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Accelerating the Adoption of Health IT: GE Perspective

Thank you, Chairman Ensign, Senator Kerry and other Members of the subcommittee for the opportunity to testify before you today on behalf of GE Healthcare. My name is Michael Raymer, vice president of global product strategy for GE Healthcare Integrated IT Solutions.

GE Healthcare Integrated IT Solutions is a leading health IT (HIT) vendor with one of the most comprehensive suites of clinical, imaging, and business information systems available. Through our acquisition of IDX Systems Corporation, we now provide a comprehensive range of cutting-edge global healthcare information solutions, which can accelerate efforts to seamlessly connect clinicians across the continuum of care, from physicians' offices to hospitals, and can help reduce medical errors, improve the quality of care, and streamline healthcare costs.

Our interest in the adoption of HIT extends beyond our role as a vendor of these systems. As a major employer and a healthcare payer, it is critically important that we support initiatives to improve healthcare quality while controlling costs. GE's direct healthcare costs total approximately \$2.5 billion annually for our close to 1 million employees and their dependents. Under the leadership of Dr. Robert Galvin, GE was instrumental in bringing together The Leapfrog Group – a consortium of healthcare purchasers dedicated to improving the quality and affordability of care by steering employees to high quality and highly efficient hospitals – and we founded Bridges to Excellence, a multi-employer coalition to reward quality across the healthcare system.

We believe technology will play a key role in supporting more cost-effective, higher quality care – leading to transparent, free flow of information that will lay the foundation for a complete and much-needed transformation of healthcare.

I. The state of healthcare today is troubling

Healthcare organizations – and the patients they serve – all face the same three challenges: quality, cost, and access.

As the cost of care continues to rise, we are not seeing a corresponding improvement in health status. In 2004 the U.S. spent \$1.9 trillion on healthcare – \$6,280 per person, equivalent to 16 percent of GDP.¹ By 2015, those numbers are expected to rise to \$4 trillion and 20 percent of GDP.² On a per capita basis, we spend two and a half times the average for industrialized countries, despite the fact that we have fewer physicians and nurses and shorter hospital stays³ – and in many cases, worse health outcomes.⁴

In a country with the most advanced medical technology in the world, barely half of Americans get appropriate acute, chronic, or preventive care.⁵ This lack of quality is pervasive, and irrespective of age, sex, or economic status. The challenge we face is not just one of providing better care to patients who can pay for it – or those who can't. What we need is fundamental system change to ensure that medical care is safe and effective, that it is based on clinically proven best practices, and that is focused earlier in the disease process.

When we do receive care, it is often duplicative and even dangerous. Medical records are fragmented – Medicare patients see an average of three providers, for example – so that no single provider has an accurate, comprehensive, and up-to-the-minute picture of the patient's condition on which to base critical

¹ Smith C, Cowan C, *et al.*, National Health Spending in 2004, *Health Affairs* 2006; 25:186-196

² Centers for Medicare and Medicaid Services, National Health Care Expenditure Projections: 2005-2015

³ Anderson GF, Frogner BK, *et al.*, Health Care Spending And Use Of Information Technology In OECD Countries, *Health Affairs* 2006; 25:819-831

⁴ Banks J, Marmot M, *et al.*, Disease and Disadvantage in the United States and in England, *JAMA* 2006; 295:2037-2045

⁵ Asch SM, Kerr EA, *et al.*, Who Is at Greatest Risk for Receiving Poor-Quality Health Care?, *N Engl J Med* 2006; 354:1147-56.

treatment decisions. As a result, patients are often forced to undergo duplicate tests, which drive up the cost of care while providing no added benefit. With no access to an individual's complete medication history, especially in the context of other factors such as diagnoses and allergies, patients may receive prescriptions for drugs that can have fatal interactions if taken together. Preventable medical errors account for as many as 100,000 deaths every year, and an untold number of serious injuries. A 1997 study in the *Journal of the American Medical Association* calculated the average cost *to the institution* of preventable adverse drug events for a 700-bed teaching hospital was \$2.8 million per year. This number reflects only increased treatment costs and length of stay – it does not include other costs of the injuries borne by the patient.⁶

And we have seen how paper medical charts are vulnerable to natural disasters such as Hurricane Katrina, that can destroy the lifetime medical histories of hundreds of thousands of people in the blink of an eye.

