TECHNOLOGY CEO
COUNCIL

1341 G Street, NW

Suite 1100

Washington DC 20005

202.393.2260

www.techceocouncil.org

A call for leadership
from the
Technology CEO Council

a healthy system

How improved **information management** can transform the quality, efficiency and value of Americans' health care

A HEALTHY SYSTEM

TECHNOLOGY CEO

COUNCIL

www.techceocouncil.org

Design and editorial assistance by Vockley•Lang

To: Leaders of U.S. business, government, technology and health care

Subject: The health of America 2006

If there's one thing that everyone agrees on about the U.S. health care system, it's that it isn't, in fact, a system.

A system is organized and consistent.

A system establishes and rewards best practices.

A system integrates diverse elements.

A system is built on standards.

A system creates incremental value.

There is much to be proud of in U.S. health care. We have the best doctors and hospitals in the world, the most advanced medical technology, the most prolific engines of biomedical research and innovation. We've shown time and again the capacity and the commitment to tackle "grand challenges," from the defeat of polio to the mapping of the human genome.

But the sad truth is that in health care today, the whole is much less than the sum of its parts. If our health care system were a brain, it would have millions of smart neurons, but no central nervous system.

We will never fix this problem simply by tinkering with its parts. As a practical matter, and as a moral imperative, we have to address the systemic problems of health care. And the most glaring — and promising — is health care's shocking lack of modern, networked information technology (IT), and the lost quality and efficiency that result.

The Technology CEO Council, a consortium of leaders in the IT industry, is focusing on this issue for three reasons:

- **First,** we believe that a high-functioning health care system presents the single best way to improve the overall health of our society and economy.
- **Second,** we believe that circumstances now are uniquely aligned to seize that opportunity — and that failing to do so will have serious long-term consequences.
- **Third,** we believe we can help. Systems are our area of expertise.

The IT industry has, over the last half century, built the systems that run virtually every important industry and public institution in America — and in the process, has transformed our national economy. Plus, as leaders of large enterprises ourselves — companies that are rapidly integrating across diverse industries, functions, businesses and parts of the world — we know first-hand the value of IT enablement, networking and integration.

The United States today finds itself in a tough battle in a globalizing marketplace, and we can't compete if we are forced to spend 30 percent of our Gross Domestic Product (GDP) fighting a two-front war against disease and disaggregated data. Worse, it's a war we're losing. The United States spends far more per capita on health care than any other country — yet by numerous measures of quality and patient satisfaction, Americans are not getting full value for their hard-earned health care dollars.

It's time — indeed, past time — to bring Americans' health care into the same century as their banking, shopping, entertainment and manufacturing.

As you read this report, you may be surprised to find a proposal from the IT industry that is not primarily about massive investment in infrastructure — although, with the United States only 16th in the world in per-capita broadband deployment, that cer-

tainly does require more work. However, in our view, the most urgent problems facing American health care — and the most promising opportunities for improving it — are not about infrastructure or computers, nor about the generation of more data.

This is less about technology than about policy. What's most needed now is *leadership.* We need a new approach that reaches across government, business and the provider community to reward integration and coordination of care, not isolation … to speed the adoption of evidence-based clinical practices, not keep them in medical journals … to reinforce collaboration, not penalize it … and to strengthen the doctor-patient relationship, not create adversaries.

Ask any CEO, governor, mayor or university president what his or her top financial challenge is, and the answer will be the same: "the rising cost of health care." The nine of us who make up the Technology CEO Council grapple with this every day in our own companies. We are deeply concerned about the impact of these escalating costs on our companies, our industry, our customers and the U.S. economy as a whole — and even more, their deeper, longer-term impact on Americans' physical and social health. The truth is, an integrated health infrastructure is a crucial part of our nation's long-term security.

We are under no illusions. We know that the issues of American health care are complex and deeply rooted. But we also know that improved information management can make a huge, transformational difference.

