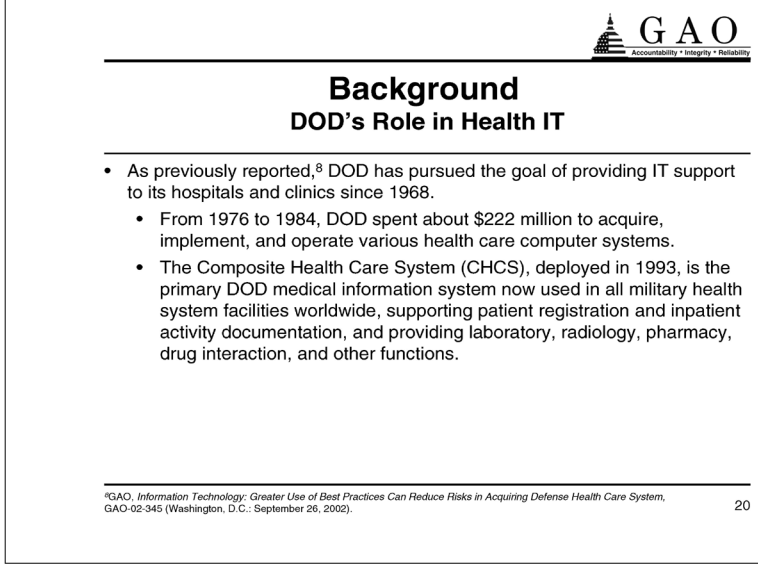
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Background
DOD's Role in Health IT
• As previously reported,[8] DOD has pursued the goal of providing IT support to its hospitals and clinics since 1968.
• From 1976 to 1984, DOD spent about $222 million to acquire, implement, and operate various health care computer systems.
• The Composite Health Care System (CHCS), deployed in 1993, is the primary DOD medical information system now used in all military health system facilities worldwide, supporting patient registration and inpatient activity documentation, and providing laboratory, radiology, pharmacy, drug interaction, and other functions.
[8]GAO, Information Technology: Greater Use of Best Practices Can Reduce Risks in Acquiring Defense Health Care System, GAO-02-345 (Washington, D.C.: September 26, 2002).
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Background
DOD's Role in Health IT

- DOD initiated CHCS II in 1997 as an advanced medical information system to assist clinicians in making improved health care decisions and to lower costs.
  - As part of CHCS II, DOD is implementing a centralized Clinical Data Repository of life-long health records for military health system beneficiaries that provide documentation such as patient histories, physician notes, and population health reporting.
  - CHCS II represents DOD's EHR and will eventually replace the existing CHCS.
- According to HHS, DOD has a lengthy history working in remote and medically underserved areas and has experience in using IT, such as telehealth, to deliver care in isolated conditions which can be compared with the conditions in some rural environments.

[5]GAO, *Information Technology: Greater Use of Best Practices Can Reduce Risks in Acquiring Defense Health Care System,* GAO-02-345 (Washington, D.C.: September 26, 2002).

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Background
VA's Role in Health IT

- VA is the country's largest health care provider and, according to RAND,[9] has been making significant strides in implementing technologies and systems to improve care, including an EHR that allows instant communication among providers across the country and reminds providers of patients' clinical needs.
- As we previously reported[10], VA has had an automated information system in its medical facilities since 1985. In 1996, this system evolved into the Veterans' Health Information Systems and Technology Architecture (VistA), an integrated outpatient and inpatient system that includes its EHR—the Computerized Patient Record System.
- VA's EHR technologies are available for public use and are being modified for transfer to rural and medically underserved settings.

[9] RAND, *Improving Quality of Care: How the VA Outpaces Other Systems in Delivering Patient Care* (Santa Monica, CA: 2005).
[10] GAO, *Information Technology: Benefits Realized for Selected Health Care Functions,* GAO-04-224 (Washington, D.C.: October 31, 2003)

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Background
Private Industry's Role in Health IT

According to the National Coordinator for Health IT:

- While the federal government plays an important role in health IT adoption, the effective use of health IT lies predominantly with the private sector.
- The federal government can provide a vision and strategic direction for a national interoperable health care system but will rely on the private sector to provide a competitive technology industry, privately operated support services, and shared investments in health IT adoption.
- The private sector must develop the market institutions to deliver the products and services that can transform the paper-based health care system into an electronic, consumer-centered, and quality-based system.

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Background
Relevant Legislation

Federal legislation requires specific activities related to the implementation of health IT by both the public and private sectors.

- The Health Insurance Portability and Accountability Act (HIPAA) of 1996[11] requires HHS to establish national standards for certain financial and administrative electronic health care transactions and national identifiers for providers, health plans, and employers.
- The Public Health Security and Bioterrorism Preparedness and Response Act of 2002[12] requires that the Secretary, in cooperation with health care providers and state and local public health officials, establish standards for interoperability of health alert and public health surveillance networks between federal, state, and local public health officials, and public and private health labs, hospitals and other facilities.

[11] Public Law 104-191 (August 21, 1996).
[12] Public Law 107-188 (June 12, 2002).

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Background
Relevant Legislation

- Among other things, the Medicare Prescription Drug Improvement and Modernization Act of 2003[13] includes provisions for an electronic prescription drug program and requires CMS to develop standards for electronic prescribing.
  - It also requires the establishment of a Commission on Systemic Interoperability to provide a road map for interoperability standards.
  - The act authorizes the Secretary of HHS to conduct a 3-year pay-for-performance demonstration program under which physicians are to adopt and use health IT to promote continuity of care, stabilize medical conditions, prevent or minimize acute exacerbations of chronic conditions, and reduce adverse health outcomes to meet beneficiaries' needs.

[13] Public Law 108-173 (December 8, 2003).

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Background
Previous GAO Reports on Health IT

- GAO has historically reviewed and reported issues related to the federal government's efforts to implement health IT, including the need for an implementation strategy, costs and benefits of health IT, barriers to implementation, and DOD's and VA's efforts to implement EHRs and exchange data.
- Appendix I includes descriptions of GAO reports issued since 2000.

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National Health IT Strategy
Office of the National Coordinator for Health IT

- The mission of the Office of the National Coordinator for Health IT is to develop and implement a strategic plan to guide the nationwide implementation of interoperable health care IT in both the public and private sectors.
  - According to the national coordinator, the office is a transitional organization with no permanent positions under the HHS Assistant Secretary for Budget, Technology and Finance.
- The first step in preparing a strategic plan was the release of a framework for strategic action, and in accordance with Executive Order 13335, HHS released *The Decade of Health Information Technology: Delivering Consumer-centric and Information-rich Health Care* (July 2004), which describes a framework for strategic action.
  - The office intends to release a complete strategic plan during this coming year to build upon the framework and provide detailed plans for implementing the President's vision.

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National Health IT Strategy
Framework for Strategic Action

- The framework for strategic action outlines an approach toward the nationwide implementation of interoperable health IT in both the public and the private sectors.
  - It calls for a sustained set of actions which will be taken over many years by the public and private health sectors.
  - The framework outlines four major goals and 12 strategies for implementing a strategy for national health IT.
- The framework states a commitment to the development of interoperability standards, a key component of progress in interoperable health IT, and describes efforts to adopt standards for use by all federal health agencies.
- The framework also supports the role of the private sector and recognizes that the adoption and effective use of health IT require a joint effort between federal, state, and local governments and the private sector.
- As we testified in July 2004, as the national coordinator moves forward with this framework, it will be essential to have continued leadership, clear direction, measurable goals, and mechanisms to monitor progress.[14]

[14] GAO, *Health Care: National Strategy Needed to Accelerate the Implementation of Information Technology*, GAO-04-947T (Washington, D.C.: July 14, 2004).