All of these factors contribute to the continuing upward spiral of healthcare costs, straining employers who are the primary source of health insurance; creating hardships for individuals who are struggling with higher co-pays or who have no insurance at all; and squeezing providers who are facing shrinking reimbursements.

We simply cannot keep doing more of what we've been doing, and expect a different result. Fortunately, much of the roadmap of how we need to change is already apparent. Both vendors and the government have roles to play.

To control costs while also improving health outcomes will require a complete transformation of our healthcare delivery system – one that in large part will be based on information technology. A recent study by the RAND Corporation, cited in the September/October 2005 issue of *Health Affairs*⁷, estimated that the use of electronic medical records (EMRs) to exchange select patient data across an interconnected U.S. health system could save more than \$80 billion a year in healthcare costs. By identifying unusual areas of disease outbreak, such a system could also be invaluable in controlling the spread of a natural pandemic, or in recognizing the early stages of a bioterror attack.

II. The promise of technology to predict and treat disease earlier

Care for patients with chronic conditions is a major driver of U.S. healthcare costs, comprising as much as 83 percent of all healthcare spending.⁸ In 2003, the cost of treating chronic illness was \$510 billion, with estimates that number will rise to \$1.07 trillion by the year 2020.⁹ Today, almost half of all Americans – 133 million people – live with a chronic condition. By 2020, as the population ages, this number will increase to 157 million. This mounting burden can only be mitigated by changing how we treat disease, not just what diseases we treat.

If you break healthcare down into four phases – predict, diagnose, inform, and treat – fully 80 percent of U.S. healthcare spending happens in the treat phase. This is much too late in the disease process to have any impact on improving this country's health status. The earlier we focus on an individual's health – rather than on a patient's disease – the more opportunities we will have to reverse these dangerous trends.

GE's vision of "early health" is a transformative approach, based on the intersection of diagnostics, therapeutics, and information technology. With early health, providers use technology and clinical knowledge to prevent and/or treat chronic diseases in the earliest phases, when health impacts are less severe and effective treatment is less costly.

⁶ Bates DW, Spell N, *et al.*, The costs of adverse drug events in hospitalized patients, *JAMA* 1997; 277:307-11

⁷ Taylor R, Bower A, *et al.*, Promoting Health Information Technology: Is There a Case for More-Aggressive Government Action?, *Health Affairs* 2005; 24(5): 1234-1245

⁸ Partnership for Solutions, "Chronic Conditions: Making the Case for Ongoing Care," September 2004

⁹ Landro, "Six Prescriptions to Ease Rationing in U.S. Healthcare," *The Wall Street Journal*, Dec. 22, 2003.

Better care need not mean more costly care. CHF is the costliest chronic condition among Medicare patients, to the tune of \$15.2 billion per year. When Duke Medical Center instituted an integrated program for CHF patients, it found that increased access to outpatient care – in this case, a six-fold increase in cardiologist visits – improved patients' health status markedly. Because there were fewer hospitalizations and shorter lengths of stay when patients were hospitalized, the total cost of care actually dropped by 40 percent, or \$9,000 per patient per year.¹⁰

And yet despite examples such as this, the healthcare system continues to reward providers for the volume of care they deliver, rather than the quality. The way our current system is structured, a provider organization that successfully works with individuals to prevent heart attacks and CHF will not reap the financial benefits – and will, in fact, make less money than a provider organization that treats patients after they have come down with these conditions.

As a company, GE is uniquely positioned at the convergence of advances in life sciences, diagnostics, and information technology to promote the model of early health.

III. The U.S. healthcare industry lags in the one area that has made every other industry successful: technology

While other industries have been transformed by information technology, the healthcare industry (especially in the U.S.) remains largely paper-based. Other industries that spent the last decade and a half integrating IT into their core processes have seen measurable productivity growth that is directly attributable to those efforts.¹¹ Today, barcodes are more common in grocery stores than in hospitals, passengers can book their airline tickets online, and ATMs are interconnected across a continent and around the world – but most healthcare providers still fax paper charts across town, or courier X-ray films, or handwrite (sometimes illegible) medication prescriptions.