We call on our peers in health care, government, insurance and business — America's providers, payers and regulators — to join us in stepping up to this leadership challenge:

National Leadership

We call on government to leverage its position as America's largest purchaser of health care, to demand more for its money, and to use measure-ment and accountability to drive value improvement and cost reduction.

Provider Leadership

We call on health care providers and insurers to establish common, transparent metrics of quality and cost and to adhere to standards that permit interoperability of their information systems and to clinical practices that conform to the best medical evidence.

Business Leadership

We call on our fellow business leaders to use their purchasing decisions to encourage delivery of the highest quality and value and to provide their employees with the personal health record tools to make better health care and lifestyle decisions.

Grassroots Leadership

We call on individual Americans to take charge of their health, to demand access to their personal health information, and to use that information in making decisions about the health products and services that they and their families use.

Specifically, we call for the implementation of the seven-point program of health care reform detailed in this report. And though we compete aggressively with one another in the marketplace, our nine companies — representing more than 800,000 employees around the world — are joining together to create common tools and approaches, and to adopt these new approaches ourselves.
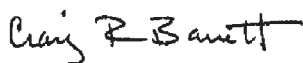
In that spirit, we offer in this report:

- **A Call to Action** that highlights our vision and recommendations
- **An e-Health Readiness Guide** that provides benchmarks for progress and action steps for organizations and individuals
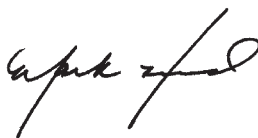- **Model Legislation** for state lawmakers to review and consider

It's time for America's unmatched technology and business creativity to focus on our citizens' health and well-being. We have great doctors, hospitals, pharmacies and scientists. We are blessed with a national culture of pragmatism, compassion and innovation. But there's so much more we can and must do.

We need a health care system that supports America's future as the world's premier hub of innovation. We need a health care system that brings 21st-century networking and knowledge systems to the prevention of injury and disease as well as its diagnosis and treatment; in short, the saving of lives. We need a health care system that empowers the American people to become active partners in improving their own health — and, through their participation, enhancing the collective health of all Americans.

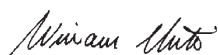In a word, we need a U.S. health care **system.**

Craig R. Barrett
Chairman, Intel Corporation
Chair, Technology CEO Council

Mark V. Hurd
President and
Chief Executive Officer
Hewlett–Packard Company

Joseph McGrath
President and
Chief Executive Officer
Unisys Corporation

William Nuti
President and
Chief Executive Officer
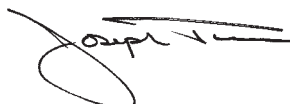NCR Corporation

Samuel J. Palmisano
Chairman and
Chief Executive Officer
IBM Corporation

Kevin Rollins
President and
Chief Executive Officer
Dell Inc.

Mike Splinter
President and
Chief Executive Officer
Applied Materials, Inc.

Joseph Tucci
President and
Chief Executive Officer
EMC Corporation

Edward Zander
Chairman and
Chief Executive Officer
Motorola, Inc.

Introduction and recommendations

The problems within U.S. health care that result from inadequate information systems are well documented:

- According to a seminal study and subsequent analyses of it, up to 98,000 hospital patients die from avoidable medical errors each year — more than from AIDS, homicides and car crashes combined.[1]

- An estimated $300 billion is wasted annually on unneeded and redundant medical tests, with another $150 billion lost to administrative waste.[2]

- This inefficiency and waste have helped drive health insurance premiums up more than 10 percent annually for five straight years — far outpacing inflation in other sectors of the economy.[3]

- A 2004 RAND study found that patients received the recommended care only 54 percent of the time. Although the standard of care for a heart attack is beta blockers and aspirin, only 45 percent and 61 percent of patients, respectively, received these important and relatively inexpensive medications.