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National Health IT Strategy

Framework for Strategic Action

- HHS's approach for implementing the framework's strategic actions aggregates its goals and strategies into three phases.
  - **Phase I** focuses on the development of market institutions to stabilize the market, create a better environment for investment and accountability, and lower the risk of health IT procurement.
  - **Phase II** involves investment in clinical management tools and capabilities such as EHRs, personal health records, telehealth, health information exchange, and other mechanisms for high-performance care delivery.
  - **Phase III** supports the transition of the market to robust quality and performance accountability, where clinicians have the tools and capabilities to manage patients and populations and to deliver consistently high-quality care in an efficient manner.

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National Health IT Strategy

Framework for Strategic Action

- HHS is currently implementing phase I and, according to the national coordinator, its initial efforts are focused on the building blocks of EHR adoption, interoperability, and streamlined federal health information systems.
  - These building blocks are necessary to enable both the private and public sectors to implement interoperable health information systems and to provide a foundation for efforts in later phases, such as personal health records and biosurveillance.
- However, HHS has not established milestones for the completion of phase I, nor has it defined or made plans for phases II and III.

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National Health IT Strategy

Framework for Strategic Action

- According to officials with the Office of the National Coordinator for Health IT, the office is in the process of establishing milestones for the completion of phase I but has not made plans for phases II and III because HHS has not formalized the organization or funding for future activities.
- Without defined milestones it remains unclear when the important activities of phase I will be completed and when the building blocks to support activities of the subsequent phases will be available.
- The following slides describe the framework's 4 goals and 12 strategies and key HHS IT initiatives that support the phase I goals.

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National Health IT Strategy

Framework for Strategic Action

Goals	Strategies[a]
Goal 1: Inform clinical practice with the use of EHRs	1. Incentivize EHR adoption **2. Reduce risk of EHR investment** 3. Promote EHR diffusion in rural and underserved areas
Goal 2: Interconnect clinicians so that they can exchange health information using advanced and secure electronic communication	**1. Foster regional collaborations** **2. Develop a national health information network** **3. Coordinate federal health information systems**
Goal 3: Personalize care with consumer-based health records and better information for consumers	**1. Encourage use of personal health records** 2. Enhance informed consumer choice 3. Promote use of telehealth systems
Goal 4: Improve public health through advanced biosurveillance methods and streamlined collection of data for quality measurement and research	1. Unify public health surveillance architectures 2. Streamline quality and health status monitoring 3. Accelerate research and dissemination of evidence

Source: GAO analysis of HHS information.
[a] Phase I strategies are shown in bold type.

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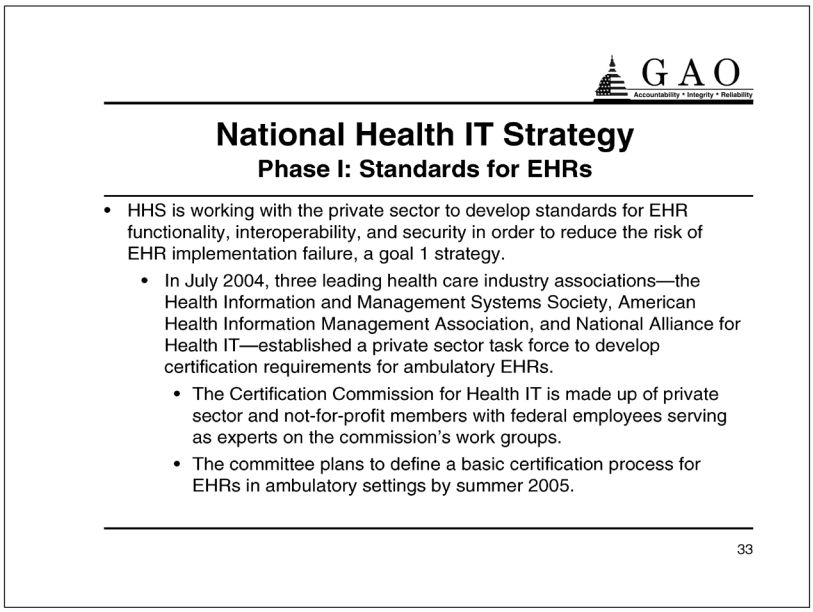
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National Health IT Strategy
Phase I: Standards for EHRs
• HHS is working with the private sector to develop standards for EHR functionality, interoperability, and security in order to reduce the risk of EHR implementation failure, a goal 1 strategy.
• In July 2004, three leading health care industry associations—the Health Information and Management Systems Society, American Health Information Management Association, and National Alliance for Health IT—established a private sector task force to develop certification requirements for ambulatory EHRs.
• The Certification Commission for Health IT is made up of private sector and not-for-profit members with federal employees serving as experts on the commission's work groups.
• The committee plans to define a basic certification process for EHRs in ambulatory settings by summer 2005.
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National Health IT Strategy

Phase I: HHS Support for Regional Collaborations

- Currently, there are two HHS programs to support regional collaborations through grants and contracts.
  - In October 2004, AHRQ announced $139 million in multi-year grants and contracts to promote the use of health IT, including five-year contracts to five states to help them develop statewide networks.
  - HRSA's Office for the Advancement of Telehealth provides seed money and support to multi-stakeholder collaboratives within communities to implement regional health information organizations. It provided $2.3 million in 2004.
- These programs support the goal 2 strategy to foster regional collaborations.
- The Office of the National Coordinator for Health IT plans to host an interoperability meeting with stakeholders this year to address requirements for regional organizations and the national health information network.

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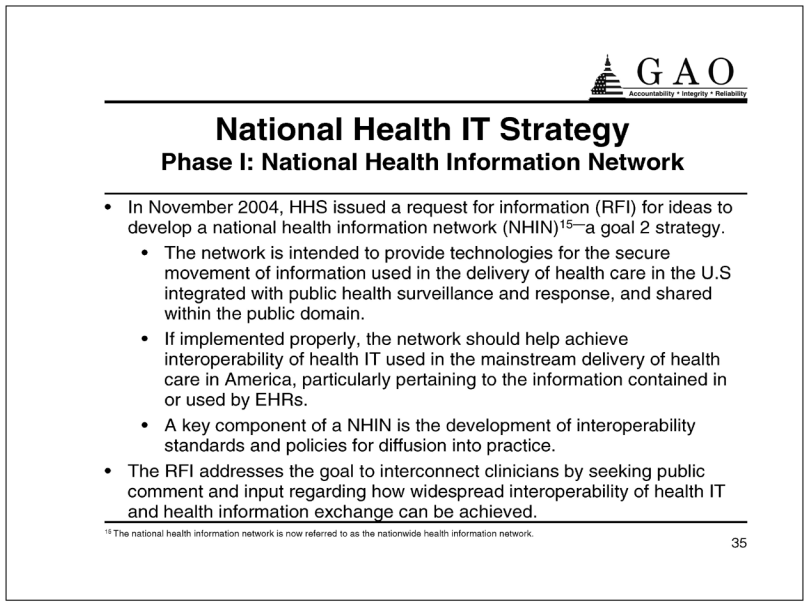
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National Health IT Strategy
Phase I: National Health Information Network
• In November 2004, HHS issued a request for information (RFI) for ideas to develop a national health information network (NHIN)[15]—a goal 2 strategy.
• The network is intended to provide technologies for the secure movement of information used in the delivery of health care in the U.S integrated with public health surveillance and response, and shared within the public domain.
• If implemented properly, the network should help achieve interoperability of health IT used in the mainstream delivery of health care in America, particularly pertaining to the information contained in or used by EHRs.
• A key component of a NHIN is the development of interoperability standards and policies for diffusion into practice.
• The RFI addresses the goal to interconnect clinicians by seeking public comment and input regarding how widespread interoperability of health IT and health information exchange can be achieved.
[15] The national health information network is now referred to as the nationwide health information network.
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National Health IT Strategy

Phase I: National Health Information Network

- The results of the RFI are intended to provide information for policy discussions inside and outside the government about possible methods by which widespread interoperability and health information exchange could be deployed and operated on a sustainable basis.
  - HHS intends to explore the role of the federal government in facilitating deployment of a national health information network, how it could be coordinated with efforts to define a federal health architecture, and how it could be supported and coordinated by regional health information organizations.[16]
  - The RFI also requests input regarding privacy and security considerations, including compliance with HIPAA rules and the role of the private sector in the construction and implementation of a NHIN.
- According to the national coordinator, HHS received over 500 responses and has convened a governmentwide task force made up of over 100 people from 17 agencies to review the responses and produce a summary.