Healthcare providers still primarily manage information on paper, with the result that most individuals have fragmented medical records. No single provider has the complete picture of an individual's medical history. More than half of people with serious chronic conditions see three or more physicians concurrently¹², making coordination of care among primary care physicians and specialists a challenging task. Those without health insurance – who now number more than 45 million¹³ – are unlikely to have a primary care physician and instead tend to rely on emergency room care, where clinicians have little or no knowledge of a patient's prior medical history.

Even with the current efforts being made to incorporate IT in healthcare, the U.S. is a dozen years behind other industrialized nations in HIT adoption, and our spending on HIT is a fraction of what other countries have spent to date.¹⁴

While the technology has been available for decades, adoption and awareness remain low. President Bush became the first American president to address this issue when, in 2004, he signed Executive Order 13335, setting forth the broad charge that every American should have an electronic health record within 10 years. The executive order also established the Office of the National Coordinator for Health Information Technology (ONC). In its first three months, through the visionary leadership of the country's first health IT czar, Dr. David Brailer, ONC drafted a framework for strategic action, outlining four key goals for the

¹⁰ Herzlinger R, Testimony before the Committee on Homeland Security and Government Affairs, Subcommittee on Federal Financial Management, Government Information and International Security, May 24, 2005

¹¹ Hillestad R, Bigelow J, *et al.*, Can Electronic Medical Record Systems Transform Health Care? Potential Health Benefits, Savings, And Costs; *Health Affairs* 2005; 24:1103-17

¹² Gallup Serious Illness Survey, 2002

¹³ Source: US Census Bureau, Aug. 2005

¹⁴ Anderson GF, Frogner BK, *et al.*, Health Care Spending And Use Of Information Technology In OECD Countries, *Health Affairs* 2006; 25:819-831

use of IT to transform healthcare in the U.S.¹⁵ Interoperability is vital to ONC's strategy to encourage the formation of regional health information organizations (RHIOs) to promote the exchange of medical data among providers. Numerous non-governmental organizations are actively supporting the concept of RHIOs, including the Markle Foundation's Connecting for Health, e-Health Initiative, the Center for Health Transformation, and others.

While the efforts of these organizations have helped to educate both healthcare providers and the general public about the benefits of electronic medical records (EMRs), actual adoption is low. A RAND Corporation study published last year found that only 15 to 20 percent of physician offices and 20 to 25 percent of hospitals in the U.S. have adopted EMR systems.¹⁶

IV. Measuring the benefits of HIT adoption

HIT is crucial to improving the health status of Americans while also reining in skyrocketing healthcare costs. One study analyzing the savings that could be achieved nationally simply by eliminating duplicate testing yielded estimates of \$8 billion to \$26 billion annually.¹⁷ Another estimated the cumulative net savings from HIT at more than \$500 billion over 15 years.¹⁸

HIT can:

- Help prevent medication errors and other types of medical errors;
- Enable clinicians to collaborate and deliver higher quality care, while reducing redundant tests and other procedures;
- Set a foundation of clinical best practices so that care is more consistent from one institution to another and from one region to another;
- Help clinicians deliver more personalized care, based on the patient's condition and medical history; and
- Provide performance and quality data so that healthcare organizations can better assess and improve their own performance, and so the industry as a whole can become more transparent, allowing consumers to select the highest quality providers.

GE Healthcare provides our customers with services to help them measure the value of their investment in a clinical information system, and to institute workflow best practices that will help them achieve the full potential of that system. Our value on investment team helps customers identify key performance indicators that track both the financial return and improvements in efficiency and quality of care. We also work with our customers to support their use of clinical best practices, change management techniques, and Kaizen (Lean) principles to support greater efficiencies of workflow.

For example, Park Nicollet Health Services, located in the Twin Cities, documented a 50 percent return on investment in its clinical information system. The benefits spanned both inpatient and outpatient environments, including more efficient online documentation, improved registration processes, and decreased need for medical records storage. Park Nicollet is one of about a dozen organizations selected for CMS' pay for performance pilot.