- A September 2005 RAND study determined that a true national health information network could save up to $165 billion per year by shortening hospital stays, encouraging tests and early treatment, and cutting administrative costs.[4]

There are hundreds of additional data points that could be cited. What is beyond dispute is that this disaggregated information regime is an important reason the American health care system ranks a mere 37th in the world in quality,[5] and the United States ranks a sobering 48th in life expectancy.[6]

The good news is that much of the broadband and computing infrastructure for a modern system already exists, with more on the way. There is also a wealth of high-quality data being generated by many elements of the health care ecosystem today — from high-tech operating rooms and labs to clinical trials and the frontiers of genetic modeling; from company benefit programs to the databases of insurers, pharmacies, schools and wellness programs. Although much physician record-keeping is still paper-based and disconnected — and these repositories of crucial information must be aggressively digitized and networked — there is a great deal that can be done right now with the data and infrastructure we already have.

Specifically, the Technology CEO Council believes that there are pragmatic steps that key stakeholders in the U.S. health care ecosystem can take in 2006 to produce meaningful near-term improvement. We call for the adoption of a seven-point program:

1 **Employers must raise the bar for quality, efficiency and safety by adopting principles that drive better health care outcomes.** Companies should buy health care based on quality, value and improved performance from providers and networks investing in measurement, accountability and interoperability. The companies of the Technology CEO Council believe that access to personal health information is a key step toward the empowerment of health care consumers that will enable the interchange of health data. The companies of the Technology CEO Council will continue to lead such efforts among employers.

2 **Providers, payers and regulators must adopt interoperable technology and common data standards.** Health care records and systems should use open standards — that is, technology standards developed through transparent public processes — to enable national interoperability among the different systems. The companies of the Technology CEO Council will adopt electronic health records based on open standards and we will make a private, personal and portable electronic health record available to each of our U.S.-based employees as soon as possible.

3 **The federal government must serve as an exemplar and change agent.** As one of the largest providers of health care services, government should play a leadership role by driving market-based open standards and best practices in its own programs, such as the U.S. Department of Defense and the U.S. Department of Veterans Affairs. Government should begin accepting and, by 2007, require federal agencies to receive and transmit information electronically, using interoperable standards.

4 **States must catalyze local change and establish the building blocks of a national system.** State policymakers should convene community dialogues to consider ways of improving health care through better information management, including legislation that:

- bases Medicaid reimbursements on value, with additional incentives for health IT adoption;
- encourages formation of regional health initiatives through loans, grants and/or regional tax-exempt bonding authority;
- removes legal and regulatory impediments;
- makes better use of health care data collected by state public health agencies; and
- enables telemedicine through licensing reforms and Medicaid reimbursement.

A discussion summary draft of Model Legislation is included on page 35 of this report.

5 **Medicare and Medicaid programs must drive quality medicine.** Medicare and Medicaid reimbursement programs must pay for performance — providing incentives to drive higher quality, greater efficiency and the spread of best practices. Congress should pass legislation that advances Medicare reimbursement reforms that reward quality and value.

6 **Public and private stakeholders must ensure patient privacy and data security.** Everyone in the health care community should review existing federal, state and health network systems and practices to ensure they both promote data sharing and network interoperability and protect patient privacy and information security.

7 **Policymakers must provide adequate funding for health care IT leadership and change.** The long-term returns vastly outweigh the near-term costs. Policymakers should commit the resources needed to catalyze change on a consistent and predictable basis, through the U.S. Department of Health and Human Services (HHS), its Centers for Medicare & Medicaid Services (CMS), and other agencies. Congress should fully fund the HHS Office of the National Coordinator for Health Information

Technology (ONCHIT) and the health IT work of the other critical HHS agencies in the Fiscal Year (FY) 2007 budget.

The journey to 21st-century e-health requires a series of transformative steps from our current fragmented, paper-based state to online, interactive health care and, ultimately, to a truly integrated system. The Technology CEO Council believes that a balanced, multifaceted effort, involving payers, providers and government, offers the best hope for success. We think our industry's area of expertise enables us to hone in on promising opportunities to accomplish that. And our leaders are eager to join with their peers in American business, health care and government to move the process forward more rapidly.