[16] Regional health information organizations are multi-stakeholder collaboratives within communities that support health information exchange efforts.

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National Health IT Strategy

Phase I: Federal Health Information Systems

- The office of the national coordinator is responsible for the Federal Health Architecture (FHA) program which is to define a framework and methodology for establishing the target architecture and standards for interoperability and communication throughout the federal health community, supporting a goal 2 strategy to coordinate federal health information systems
  - FHA was initiated in 2003 in HHS's office of the chief information officer and was incorporated into the national coordinator's office in 2004.
- FHA is intended to provide a structure for bringing HHS's divisions and other federal departments together through its partners' council,[17] initially targeting standards for enabling interoperability.
  - The FHA program is supported by four advisory work groups.
  - Appendix II includes descriptions of the FHA work groups and their responsibilities, followed by a table describing membership.

[17] The FHA partners' council includes almost 400 members from 15 agencies

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National Health IT Strategy

Phase I: Federal Health Information Systems

- The FHA partners are responsible for improving coordination and collaboration on federal health IT solutions and investments and improving efficiency, standardization, reliability, and availability of health comprehensive information solutions.
  - According to the national coordinator, there is a strong need for the federal government's health information systems to be able to exchange data so that these systems become more efficient and cost-effective.
  - HHS plans to produce in September 2005 the first release of an information architecture for the federal health enterprise to enable collaboration and data sharing across the government and with various organizations, such as states and private entities.
    - The first release will contain foundational elements to support the development and evolution of the full architecture which will occur over several years.

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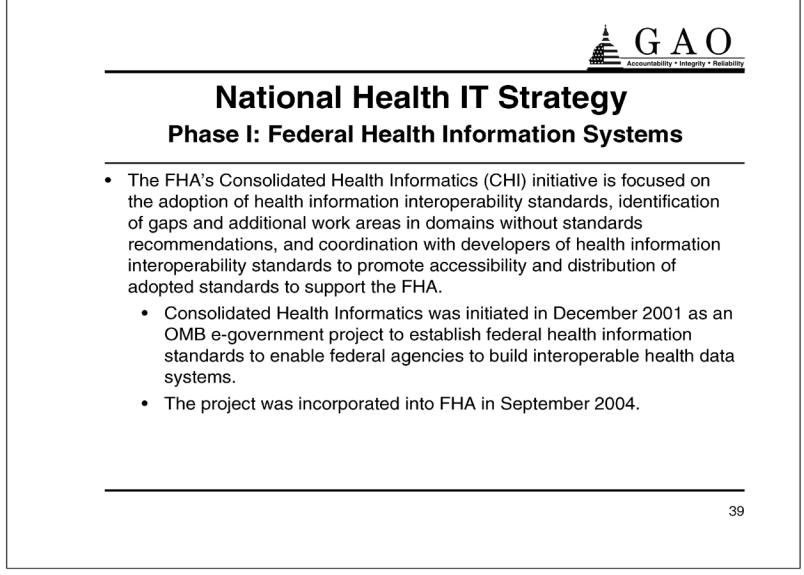
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National Health IT Strategy
Phase I: Federal Health Information Systems
• The FHA's Consolidated Health Informatics (CHI) initiative is focused on the adoption of health information interoperability standards, identification of gaps and additional work areas in domains without standards recommendations, and coordination with developers of health information interoperability standards to promote accessibility and distribution of adopted standards to support the FHA.
• Consolidated Health Informatics was initiated in December 2001 as an OMB e-government project to establish federal health information standards to enable federal agencies to build interoperable health data systems.
• The project was incorporated into FHA in September 2004.
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National Health IT Strategy

Phase I: Personal Health Records

- In January 2005, NCVHS held hearings on personal health records—a goal 3 strategy to personalize care—and identified issues, some specifically related to the federal government.
  - Issues discussed include privacy and information control, security of health information, legal issues, cost, and interoperability.
  - Federal issues include the relationship of roles in and uses of personal health records to the larger health objectives of the federal government, such as (1) what costs agencies will face, (2) how the federal government should promote interoperability, and (3) whether there needs to be a standardized approach to a personal health record across all of the federal activities.
- The hearings also discussed broader issues such as ownership and control of personal health information and policy issues such as access rights and authorization of usage.

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National Health IT Strategy
Framework Support: Standards and Interoperability

- According to the national coordinator, the development of technically sound and robustly specified interoperability standards and policies is a key component of progress toward the implementation of a national strategy that provides interoperable health IT systems
- The development, approval, and adoption of standards for health IT is an ongoing, long-term process that supports multiple goals of the framework and includes federally mandated standards requirements (e.g., HIPAA) and a voluntary consensus process within a market-based health care industry.
- The use of some standards, such as those defined by HIPAA and MMA, is mandated by the federal government while others are defined by standards development organizations such as the American Association of Medical Instrumentation and the National Council for Prescription Drug Programs.
- The following graphic provides an overview of the highly complex standards-setting process for health care data exchange in the United States.

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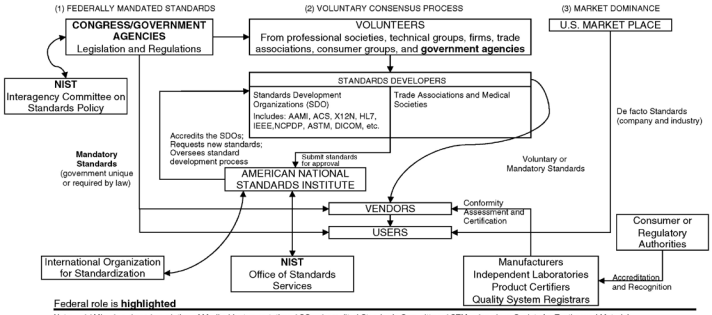
National Health IT Strategy

Framework Support: Standards and Interoperability

Overview of the Process to Set Standards for the Exchange of Health Care Data in the U.S.



Federal role is **highlighted**

Note: AAMI = American Association of Medical Instrumentation; ASC = Accredited Standards Committee; ASTM = American Society for Testing and Materials
DICOM = Digital Imaging and Communication in Medicine; HL7 = Health Level Seven; IEEE = Institute for Electrical and Electronics Engineers
NCPDP = National Council for Prescription Drug Programs; NIST = National Institute of Standards and Technology, (part of the Commerce Dept)
Source: Institute of Medicine, *Patient Safety: Achieving a New Standard for Care* (Washington, D.C.: 2004).

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National Health IT Strategy
Framework Support: Standards and Interoperability

- HHS identifies and researches standards that are defined by standards development organizations and determines which approved standards are appropriate for use in federal agencies' health IT systems.
- According to an HHS official, the department has limited authority to mandate standards outside of the federal government, but, through the Consolidated Health Informatics initiative, is encouraging the implementation of standards within the federal government to provide a catalyst for the private sector to follow.
  - Federal agencies agreed to endorse 20 domains of health data standards for information exchange as a model for the private sector, yielding 11 sets of standards to be used in federal IT architectures.
  - HHS is committed to supporting collaboration between the public and private sectors to develop, adopt, and certify standards.