We have also seen how organizations such as the Indiana Health Information Exchange (IHIE) and HealthBridge in Cincinnati are demonstrating the cost savings that can be achieved by providing online

¹⁵ "The Decade of Health Information Technology: Delivering Consumer-centric and Information-rich Health Care," July 21, 2004

¹⁶ Fonkych K and Taylor R, "The State and Pattern of Health Information Technology Adoption," RAND 2005

¹⁷ Walker J, Pan E, *et al.*, The Value Of Health Care Information Exchange And Interoperability, *Health Affairs*, 10.1377/hlthaff.w5.10

¹⁸ Hillestad, *supra*, n.11

access to emergency department data. The amount that participating healthcare institutions pay for this service – which still results in a net savings to them – is enough to fund other health information exchange projects and make both IHIE and HealthBridge self-sustaining. One health system served by HealthBridge has saved \$500,000 per year simply from using electronic data exchange instead of photocopying or faxing for delivery of test results.

The reduction of medical errors is another important indicator of the value created by HIT. Every medication order in a hospital goes through a multi-step process of hand-offs involving doctor, nurse, and pharmacist. Almost all medication errors can be traced to one of two stages¹⁹: ordering – where illegible handwriting can result in the patient being given the wrong medication or the wrong dose of the right medication; and administration – where one patient may be given medication intended for another, or incorrect amounts are administered because packaged unit doses differ from the prescribed dosage.

By replacing handwritten medication orders with an electronic system, Montefiore Medical Center in the Bronx has reduced potential medication errors by 80 percent. Because the system instantly transmits the order from the physician to the pharmacist, Montefiore has also reduced by two hours (60 percent) the time lag from when the order is written to when the medication is first administered to the patient.

Barcoding – the technology we take for granted to ensure accuracy at the supermarket checkout stand – is just beginning to be used to ensure the same level of accuracy for inpatient medication administration. At Lehigh Valley Hospital and Health Network in Pennsylvania, every hospital patient wears a barcoded wristband, and every unit dose of medication is similarly labeled. Nurses scan both barcodes, and the software system performs a final check to ensure the “five rights” of medication administration are present: the right patient receives the right dose of the right drug via the right route at the right time. If any of these don’t match up, the system alerts the nurse to a potential error.

Since instituting this system, the institution has prevented 50 potential medication errors per month on an average 30-bed patient care unit. Seasoned nurses were initially skeptical of the technology when it was first rolled out, but having seen the number of errors that were being caught, they became major proponents of the system.

V. Improving the quality and cost of healthcare with portable clinical best practices

Too much of medical care is still guided by tradition, without a solid evidence-based foundation.²⁰ The dissemination of new scientific discoveries can take as long as 17 years before they become an accepted medical practice.²¹

As we become better able not just to treat acute disease, but also to diagnose serious illness earlier in its progression – and even to predict who is at greatest risk before the disease process sets in – there is a corresponding obligation to ensure that best practice guidelines are widely disseminated, so that patients in Nevada, Massachusetts, or Texas can all expect to receive the same scientifically proven treatment for the same condition.

The 100,000 Lives Campaign demonstrates the power of adherence to best practices. A project of the Institute for Healthcare Improvement (IHI), the campaign’s goal was to prevent 100,000 deaths over 18 months through the uniform application of six practice guidelines at hospitals throughout the country. Last week, IHI announced that it had far exceeded the goal, with an estimate of 122,300 lives saved.

Where evidence-based guidelines do exist, they can be complex documents, not easy to evaluate on the fly while evaluating information from a patient’s chart. Incorporating evidence-based guidelines into clinical

¹⁹ Bates DW, Leape LL, *et al.*, Effect of Computerized Physician Order Entry and a Team Intervention on Prevention of Serious Medication Errors, *JAMA*, 1998, 280:1311-1316

²⁰ See, e.g., “Medical Guesswork,” *BusinessWeek*, May 29, 2006

²¹ Balas, Information Systems Can Prevent Errors and Improve Quality, *J Am Med Inform Assoc.*2001; 8: 398-399

information systems can help get life-saving protocols into common practice much faster, while at the same time helping to ensure that they are not inappropriately overused.