If we do so, we believe it is reasonable to achieve, within the next five to 10 years, a U.S. health care system where we see:

- A 40 percent to 60 percent reduction in preventable medical errors in hospitals through improved information controls
- Fewer than 10 percent of individuals manually entering health information for each new provider visit
- More than 80 percent of health records available electronically, with every American who wants an electronic health record possessing one
- More than 80 percent of individuals with online wellness programs that monitor progress, improve compliance and engage providers
- More than 80 percent of prescriptions produced and transmitted electronically
- 100 percent of individuals accessing care remotely, with providers receiving health data from people's homes
- 100 percent of providers with real-time access to the most current information on evidence-based clinical practices and adverse drug interactions, accessed electronically during the course of care
- 100 percent of government agencies enabled to receive and share health-related information electronically

The good news is that much of the infrastructure and tools needed to transform our health care system exist today, and others are in development.

Much network infrastructure already exists. Nearly 40 million American homes receive current-generation broadband connections; more than 80 million American households own personal computers[7]; and more than 182 million Americans use cell phones, increasingly for data-rich applications.

In addition, we have an ocean of high-quality data. Every day in this country, hundreds of thousands of citizens interact with doctors, nurses, hospitals, health clinics and pharmacies. Every hour these interactions generate new data on drug efficacy and side effects, optimal courses of treatment, risks of disease and complication, potential epidemics and outbreak migrations, and quality of care. Prescriptions are tracked electronically by pharmacy benefit management firms — entities created or hired by insurers and employers to manage prescription drug costs for their enrollees and employees. Lab results often are processed electronically by independent laboratories and hospitals. All of this data could be used to assess whether health care dollars are well spent.

In development today and ready to serve as the linchpins of a networked health care infrastructure are many tools, including:

Passive Network Tools — Repositories for Health Information

Picture archiving and communication systems. These systems capture and store radiological and digital images from X-rays, MRIs, CT scans and other sources, making them available to providers and patients.

Electronic health records (EHRs).
EHRs put all of a patient's medical data in one place. They enable doctors, nurses, patients and their families to get the right information at the

right time to make the best decisions. And they allow individuals to interact directly with their integrated, continually updated health records. In the future, the idea that health records were locked inside many doctors' separate file cabinets will seem as quaint as having checking account records locked inside a bank vault.

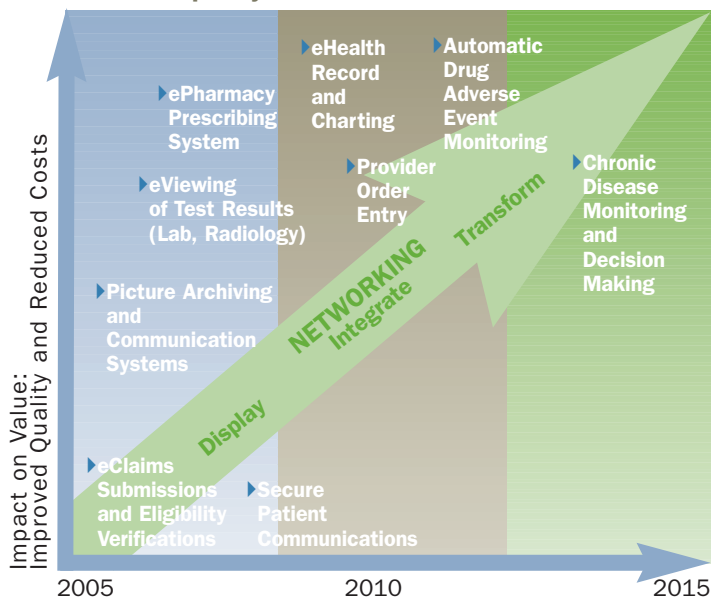## Interactive Network Tools — Getting Information and Giving Orders Online

Computerized physician order entry systems (CPOEs). CPOEs oversee order and fulfillment of medical actions, including prescriptions, lab orders, discharges, transfers and referrals. Electronic "audits" identify problems such as allergies and known adverse drug interactions. By reducing mistakes and automating processes, e-prescribing can improve patient safety and cut costs. E-prescribing also gives patients and clinicians access to the best medical information to make critical decisions about medicine selection, enabling patients to get the most benefits at the lowest cost.