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National Health IT Strategy
Framework Support: Standards and Interoperability

- HHS divisions, such as AHRQ, CMS, NIH, CDC, and FDA, have been and continue to be responsible for selecting and adopting standards and are now included in the CHI initiative, supporting multiple goals of the framework.
- AHRQ and CMS are working on initiatives that support goal 1 of the framework.
  - AHRQ is working to identify and establish clinical standards and research to help accelerate the adoption of interoperable health IT systems, including
    - industry clinical messaging and terminology standards,
    - national standard nomenclature for drugs and biological products, and
    - standards related to clinical terminology.
  - CMS is responsible for identifying and adopting standards for e-prescribing and for implementing the administrative simplification provisions of HIPAA, including electronic transactions and code sets, security, and identifiers.

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National Health IT Strategy
Framework Support: Standards and Interoperability

- NIH's work on standards supports the framework's goal 2.
  - NIH's National Library of Medicine (NLM) is working on the implementation of standard clinical vocabularies, including support for and development of selected standard clinical vocabularies to enable ongoing maintenance and free use within the United States' health communities, both private and public.
    - In 2003, NLM obtained a perpetual license for the Systematized Nomenclature of Medicine (SNOMED)[18] standard and ongoing updates, making SNOMED available to U.S. users.
    - Other efforts at NLM include the uniform distribution and mapping of HIPAA code sets, standard vocabularies, and Health Level 7[19] code sets.

[18] SNOMED is a nomenclature classification for indexing medical vocabulary, including signs, symptoms, diagnoses, and procedures. It was adopted as a CHI standard in May 2004.
[19] HL7 is a standards development organization that creates message format standards for electronic exchange of health information.

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National Health IT Strategy
Framework Support: Standards and Interoperability

- The Centers for Disease Control and Prevention (CDC), FDA, and NIH are working on standards-setting initiatives that support the framework's goal 4.
  - CDC, through its Public Health Information Network (PHIN) initiative, is working on the development of shared data models, data standards, and controlled vocabularies for electronic laboratory reporting and public health information exchange that are compatible with federal standards activities such as CHI.
  - FDA and NIH, together with the Clinical Data Interchange Standards Consortium, a group of over 40 pharmaceutical companies and clinical research organizations, have developed a standard for representing observations made in clinical trials, the Study Data Tabulation Model.
- In May 2003, we recommended to HHS that ongoing standards-setting organizations coordinate their efforts to define and implement health IT standards (GAO-03-139; see appendix I).

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National Health IT Strategy

Framework's Goals and Supporting HHS IT Initiatives

- In addition to those already described, other ongoing HHS IT initiatives support the framework's goals.
- The following table lists key HHS IT initiatives for health IT by division and identifies the goals that they support.
- Descriptions of each of the initiatives are included in appendix III.

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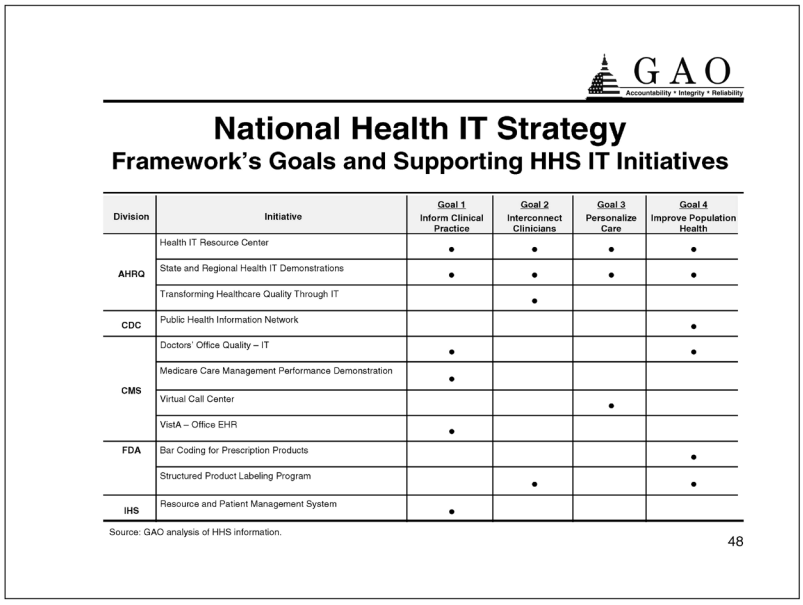

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National Health IT Strategy
Framework's Goals and Supporting HHS IT Initiatives

Division	Initiative	Goal 1 Inform Clinical Practice	Goal 2 Interconnect Clinicians	Goal 3 Personalize Care	Goal 4 Improve Population Health
AHRQ	Health IT Resource Center	•	•	•	•
	State and Regional Health IT Demonstrations	•	•	•	•
	Transforming Healthcare Quality Through IT		•		
CDC	Public Health Information Network				•
CMS	Doctors' Office Quality – IT	•			•
	Medicare Care Management Performance Demonstration	•			
	Virtual Call Center			•	
	VistA – Office EHR	•			
FDA	Bar Coding for Prescription Products				•
	Structured Product Labeling Program		•		•
IHS	Resource and Patient Management System	•			

Source: GAO analysis of HHS information.

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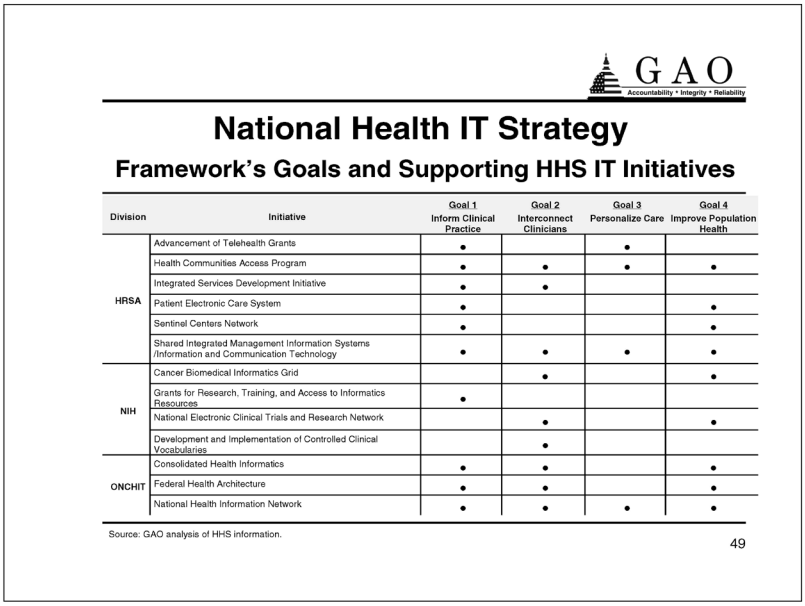

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National Health IT Strategy

Framework's Goals and Supporting HHS IT Initiatives

Division	Initiative	Goal 1 Inform Clinical Practice	Goal 2 Interconnect Clinicians	Goal 3 Personalize Care	Goal 4 Improve Population Health
HRSA	Advancement of Telehealth Grants	•		•	
	Health Communities Access Program	•	•	•	•
	Integrated Services Development Initiative	•	•		
	Patient Electronic Care System	•			•
	Sentinel Centers Network	•			•
	Shared Integrated Management Information Systems /Information and Communication Technology	•	•	•	•
NIH	Cancer Biomedical Informatics Grid		•		•
	Grants for Research, Training, and Access to Informatics Resources	•			
	National Electronic Clinical Trials and Research Network		•		•
	Development and Implementation of Controlled Clinical Vocabularies		•		
ONCHIT	Consolidated Health Informatics	•	•		•
	Federal Health Architecture	•	•		•
	National Health Information Network	•	•	•	•

Source: GAO analysis of HHS information.

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National Health IT Strategy
Framework Support: Private Sector Participation

- Certain private sector activities provide support for goals 1 and 2 of the framework.
  - The private sector task force, the Certification Commission for Health IT, is working to develop certification procedures for EHRs, supporting goal 1.
  - The Commission on Systemic Interoperability, which includes nationally recognized experts in the area of health IT, is charged by the Medicare Modernization Act to develop a comprehensive strategy for the adoption and implementation of health care IT interoperability standards, which supports goal 2.