Many healthcare organizations struggle to institutionalize best practices so that they can consistently provide high quality care across the organization – or care that is comparable to that at other competing institutions. GE is working on this challenge in partnership with Intermountain Healthcare, an integrated delivery network (IDN) with 21 hospitals in Utah and Idaho, as well as physician clinics and insurance plans. Intermountain has been recognized five years in a row as the nation’s top IDN, and is the winner of numerous national awards for healthcare quality. A report assessing the value of HIT in improving healthcare quality recognized Intermountain among only a handful of institutions leading the development of these systems.²²

Not coincidentally, Intermountain is able to provide higher quality care at lower cost – 27 percent lower than national averages. One of the ways it does this is by combining clinical best practices with computer-based decision support that incorporates data from the patient’s medical record.

The example of congestive heart failure provides a useful illustration. When heart attack patients are discharged from the hospital, they can usually benefit from medications such as statins to lower cholesterol and beta blockers to reduce blood pressure, making it easier for the damaged heart to do its work and reduce the potential impact of CHF. Yet at many healthcare organizations, patients are sent home without the appropriate prescriptions.

After Intermountain introduced computer alerts to prompt clinicians about these medications prior to a patient’s discharge from the hospital, the institution saw dramatic results. In the first year, the protocol:

- prevented 551 readmissions for CHF;
- saved \$2.5 million because of the reduced readmissions; and
- prevented 331 deaths from complications of CHF.

Other GE customers are also using expert rules and clinical decision support to improve patient care and patient safety. Thomas Jefferson University Hospital in Philadelphia, for example, is utilizing an expert rule for pediatric dosing that automatically calculates the correct amount of medication based on the patient’s weight, eliminating a common source of potentially dangerous errors.

Our partnership with Intermountain entails encoding evidence-based clinical guidelines in such a way that they communicate with a patient’s electronic medical record to deliver appropriate alerts to clinicians with recommendations tailored to each patient’s condition. The alerts do not replace a clinician’s judgment; rather, they provide the most relevant and reliable information to the clinician at the point of care.

In the early stages, our work with Intermountain will focus on building that organization’s best practices into GE’s Centricity[®] Enterprise clinical information system. Ultimately, however, our goal is to devise an interoperable encoding mechanism so that any institution’s guidelines can be integrated with any vendor’s clinical system. We have already been able to demonstrate proof of concept that such integration is possible using a clinical guideline for pediatric immunizations. This work, which has been partially funded by a grant from the National Institute of Standards and Technology (NIST), also involves other prestigious healthcare institutions, including the Mayo Clinic, Stanford University, and the Nebraska Medical Center.

VI. Overcoming barriers to HIT adoption

Three major factors that impede adoption of HIT are the current lack of interoperability, cost and complexity of implementing the systems, and resistance to change.

²² “Costs and Benefits of Health Information Technology,” AHRQ Publication No. 06-E006, April 2006

In order to evolve toward the promise of early health, we must begin to put the enabling framework in place today. Physicians are the backbone of our healthcare system. The evolution begins with our nation's physicians being assured that they will have the freedom to choose the best facilities and services for their patients, the ability to dictate their own work flow and protocols and the ability to share patient data with other systems. True interoperability is absolutely critical to achieve these physician requirements and the federal government's efforts are key in this endeavor. The biggest challenge we face is the current lack of interoperability in healthcare IT systems. Interoperability for the healthcare industry is a challenging undertaking. Redundant standards, inconsistent implementations of standards, incomplete data models and terminology make the task complex, time consuming and costly. However, technical complexity is only a part of the problem. Interoperability is not a reality today because the incentives are wrong for those who could drive it. IT vendors' incentive under the current market structure is to lock-in providers into their own proprietary solutions. In this structure it is economically rational for them to invest money in proprietary solutions rather than to invest in interoperability. The providers' incentive is to choose the most cost effective solution. Today, once a provider is "locked-in" to a proprietary solution, the interoperability and switching costs are so high that the provider likely will not change a vendor after the initial vendor decision is made. Interestingly, this system lock-in works to the advantage of providers and/or health plans if it has the effect of locking up a referral network.