Privacy management systems. These systems limit access to data to people with appropriate proof of identity, need, location and patient permissions.

Active Network Tools — Putting Systems to Work for Health Care

Clinical decision support systems (CDSS). Many recent studies show that physicians and other caregivers cannot keep up with the avalanche of new medical information. Clinical decision support programs address this information overload by giving providers real-time recommendations on diagnoses and treatments. From basic alerts (such as, "You should not give this patient beta blockers due to her asthma") to complete clini-

Deployments of new health IT tools and their impacts on patient outcomes and cost quality

Impact on Value: Improved Quality and Reduced Costs

- ▶ ePharmacy Prescribing System
- ▶ eViewing of Test Results (Lab, Radiology)
- ▶ Picture Archiving and Communication Systems
- ▶ eClaims Submissions and Eligibility Verifications
- ▶ eHealth Record and Charting
- ▶ Provider Order Entry
- ▶ Secure Patient Communications
- ▶ Automatic Drug Adverse Event Monitoring
- ▶ Chronic Disease Monitoring and Decision Making

NETWORKING
Integrate
Transform
Display

2005   2010   2015

cal protocols (such as, "Here are the 15 steps appropriate for a patient presenting these symptoms of coronary artery disease"), these systems supplement providers' training and memories so that best practices are known and offered — without limiting providers' ability to customize care based on the needs of the patient.

Wireless networks and remote care.

Electronic monitoring systems allow hospitals to track medications, patients and doctors within hospitals, with radio frequency identification (RFID) replacing bar coding to match patients and drugs (and the right dosage for the right individual). More advanced wireless monitoring will allow patients to receive frequent or constant observation and assessment beyond the confines of a hospital bed.

Aggregate database on treatment outcomes.

As more agencies permit or require electronic submission of quality metrics and outcome data, storage of clinical information in databases (with patient names removed) will enable us to mine such data to vastly improve health care

providers' understanding of the results of various courses of treatment, such as adverse events from medications.

For example, for more than a decade NCR Corporation has worked with the Michigan Department of Community Health to develop and maintain an electronic data warehouse that stores and analyzes records from the state's many medical programs. This aggregation of data allowed health officials to raise Michigan's child immunization rates from last to first in the nation by analyzing immunization patterns county by county. It also has reduced Medicaid administrative costs by 25 percent and saved $75 million to $100 million annually by reducing program overlap, revealing fraud and allowing officials to anticipate problems through improved forecasting.

We still have a long way to go. Increased commitment to and deployment of information technologies are critical to success. Most of the technologies noted above have penetration rates among their end users of 20 percent or less, with CPOE usage rates below 5 percent. The costs to implement these systems total tens of millions of dollars. For that to change, these tools must become standardized, networked and easier to use. But the path forward has been cleared — and much of the infrastructure has been built — by the rest of the American economy, from retail to finance to manufacturing to transportation. All of these sectors have leveraged the power of IT to transform themselves and lay the foundation for a true 21st-century health care infrastructure.

AN EARLY EXAMPLE OF IT-ENABLED TRANSFORMATION: E-PRESCRIBING

In digital health care, the electronic prescription system, or e-prescribing, reduces mistakes, improves patient safety and reduces costs.

In fact, a study conducted by CGEY and Allscripts revealed a savings of 75 cents to $3.20 per electronic prescription compared with a paper one.[8] This return on investment is tremendous on a national scale across billions of prescriptions. But recent surveys indicate that as few as 5 percent — and no more than 18 percent — of the estimated 3 billion prescriptions written every year are ordered electronically.[9]

E-prescribing also enables physicians to obtain from drug plans information about patients' eligibility and medication history.