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National Health IT Strategy
Framework Support: Private Sector Participation

- HHS has supported and continues to support opportunities for private sector participation in establishing health care IT through grants and funding for demonstration projects through its divisions.
- HHS participates with the medical and public health communities, academia, and health IT vendors through conferences and symposia.
  - The national coordinator speaks at industry conferences that are focused on identifying government incentives to encourage health IT adoption in private industry.
  - HHS's Secretarial Summit on Health IT held in July 2004 provided nongovernmental participants opportunities to make recommendations regarding incentives for health IT, population health, clinical research, and health IT governance.
- According to HHS, close collaboration between public and private sectors can develop new methods for improving care without creating unnecessary regulation and minimizing reporting burdens on private industry.

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Lessons Learned from VA and DOD

- DOD and VA experiences in implementing EHRs offer important lessons learned that could be used in developing and implementing a national health care effort. As providers and payers of health care services, DOD and VA's lessons include
  - Obtain full endorsement of top leadership
    - Senior administrators and clinical leaders should share and communicate a common sense of urgency regarding the need for change.
    - Senior leadership's full endorsement, including support for funding, is critical to successfully implementing an electronic health record, promoting end-user support, and securing a usable product.

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Lessons Learned from VA and DOD

- Implement an enterprise-wide communication plan
  - EHR implementation entails organizational change and acceptance across the enterprise and at all organizational levels.
  - System acceptance and support depend upon regular, effective communication, from executive leadership levels down through end users.
  - Keeping stakeholders informed of objectives, progress, problems encountered and resolved, lessons learned, and benefits is critical to setting realistic expectations and facilitating stakeholder buy-in.

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Lessons Learned from VA and DOD

- Recognize and address needs of the varied stakeholder communities
  - A management/governance structure that represents the entire stakeholder community should be established, and reflect clearly defined roles, responsibilities, and decision-making authority among the different levels of leadership.
  - Users (i.e., clinicians, payers, and others) should have an early and integral role in defining a strategy to meet their needs, establish accountability for the initiative, and sustain long-term project success.
  - Users should be actively involved in all project phases, including requirements definition, system design, development, testing, and implementation.

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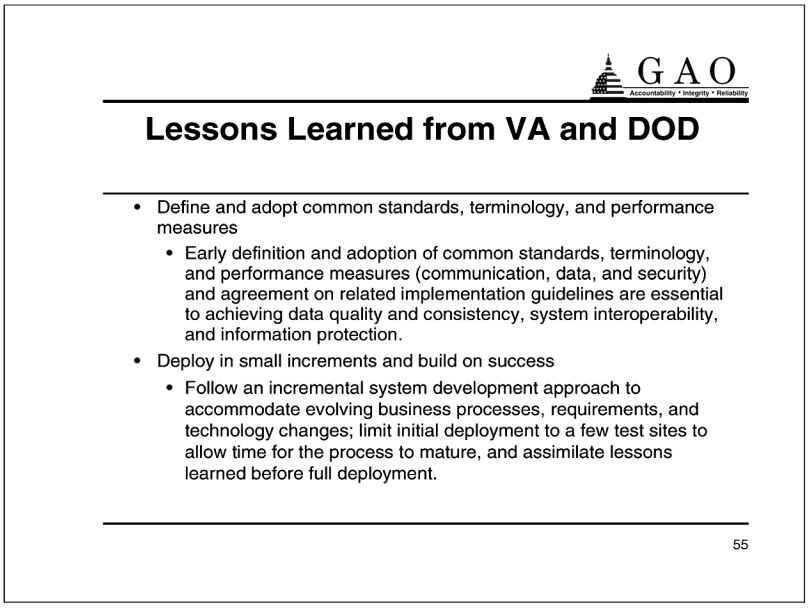
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Lessons Learned from VA and DOD
• Define and adopt common standards, terminology, and performance measures
• Early definition and adoption of common standards, terminology, and performance measures (communication, data, and security) and agreement on related implementation guidelines are essential to achieving data quality and consistency, system interoperability, and information protection.
• Deploy in small increments and build on success
• Follow an incremental system development approach to accommodate evolving business processes, requirements, and technology changes; limit initial deployment to a few test sites to allow time for the process to mature, and assimilate lessons learned before full deployment.
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Lessons Learned from VA and DOD

- Customize training and support to sustain system implementation
  - Establish training programs that are tailored to meet the needs of the varied users' groups. On-site clinical champions and subject-matter experts should be identified and empowered to promote and demonstrate the new system to other personnel and provide ongoing technical assistance.

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Lessons Learned from Other Countries
Canada, Denmark, and New Zealand

- While the U.S. has just begun to develop a national strategy for health IT adoption, Canada and Denmark have developed national strategies and begun to take steps toward implementation, and New Zealand plans to finalize its strategy in June 2005.
  - Canada finalized its strategy in 2004 and is a year into implementation.
  - Denmark finalized its strategy in February 2003 and is 2 years into a 4-year implementation plan.
  - New Zealand has prioritized six initiatives to be implemented in the next 3 to 5 years.
- These countries are farther along in their strategy development and implementation than the U.S. and are able to share lessons learned from their experiences.

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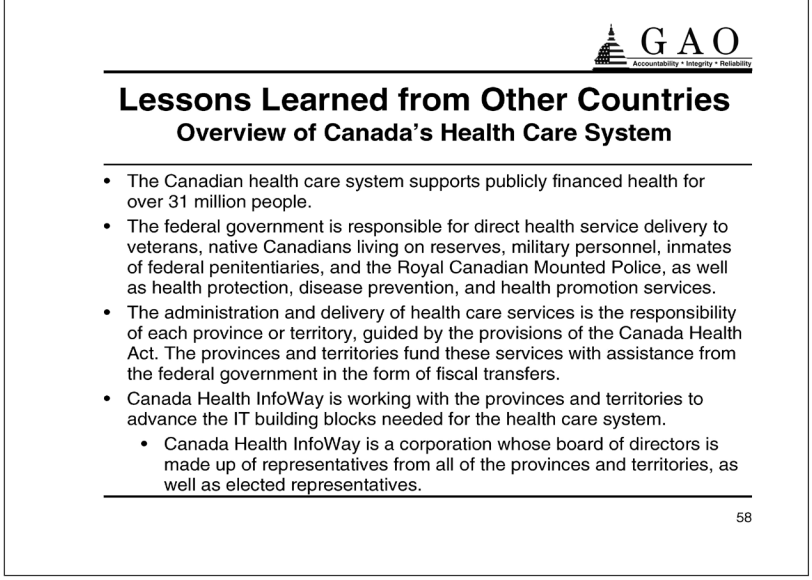
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Lessons Learned from Other Countries
Overview of Canada's Health Care System
• The Canadian health care system supports publicly financed health for over 31 million people.
• The federal government is responsible for direct health service delivery to veterans, native Canadians living on reserves, military personnel, inmates of federal penitentiaries, and the Royal Canadian Mounted Police, as well as health protection, disease prevention, and health promotion services.
• The administration and delivery of health care services is the responsibility of each province or territory, guided by the provisions of the Canada Health Act. The provinces and territories fund these services with assistance from the federal government in the form of fiscal transfers.
• Canada Health InfoWay is working with the provinces and territories to advance the IT building blocks needed for the health care system.
• Canada Health InfoWay is a corporation whose board of directors is made up of representatives from all of the provinces and territories, as well as elected representatives.
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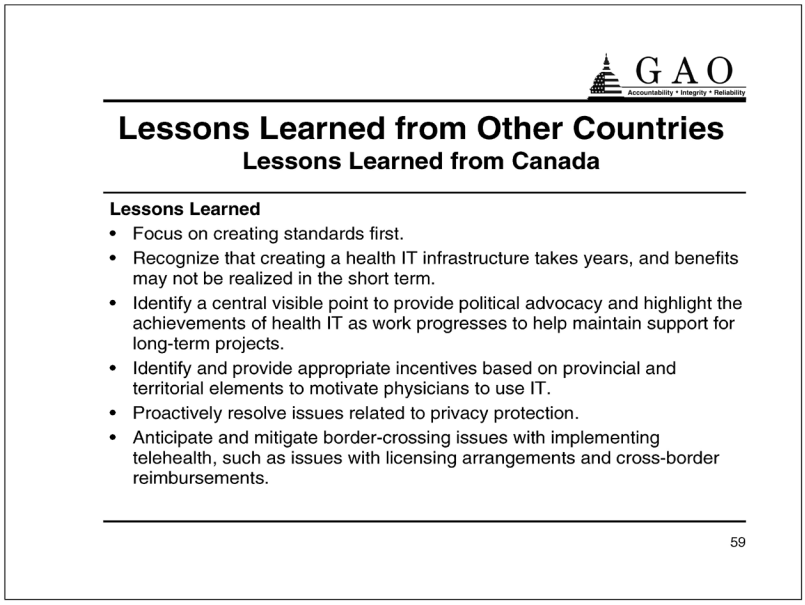
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Lessons Learned from Other Countries
Lessons Learned from Canada
Lessons Learned
• Focus on creating standards first.
• Recognize that creating a health IT infrastructure takes years, and benefits may not be realized in the short term.
• Identify a central visible point to provide political advocacy and highlight the achievements of health IT as work progresses to help maintain support for long-term projects.
• Identify and provide appropriate incentives based on provincial and territorial elements to motivate physicians to use IT.
• Proactively resolve issues related to privacy protection.
• Anticipate and mitigate border-crossing issues with implementing telehealth, such as issues with licensing arrangements and cross-border reimbursements.
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Lessons Learned from Other Countries
Overview of Denmark's Health Care System