For many healthcare organizations, especially small physician practices, the initial costs of implementing EMR systems can be prohibitive. These costs include not only purchasing and installing the system itself, but also lost revenue resulting from reduced patient visits while providers spend time learning the system. Organizations that choose to make this initial investment find that they can recoup the cost within, on average, two and a half years – and even begin to see significant positive benefits after that.²³

There is active debate as to how best to reduce the barriers to adoption. As the custodian of the public health, and the largest employer and healthcare payer in the country, the federal government has a fiduciary responsibility to provide incentives for HIT adoption.²⁴ Legislative approaches currently under consideration include increasing tax breaks for physicians who invest in HIT (HR 4641, the ADOPT HIT Act, introduced by Rep. Phil Gingrey, R-Ga.), and relaxation of the Stark and anti-kickback provisions (HR 4157, the Health Information Technology Promotion Act, sponsored by Rep. Nancy Johnson, R-Conn., and Rep. Nathan Deal, R-Ga.).

PeaceHealth, an integrated delivery network serving three states in the Pacific Northwest, is already using an ASP model to share its clinical information system with unaffiliated physicians in its service area. This model enables providers to lease remote access to an EMR system without the need for investing in dedicated hardware.

The nurses' experience at Lehigh Valley demonstrates the other challenge of integrating information technology into the culture of healthcare. Experienced clinicians in all areas of the healthcare organization can be highly resistant to new technologies that threaten their established patterns. Changing workflows – the way providers practice on a day-to-day basis – is not an easy task, and yet it is absolutely essential to realizing the benefits of HIT. The transformative impact of HIT comes not from transferring existing processes from paper to computer screens, but from thoroughly analyzing those processes and using technology as a means to achieve greater efficiencies and improve the quality of care. Institutions that have failed in their implementation of HIT have largely done so because they underestimated the cultural component of the project.

Another important culture change that needs to happen is addressing patients' concern about the privacy of their medical records. Although digital records are in many ways more secure than paper – using, for example, biometric login and the automatic creation of audit trails that make it possible to detect

²³ Miller RH, West C, *et al.*, The Value Of Electronic Health Records In Solo Or Small Group Practices, *Health Affairs* 2005; 24:1127-1137

²⁴ Taylor R, Bower, A *et al.*, Promoting Health Information Technology: Is There a Case for More Aggressive Government Action:, *Health Affairs*, 2005; 24:1234-1245

unauthorized access – incidents such as the recent theft of 26.5 million VA employment records serve to undermine public confidence in the security of electronic data of any kind.

As happens with any new technology, HIT has evolved ahead of standards that enable competing systems to easily share data. Think about the early days of ATMs, when a customer could enact a transaction only at an ATM machine owned by the bank where he or she had an account. Today, we can get money from an ATM halfway around the world. Just as standards enabled different institutions' ATMs to talk to each other, we need interoperability standards to enable the appropriate sharing of medical information. Although the content of healthcare records is significantly more complex, ATMs and other technologies demonstrate that the technological aspects of interoperability are clearly achievable.

Here, too, overcoming cultural attitudes about competition and collaboration is critical to success. Because healthcare is primarily local, competing organizations are especially sensitive about sharing information lest they lose their advantage in the marketplace.

VII. Delivering on the promise of an interoperable digital healthcare system

In order to create a comprehensive lifetime patient record that will support the delivery of patient-centered care, we first need to ensure that the IT systems and infrastructure are capable of ensuring that physicians will have a portable health record and that the physicians have the freedom to associate with any facility, service provider or other physician. The next challenge is to determine who will pay for the IT systems for physicians use.

Lack of interoperability – the inability to share data across different systems and among different institutions – can prevent realization of the benefits of EMRs on a community-wide, regional, or national basis. Many medication errors occur because patient information exists in different silos, with no communication between them. When patients cross the boundary, for example, from inpatient to ambulatory care, complete medical records may not make the transition with them. As a result, patients may receive duplicate or conflicting prescriptions, with sometimes fatal results. These boundary errors can be avoided with technology that eliminates the boundaries among healthcare providers.