The Medicare Modernization Act called upon the National Committee on Vital and Health Statistics to develop recommendations for uniform standards for e-prescribing to promote patient safety and quality health care. Medicare soon will require drug plans participating in the new prescription drug benefit to support e-prescribing (although it will be voluntary for physicians and pharmacies).

HHS is pushing EHRs and regulations that will standardize e-prescribing, along with communicating and interpreting other health information.

challenges to overcome

Without question, a major challenge with America's health care system is that it remains dependent on manual data entry and paper records. For example, 95 percent of small practices still rely solely on pen and paper, according to *Healthcare Informatics*.[10] In the end, however, fixing U.S. health care is not primarily a matter of technology enablement.

Instead, we must change practices, habits and culture. And we must adopt policies and incentives that encourage and enable digitization, integration, coordination and information sharing.

Challenge 1

Much important data is paper-based, isolated and disconnected.

While primary care physicians have their own records, they do not have access to information about much of the care their patients receive outside their offices — unless patients bring a report or tell their doctor where to submit a written request for information. Hospital providers rarely have access to patient records, such as previous treatment histories outside their hospitals, while emergency room doctors know almost nothing about patients' allergies and pre-existing conditions. This often results in redundant tests, increasing the cost of care, and missed diagnoses or treatment resulting in injury.

Emergency medical technicians (EMTs) — the medical personnel on the front lines who must make immediate treatment decisions — may have it toughest of all. If these dedicated first responders are lucky, patients may have medical alert devices or coherent relatives well versed in their family member's medical history. More often, EMTs work in the absence of real-time data on complete strangers. The irony is that most people suffer medical emergencies near their homes, so that critical information may be in a hospital or doctor's office just down the street.

Poor information systems threaten nonemergency patients as well. Whether your medication for anxi-ety peacefully co-exists in your bloodstream with the cholesterol medication you have been taking depends on whether each doctor was aware of the other's prescription. And whether the pharmacist gives you Zoloft or Zocor depends too often on the clarity of the physician's handwriting. These challenges become even greater when a patient is taking multiple prescription drugs and using more than one pharmacy. The average senior receives 25 prescriptions annually.[11]

Information that could improve future care remains unknown to the doctors and patients who need it most. The government and private entities spend billions each year for research, clinical trials and patient studies — but we still collect most of this data in paper formats, enter it manually into separate databases, and keep it distinct and not cross-referenced. Even the data that is already in electronic form is inaccessible to people who could use it for productive research. Given the rapid changes and advances in clinical care, it is difficult for most providers to be aware of the best and most recent evidence-based treatment protocols. Further, patients with identical conditions often receive different care, with treatment based not on their unique facts and circumstances, but rather on their providers' widely varying levels of awareness of the latest course of treatment.

Challenge 2

We do not use common standards, preventing effective interoperability, even among electronic networks.

Because there are multiple standards for software interoperability and representation of clinical data, even systems that have replaced pen and paper cannot interact. Networks of information remain isolated and distinct — call it *chronic asystemia* — and this disconnection disserves both providers and their patients. By keeping vital patient information out of the hands of both, we limit their ability to make the best medical decisions. By failing to auto-

mate prescription and delivery systems, we subvert their intentions and confuse their instructions. When we fail to aggregate, analyze and risk-adjust information on quality and outcomes, doctors don't have the best data about the results of medications and treatments, information that would help them save lives. And by failing to differentiate payments based on results, even where clinical standards are well established, we push them to practice quantity medicine rather than quality medicine.

More than 30 standards development organizations (SDOs) have produced health standards. The federal government already has identified 24 for use by federal agencies. But major providers, starting with the government, are not yet demanding or successfully driving their adoption. While the government financially supports more than 75 percent of the work done by these various SDOs, its own health systems do not yet use standards that can interoperate within a broader health care system.