- The Danish health care system serves a population of 5.3 million people and is 85% tax-financed.
- At the national level, the Ministry of Health is responsible for legislation and preparing overall guidelines for the health care sector, and the National Board of Health is responsible for supervising health personnel.
- The regional level consists of 14 counties and the Copenhagen Hospital Corporation. The counties own and run hospitals and prenatal care centers and finance general and specialist practitioners, pharmacies and physiotherapists through the National Health Security System.
- The responsibility for the municipal level includes nursing homes, home nursing, health visitors, and school health services.

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Lessons Learned from Other Countries
Overview of Denmark's Health Care System

- Denmark's National Strategy for IT in Health Care 2003 - 2007 was finalized in February 2003.
  - It states that the most important reasons for increasing the use of IT in health care are related to the improvement of quality, efficiency, and effectiveness of health care delivery.
  - Three major initiatives of the National Strategy are
    - coordinated development, testing, and implementation of EHRs,
    - a national database to organize health care terms and concepts, and
    - concept classifications to facilitate communications across sectors and professions in health care.

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Lessons Learned from Other Countries

Lessons Learned from Denmark

Lessons Learned

- Implementation of health IT across the entire country will take a long time.
- Involve health care service providers throughout the entire implementation process.
- A very strong central organization must lead the entire health IT implementation from start to finish.
- Integrate federal efforts with hospitals before undertaking a larger national plan.
- Anticipate and resolve funding, IT process reengineering, consensus-building, and other issues during the planning phase to avoid negative impacts on progress.
- Realize that the investment in health care IT is costly, and short-term gains are hard to identify.
- Promote successes as soon as possible to encourage acceptance by stakeholders.

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Lessons Learned from Other Countries

Overview of New Zealand's Health Care System

- The New Zealand health care system serves a population of 4 million people.
- At the national level, the Ministry of Health provides policy advice on improving health outcomes and monitors the performance of the district health boards.
- The regional level consists of 21 district health boards. Each district health board has up to 11 members, seven of which are elected by the community and up to four of which are appointed by the Minister of Health.
  - District health boards are responsible for planning, funding and ensuring the provision of health and disability services to a geographically defined population.

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Lessons Learned from Other Countries
Overview of New Zealand's Health Care System

- New Zealand is currently redeveloping its health information strategy, which is expected to be complete by June 2005.
- The draft strategy identifies 12 action zones for implementation planning over the next 3 to 5 years; six were selected as initial priorities:
  - Enable secure connections and access to health information
  - Ensure national systems anchors (such as the National Health Index) are in place
  - Create and publish accessible key event summaries
  - Expand the level of electronic communication across primary and secondary care
  - Extend the collection of health information
  - Safe Access to National Information within the context of the Health Information Privacy Code is essential for the support of population health

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Lessons Learned from Other Countries

Lessons Learned from New Zealand

Lessons Learned

- The distributed government model that governs New Zealand's health care system works best.
- High level EHR components that can be shared and accessed encourage greater coordination of health services.
- Provide adequate funding for and prioritize the initiatives
- Educate stakeholders about the value of developing health IT to encourage stakeholder buy-in.

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Lessons Learned from Other Countries

Overview of the United Kingdom's Health Care System

- The United Kingdom's Department of Health is responsible for setting health and social care policy in England; health services are largely tax-financed in the United Kingdom and account for 14 per cent of general government spending.
- In summer 2002, the government set up the National Programme for IT (NPfIT) which defines four main projects to be introduced in stages across different regions:
  - Electronic Patient Records
  - Electronic Appointment Booking
  - Electronic Transmission of Prescriptions
  - Communications Network
- NPfIT plans to have electronic booking substantially in place and to have 50% of prescriptions transmitted electronically by the end of 2005.
- We could not identify lessons learned from the United Kingdom's efforts based upon publicly available information.

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Conclusions

- Since establishing the Office of the National Coordinator for Health IT, HHS has made progress toward coordinating federal health IT efforts and reaching out to private industry.
- However, coordination of standards development and adoption activities throughout the health care industry, including federal efforts to accelerate the process, remains a challenge.
- HHS has not made long-term plans or established milestones for the implementation of a national strategy to accelerate the adoption of IT across the health care industry.

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Conclusions

- DOD's and VA's experiences in implementing EHR systems offer important lessons learned that may be applied to HHS's efforts to help increase the likelihood that interoperable EHRs could be available in the next ten years.
- The United States could benefit from other countries' experiences and lessons learned from their efforts toward modernizing their health IT infrastructures.
- The National Coordinator for Health IT recognizes DOD's and VA's efforts and works closely with them to share lessons learned from their experiences with implementing health IT.
- The national coordinator has recently initiated discussions with other countries to also learn from their experiences in modernizing health information infrastructures.

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Recommendation

To accelerate the adoption of interoperable IT for health care, we recommend that the Secretary of HHS

- establish detailed plans and milestones for each phase of the framework for strategic action, and
- take steps to ensure that plans are followed and milestones are met.

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Agency Comments

We requested comments from HHS, DOD, and VA on a draft of these briefing slides.

- HHS did not provide comments.
- DOD's Chief Enterprise Architect for Military Health System provided written technical comments, which we incorporated as appropriate.
- VA's Acting Deputy Chief Information Officer for Health provided oral comments and agreed with the information presented.

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Appendix I
Recent GAO Reports on Health IT

- **Health and Human Services' Estimate of Health Care Cost Savings Resulting from the Use of Information Technology (GAO-05-309R; February 17, 2005):** We reported that IT can improve the efficiency and quality of medical care and result in costs savings and that, although estimated nationwide savings are primarily based on studies with methodological limitations and are contingent on much higher IT adoption rates than are currently estimated, the potential for substantial savings is promising.
- **Health Care: HHS's Efforts to Promote Health Information Technology and Legal Barriers to its Adoption (GAO-04-991R; August 13, 2004):** We identified major HHS IT initiatives and associated funding, and reported that attempts by the federal government to address legal issues that present barriers to the widespread use of IT have not been sufficient.
- **Health Care: National Strategy Needed to Accelerate the Implementation of Information Technology, (GAO-04-947T; July 14, 2004):** We reported that it will be essential to have continued leadership, clear direction, measurable goals, and mechanisms to monitor progress of the implementation of a national strategy for health IT.
- **Computer-Based Patient Records: VA and DOD Efforts to Exchange Health Data Could Benefit from Improved Planning and Project Management, (GAO-04-687; June 7, 2004):** To help ensure progress in achieving the two-way exchange of health information, we recommended that VA and DOD develop an architecture for an electronic interface between their health systems and establish a project management structure to guide the initiative.