Unfortunately, market incentives are not aligned for vendors to promote interoperability. Instead, the burden of multiple standards falls on the end users (providers), while the benefit – in terms of cost savings – largely accrues to payers.²⁵

The evolution of the U.S. cellular telephone industry provides an illustration of this. In the early days, regional cell phone carriers used different standards. Phones that used CDMA would not work in an area covered by TDMA, and vice versa. Once customers made a purchase decision, they were effectively locked into that vendor's telecom IT infrastructure. The burden of bridging different standards fell on the customer – who would have to buy multiple handsets or more-expensive dual- or tri-mode phones in order to have broader access. The industry's initial response to consumer demand for greater accessibility was more affordable handsets that would work with multiple standards. Consumers were still locked in to a specific carrier, however, until the FCC stepped in with regulations on number portability, enabling customers to keep their phone number when they changed carriers. Similarly, federal policies and regulations for HIT can either create or break down barriers to transparency and choice.

Once a healthcare organization selects an HIT system – a decision often based on cost as much as on other criteria – it is locked into that decision. The cost and disruption of replacing these systems is simply too great. In the same way, in the absence of interoperability hospitals can lock in their referral networks by influencing local providers to acquire the same system. When data can be freely shared, regardless of software, it will increase competitiveness in the market.

²⁵ Hillestad, *supra*, n.11

GE Healthcare is committed to the development of a nationwide health information network as the foundation for improving the quality of care in the U.S. It is crucial that all participants in healthcare – including payers, vendors, and providers – work together to support and evolve to a single set of standards that enable different HIT systems to exchange patient data.

We have a long history of successfully driving open, standard-based data exchange with other vendors. The earliest example is the Digital Imaging and Communications in Medicine (DICOM) standard, which has enabled diagnostic imaging devices and software systems to exchange images and related information regardless of vendor. Diagnostic imaging vendors historically created proprietary formats for the CT or MR images created by their systems. While image exchange was interoperable between systems supplied by the same vendor, that was not the case among systems supplied by competing vendors. This lock-in limited the flexibility of hospital radiology departments to utilize imaging technology in an optimum fashion. Consequently, the radiology community was on the verge of seeking government help to mandate interoperable systems when the diagnostic imaging vendors, through the National Electrical Manufacturers Association (NEMA), and radiologists, through the American College of Radiology and the Radiological Society of North America (RSNA), collaborated to develop the DICOM standard, which became available in 1993²⁶. DICOM allowed images to move from system to system, enabled hospitals to centralize storage of images to reduce costs, and led the radiology department to move towards diagnosing images on a computer screen. Consequently, DICOM enabled the creation of today's \$2 billion picture archiving and communications systems (PACS) market, and has allowed many hospitals to eliminate the second highest expense in their operating budgets: film. PACS has transformed the workflow within the radiology department, leading to increased efficiency and higher quality of care. Physicians at different locations can consult while simultaneously examining the same images and comparing them with other clinical results to get a more complete picture of the patient's condition.

More importantly, the lesson of DICOM is that market pressure to demand interoperability of HIT vendors is more effective than regulatory remedies. Through the competitive marketplace of allowing radiologists to choose diagnostic imaging systems, the diagnostic imaging industry created an interoperability solution that allows complex systems to plug-n-play, and demonstrates how interoperability led to broader and competitive innovation in healthcare.

GE has been a long-term leader in Integrating the Healthcare Enterprise (IHE), an industry-led initiative that is creating a standards-based framework for clinical IT. IHE was established in 1998 by RSNA and the Health Information Management and Systems Society (HIMSS), as the popularity of DICOM led to the desire to improve imaging information exchange beyond the radiology department to other clinical IT systems in the hospital. IHE's interoperability showcases – held at major industry conferences – encourage competing vendors to build and demonstrate data exchange between their products via a collaborative and transparent process. This includes laboratory results, radiology images, medical summaries, and cardiology reports – the very information that today is often still faxed, couriered, or mailed between the majority of healthcare organizations in the U.S.

And GE is one of the leaders in the EHR Vendor Association (EHRVA), a group of the top 39 EHR vendors committed to making EMRs interoperable and to accelerating EMR adoption in hospital and ambulatory care settings. EHRVA is playing a pivotal role in driving standards for electronic health records interoperability, similar to the role NEMA played in the 1990s for diagnostic imaging. Standards for electronic medical records are complex, because they involve multiple types of data, and terminologies that are not 100 percent congruent from one specialty to the next – or even from one hospital to the next.