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Appendix I
Recent GAO Reports on Health IT

- **Computer-Based Patient Records: Improved Planning and Project Management Are Critical to Achieving Two-Way VA-DOD Health Data Exchange, (GAO-04-811T; May 19, 2004):** We testified that DOD and VA were continuing with activities to support the sharing of health data; nonetheless, achieving the two-way electronic exchange of patient health information remained far from being realized.
- **Computer-Based Patient Records: Sound Planning and Project Management Are Needed to Achieve A Two-Way Exchange of VA and DOD Health Data (GAO-04-402T; March 17, 2004):** We testified that DOD and VA had made little progress since November 2003 in determining an approach for achieving two-way exchange of patient data and reported that DOD and VA have taken measures towards implementing prior recommendations for enhancing management and accountability.
- **Computer- Based Patient Records: Short-Term Progress Made But Much Work Remains to Achieve A Two-Way Data Exchange Between VA and DOD Health Systems (GAO-04-271T; November 19, 2003):** We testified that DOD and VA faced challenges in exchanging standardized data and that a common health information infrastructure and architecture was needed to achieve data exchange capability.

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Appendix I
Recent GAO Reports on Health IT

- **Information Technology: Benefits Realized for Selected Health Care Functions (GAO-04-224, October 31, 2003):** We reported significant improvements in health care delivery and financial benefits realized from the nation's health care community's implementation of health IT, including cost savings resulting from VA's and DOD's implementation of health IT.
- **Bioterrorism: Information Technology Strategy Could Strengthen Federal Agencies' Abilities to Respond to Public Health Emergencies (GAO-03-139; May 30, 2003):** We recommended that HHS coordinate with DHS, DOD, and VA to establish a national IT strategy, and that ongoing standards-setting organizations coordinate their efforts to define and implement health IT standards.
- **Computer Based Patient Records: Better Planning and Oversight by VA, DOD, and IHS Would Enhance Health Data Sharing (GAO-01-459; April 30, 2001):** We recommended that DOD, VA, and IHS create comprehensive and coordinated plans to ensure that the agencies can share patient health data, including performance measures and use of existing IT capabilities.

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Appendix II
Responsibilities of FHA Work Groups

- **Food safety:** recommend a target, business architecture to serve as the framework for developing and implementing systems which support the food safety business government-wide
- **Interoperability:** recommend target technical standards for interoperability across the health line of business.
- **EHR:** recommend a target, health care services electronic health record business architecture, a component of the health lines of business, to serve as framework within the federal sector for developing and implementing an electronic health record.
- **Public health surveillance:** recommend a target architecture related to the health line of business to serve as the framework within the federal sector for developing and implementing public health surveillance systems.

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Appendix II
FHA Work Groups' Members and Leaders

Federal Membership	FHA Work Groups: Electronic Health Record	Food Safety	Interoperability	Public Health Surveillance
HHS Divisions				
AHRQ	●		●	●
CDC		●	●	❍
CMS	●		●	
FDA		❍	●	●
HRSA			●	
IHS	●	●	●	●
NIH			●	
ONCHIT	●	●	❍	●
Other Federal Agencies				
DHS		●	●	●
DOD	❍	●	●	●
DOE	●		●	●
EPA		●	●	●
Justice	●		●	●
NASA				●
Commerce/NIST			●	
OMB	●	●	●	●
SSA			●	
State	●		●	●
VA	❍	●	●	❍
USAID				
USDA	●	❍	●	●
USPS				●

Source: HHS

Co-lead agencies are indicated by ❍

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Appendix III
Descriptions of Key HHS IT Initiatives

Divisions	IT initiative	Description	FY 05 Funding
AHRQ	Transforming Healthcare Quality through IT	A series of three grant programs released in FY04 that include 1) demonstrating the value of HIT, 2) planning grants for future HIT implementations, and 3) providing HIT implementation grants for partnerships of three or more entities.	$25,630,246
	Health Information Technology Resource Center	A state-of-the-art service center for grantees and organizations that are engaged in health IT diffusion activities (research, diffusion, or adoption).	$3,533,885
	State and Regional Health IT Demonstrations	A contract solicitation to establish and implement state and regional demonstrations of interoperable health information systems.	$4,965,664
CDC	Public Health Information Network	An initiative between CDC and its public and private partners to advance software components and data, and technical specifications that are compatible with federal standards activities such as CHI, NCVHS, and eGov.	$10,000,000
CMS	Doctors' Office Quality - Information Technology	A special study to develop an approach to promoting adoption and use of information technologies in the physician office and reporting of information to Quality Improvement Organizations (QIOs).	not determined
	Medicare Care Management Performance Demonstration	A 3-year, pay-for-performance pilot with physicians to promote the adoption and effective use of HIT to improve the quality of patient care for chronically ill Medicare patients.	$354,531
	Virtual Call Center pilots	A project to improve beneficiary telephone customer service through the implementation of various web-based initiatives for efficient and effective handling of all types of inquiries.	$20,750,000
	VistA-Office EHR	A project to modify and repackage VistA (the VA's EHR software) for the physician office setting.	$4,000,000
FDA	Bar Coding for Prescription Products	An initiative to standardize bar code labels.	$0
	Structured Product Labeling Program	Supports health IT initiatives such as electronic prescribing and decision support by providing standards for medication terminology and information found in approved FDA drug labels or package inserts in a computer-readable format.	$4,000,000

Source: HHS divisions.

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Appendix III
Descriptions of Key HHS IT Initiatives

Divisions	IT initiative	Description	FY 05 Funding
HRSA	Healthy Communities Access Program	A community-based program to develop or strengthen health care safety net delivery systems through providing an infrastructure that will coordinate health care for the uninsured. Development of information systems is fundamental to supporting coordination of efforts that increase access to care.	$76,500,000 (not all for health IT)
	Integrated Services Development Initiative	A clinical network providing support to physicians who are on their way to an electronic health record by encouraging people to work together.	$5,555,000
	Office for the Advancement of Telehealth grants	Grants for support of community-based activities in informatics, electronic health records, and telemedicine, including telepharmacy.	not determined
	Patient Electronic Care System	Enables health centers to electronically track clinical information on patients, that would otherwise only be captured in the patient's medical chart..	$652,000
	Sentinel Centers Network	Invests in the information systems of participant health centers and networks to provide timely, patient-level data to inform policy decisions and quality improvement activities across all health centers.	$870,000
	Shared Integrated Management Information Systems / Information and Communication Technology	Provides hardware, software, and support services for integration of practices management systems among federally supported health centers, and integration of electronic health records with practice management systems at consolidated health centers.	$697,000 (SIMIS) $4,988,000 (ICT)
IHS	Resource and Patient Management System	The hospital information system utilized by 49 hospitals, 221 health centers, 120 health stations, and 170 Alaska village clinics. It includes IHS-EHR which provides order entry, results reporting, encounter documentation, and other clinical functionality to IHS, tribal, and urban Indian health care providers.	$36,166,000

Source: HHS divisions.