In February 2005, EHRVA presented to Dr. David Brailer the first roadmap and phased timeline for the interoperability needed to implement a nationwide health information infrastructure (NHIN). The first phase of that roadmap was demonstrated less than a year later at the HIMSS Conference in 2006, with GE joining 37 other IT vendors, including the VA and DOD in showcasing multiple interoperability use-cases. One of the NHIN pilot implementations uses several aspects of the proposed roadmap, and GE and

²⁶ Wiley, G. The Prophet Motive: How PACS was Developed and Sold., *Imaging Economics*, May 2005

EHRVA are reaching out to other stakeholders to encourage further implementation and convergence of the roadmap.²⁷

The roadmap also contemplates that interoperability will be achieved incrementally. As standards become more mature, GE is fully prepared to incorporate them into our products, and we are encouraging other vendors do the same. In the early days of fax machines, there was little value in owning one if there wasn't anyone else you could fax to. Similarly, to be the only vendor implementing interoperability standards benefits no one.

While pursuing technical solutions supporting data exchange is critical to achieving the goal of interoperability, there is only so much vendors can do. HHS Secretary Leavitt, speaking at the January 2006 meeting of the American Health Information Community (AHIC), recognized that there are sociological barriers here that need to be overcome. Even if the technological capacity existed to securely exchange information wherever and whenever it is needed to deliver safe and effective care, providers may be reluctant to participate fully for fear of losing their edge in a fiercely competitive marketplace. That is why it is critical that all of us as stakeholders work together to try to put in place creative solutions that create market demand for interoperability.

VIII. Government's role and responsibility

Vendors can advocate for improved interoperability standards and ensure that our products meet those standards as they evolve. We can pioneer new technologies that make clinical best practices both inherent in clinical information systems and portable between competing systems. And we can assist customers in both realizing and measuring the true value that HIT can deliver in terms of both cost and quality of care.

Ultimately, however, our customers still operate in a world of declining reimbursements and a population of increasingly older and more acutely ill patients. Hospital operating margins are declining; according to the American Hospital Association, they were 6.7 percent in 1996 and only 4.6 percent in 2000.²⁸ Smaller physician clinics are even less able to make an investment in clinical information systems, which can cost, on average, \$44,000 per provider initially and \$8,500 per provider per year on an ongoing basis.²⁹

Our healthcare system still rewards healthcare organizations for the volume of services they provide rather than the quality of outcomes they produce. Except for very limited pay-for-performance pilot programs, where providers receive higher reimbursements for instituting quality measures, the beneficiaries of improved outcomes are the payers, not the providers. Investing in HIT can generate a demonstrated return on investment, but the start-up costs are high enough that they are a deterrent to adoption.

In this environment, there are several things government can and must do to improve adoption of HIT:

- Continue to support and expand pay-for-performance models of reimbursement, which are necessary to promote quality over quantity of care;
- Facilitate the continuation of industry interoperability efforts, through fair and transparent collaboration among private and public sector stakeholders in the American Health Information Community (AHIC) and the standards harmonization and nationwide health information network pilot efforts that AHIC oversees;
- Continue to be a strong proponent of RHIOs and health information exchanges by appointing a strong, effective successor to Dr. Brailer, and adequately funding the Office of the National Coordinator;

²⁷ The EHRVA interoperability roadmap can be found at http://www.ehrva.org/docs/roadmap_v2.pdf.

²⁸ Statement of the American Hospital Association before the Federal Trade Commission Health Care Competition Law and Policy Workshop, September 9-10, 2002

²⁹ Miller and West, *Health Affairs*, *supra* n.23.

- Create market-based incentives that allow physicians to choose a certified EMR system that best meets the needs of their practice.

The policy choices we make today regarding adoption of HIT will determine whether existing barriers to portability and transparency of health information are maintained, or whether we will encourage market forces to demand interoperable solutions that will support the delivery of highest quality care.

On behalf of GE Healthcare, Mr. Chairman, I want to express my gratitude for the opportunity to share with you our perspective on accelerating the adoption of health information technology. I would be happy to answer any questions you and the subcommittee might have.

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