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Appendix III
Descriptions of Key HHS IT Initiatives

Divisions	IT Initiative	Description	FY 05 Funding
NIH	Cancer Biomedical Informatics Grid	A virtual cancer research network of interconnected data, individuals, and organizations that will create a common, widely distributed infrastructure that facilitates th e sharing of data and applications, enhancing research productivity and efficiency of research. The infrastructure is based on CHI standards and is composed of HHS-established controlled vocabularies, standard data elements, and domain models.	$30,000,000
	Grants for research, training, and access to informatics	Grant programs that provide incentives for health information exchange, such as technology support, training, and access to digital libraries.	$40,000,000
	National Electronic Clinical Trials and Research Network	A network which will link research sites and create a "national network of networks" in coordination with the national health information network, by which research information and findings will be shared and scientific collaborations facilitates.	$16,769,000
	Development and Implementation of Controlled Clinical Vocabularies	A project that includes uniform distribution and mapping of HIPAA code sets, CHI standard vocabularies, HL7 code sets, and other important vocabularies.	$5,600,000
ONCHIT	Consolidated Health Informatics	A project that establishes federal health information interoperability standards as the basis for electronic health data transfer in all activities and projects and among all agencies and departments.	included in PHA
	Federal Health Architecture	A project that defines an overarching framework and methodology that allows initiatives throughout several federal agencies to proceed coherently, establishing the target and standards for interoperability and communication that will unify the federal health community.	$5,500,000
	National Health Information Network	A network of health IT intended to provide low-cost and secure movement of information used in the delivery of health care in the U.S.; be HIPAA-compliant, integrated with public health surveillance and response, and shared within the public domain; adhere to standards for interoperability to support rapid adoption of interoperable EHRs; and be coordinated and interoperable with the PHA. ONCHIT's review of RFI responses will help further define the NHIN.	not determined

Source: HHS divisions.

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Appendix II

Comments from the Department of Health and Human Services

DEPARTMENT OF HEALTH & HUMAN SERVICES Office of Inspector General

Washington, D.C. 20201

MAY 24 2005

Mr. David A. Powner
Director
Information Technology Management Issues
U.S. Government Accountability Office
Washington, DC 20548

Dear Mr. Powner:

Enclosed are the Department's comments on the U.S. Government Accountability Office's (GAO's) draft report entitled, "HEALTH INFORMATION TECHNOLOGY—HHS is Taking Steps to Develop a National Strategy" (GAO-05-628). The comments represent the tentative position of the Department and are subject to reevaluation when the final version of this report is received.

The Department provided several technical comments directly to your staff.

The Department appreciates the opportunity to comment on this draft report before its publication.

Sincerely,

Daniel R. Levinson
Acting Inspector General

Enclosure

The Office of Inspector General (OIG) is transmitting the Department's response to this draft report in our capacity as the Department's designated focal point and coordinator for U.S. Government Accountability Office reports. OIG has not conducted an independent assessment of these comments and therefore expresses no opinion on them.

COMMENTS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES ON THE U.S. GOVERNMENT ACCOUNTABILITY OFFICE'S REPORT ENTITLED "HEALTH INFORMATION TECHNOLOGY — HHS IS TAKING STEPS TO DEVELOP A NATIONAL STRATEGY" (GAO-05-628)

The Department of Health and Human Services (HHS) appreciates the opportunity to review the draft General Accountability Office's (GAO) report to the House of Representatives Committee on the Budget entitled "HEALTH INFORMATION TECHNOLOGY — HHS is Taking Steps to Develop a National Strategy." The focus of the GAO report is on HHS's recent efforts to develop a National health IT strategy for realizing the President's vision, lessons learned from the Department of Defense's and Veterans Administration's and other countries' experiences in implementing health IT.

The National Coordinator for Health Information Technology (National Coordinator) was appointed on May 6, 2004, and heads the Office of the National Coordinator for Health Information Technology (ONC). In a new position in the Government with responsibilities for coordinating internal Federal health information technology (health IT) programs as well as coordinating with private sector health IT efforts, the National Coordinator has taken an iterative approach to strategic planning. This has allowed the National Coordinator to be inclusive in planning, to balance near-term needs with long-term goals, and to work within the constraints of available resources and appropriations. The core of ONC's efforts are the *Framework for Strategic Action* (the Framework) published in July 2004 and the Request for Information (RFI) published in November 2004.

The GAO report highlights numerous other activities and developments regarding health IT that have occurred during the past year as well, including:

- ONC has consulted with, and actively partnered with, numerous Federal agencies in the U.S. Government including the Departments of Veterans Affairs, Defense, Commerce, and Homeland Security.
- ONC has met with many organizations and individuals representing stakeholders of the healthcare system.
- ONC has reached out to States and regions through site visits and town hall meetings to understand the health IT challenges experienced at the local level as well as best practices for the use of, and collaboration regarding, health IT.
- ONC has regularly testified before, and been informed by, the National Committee on Vital and Health Statistics on issues critical to the Nation's health IT goals.
- ONC has monitored and coordinated with the efforts of the Commission for Systemic Interoperability.

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- The National Coordinator has met with delegations involved with health IT from other countries, including Canada, Netherlands, Japan, Australia, Great Britain, and France.

As recommended in the GAO report, HHS agrees that detailed plans and milestones are necessary, and they must meet near-term, medium-term, and long-term planning needs. HHS has begun to take key steps to act on the Framework and the lessons from the large public response to the RFI.

The Secretary recently released his 500-Day Plan which includes as an integral part the transformation of the health care system. This plan includes long-term (5,000 day) visions and shorter-term (500 day) strategies to achieve these visions. Three of those strategies include health IT:

- Expressing a clear vision of health information technology that conveys the benefits to patients, providers, and payers.
- Convening a national collaboration to further develop, set, and certify health information technology standards and outcomes for interoperability, privacy, and data exchange.
- Realizing the near-term benefits of health information technology in the focused areas of adverse drug-incident reporting, e-prescribing, lab and claims-sharing data, clinic registrations, and insurance forms.

Three of the Secretary's longer-term visions are:

- Nearly all health records can be linked through an interoperable system that protects privacy as it connects patients, providers, and payers – resulting in fewer medical mistakes, less hassle, lower costs, and better health.
- Consumers are better informed and have more choices.
- Payers reward providers for healthy outcomes rather than quantity of care and services.

HHS funds have been reallocated to provide a total of $32.8 million to initiate this work in fiscal year (FY) 2005. For FY 2006, the President has requested an additional $125 million which, if approved, will help HHS to further develop milestones and plans that are consistent with the 500-Day Plan.

In May 2005, the Secretary released the *Health IT Leadership Panel Report*, prepared by the Lewin Group, an HHS contractor, which highlighted findings from a small group of Fortune 100 CEOs who convened to consider and discuss issues related to health IT. This report called for Government to be a leader, catalyst, and convener of the Nation's health

information technology effort. The Secretary has already begun by listening to stakeholders through a series of roundtable discussions.

HHS will continue working in concert with those principles and items identified by GAO as lessons from the VA and DOD. This includes the continued leadership of the Secretary as evidenced in his 500-Day Plan; identification and adoption of additional clinical standards through Federal Health Architecture and Consumer Health Information as well as e-prescribing standards under the Medicare Prescription Drug, Improvement, and Modernization Act of 2003; additional stakeholder input through collaboration; and, focus on near-term wins to "deploy in small increments and build on success."

Appendix III

Comments from the Department of Veterans Affairs

THE DEPUTY SECRETARY OF VETERANS AFFAIRS
WASHINGTON

May 20, 2005

Ms. Linda D. Koontz
Mr. David A. Powner
U. S. Government Accountability Office
441 G Street, N.W.
Washington, DC 20548

Dear Ms. Koontz and Mr. Powner:

The Department of Veterans Affairs (VA) has reviewed the Government Accountability Office's (GAO) draft report, ***HEALTH INFORMATION TECHNOLOGY: HHS is Taking Steps To Develop a National Strategy*** (GAO-05-628). VA is pleased that this review found the lessons learned from VA and the Department of Defense could provide Health and Human Services valuable insights as it develops a national health information technology infrastructure. Technical comments are included in the enclosure.

VA appreciates the opportunity to comment on your draft report.

Sincerely yours,

Gordon H. Mansfield

Enclosure