Prescriptions are tracked electronically by insurers — but not shared, even in anonymous aggregate formats. Lab results processed electronically by independent laboratories and hospitals are not integrated and often are not accessible to the physician. Indeed, the vast majority of outcome data generated by the health system — information that could lead to far better understanding of treatment options, adverse drug events and outcomes — is lost within the system: disaggregated, unanalyzed and useless. The positive impact from broader, more effective collection and use of this data would be enormous.

Challenge 3
Patients are asked for too much information and given too little to make the best decisions.

While health care today is, at various times, provider-, insurer-, employer- and prescription drug maker-centric, it is rarely patient-centric. From wait-

ing room delays to repeated filling out of identical forms to multiple blood samples for the same test, patients find much to be desired from most health care interactions. For example, your doctor may send you to a specialist with a $1.5 million CT scanner, but every time you enter a new office you are handed a clipboard with forms seeking your name, address, insurance information and medical history. Such redundant paperwork accounts for only part of the millions of hours patients waste annually in waiting rooms and traveling to and from appointments.

Patients are in the paradoxical and maddening position of simultaneously lacking important data about their own medical histories and about their providers' track records — and drowning in a sea of health care information and options.[12] This is in marked contrast to many less important areas of our lives. Buyers and sellers on eBay can access information on the reputation of all other buyers and sellers, based on their transaction histories. Someone buying a book on heart surgery can compare reviews of dozens of titles on Amazon.com, share experiences with patients around the world in chat rooms, or access cutting-edge data on the procedure. But patients facing heart surgery who are trying to select doctors often must rely on word of mouth to assess the relative quality or efficiency of a surgeon.

Challenge 4
Providers lack incentives to change and face costs and confusion.

We know that some doctors and hospitals may be wary of any broad plan to measure how well they take care of their patients, or resistant to what they perceive as "one-size-fits-all" clinical decision support systems that purport to know more than they do or suggest specific treatments or protocols. Many health care professionals have developed successful practices using the current paper-based system. It is understandable that they would be

reluctant to invest time and money to transform a system that appears to satisfy their community and patients.

Using this system, they have served their patients and communities well for many decades. And for the tens of thousands in small or solo practices, the money for electronic systems would come straight out of their pockets. Current reimbursement practices from government and private insurance do not reward systemic upgrades, even where such investments would lead to better patient outcomes.

Understanding these doctors' reluctance to invest in new technologies is critical to determining the types of products and features that may work best within their practices. The challenge before us is to convince the health care community that moving to an integrated IT-based system will allow them to enhance their capability to provide quality care at less cost to their patients and less risk to themselves.

Challenge 5
Our system is based on inputs, not outcomes.

In American health care today, we pay far too much for process and far too little for performance, placing quantity over quality for purposes of reimbursements. Medicare, Medicaid and private insurance companies pay providers based on the number of transactions, irrespective of the quality of care delivered. Thus, whether physicians follow or fail to follow evidence-based practices known to be effective, they are typically paid the same by Medicare, Medicaid, employer-sponsored health plans or other insurance programs.

The result of these challenges is a system of inadequate quality that costs too much — with a high level of patient dissatisfaction with cost, inconvenience and duplication. At a societal level, the inefficiency of such a key sector of the economy is a strategic impediment to America's competitive position. And it's just as key for the U.S. govern-

Quality of Care Is Inadequate	Cost of Care Is Excessive	Delivery of Care Is Inconvenient
■ Up to 98,000 hospitalized Americans die each year from preventable medical errors.[13]	■ One-third of the $1.8 trillion in annual U.S. health care spending is duplicative or inappropriate procedures.[17]	■ Three of every 10 tests are reordered because results cannot be found.[23]
■ Patients received the recommended care only 54 percent of the time.[14]	■ Roughly 38 percent of health care costs go to administrative overhead.[18]	■ Patient charts cannot be found on 30 percent of visits.[24]
■ There are more than 7,000 deaths and more than 500,000 preventable injuries yearly from medication errors alone (both in and out of the hospital).[15]	■ As much as $200 billion is lost to injuries resulting from medical error.[19]	■ Providers need to fill out an average of 20,000 forms every year.[25]
■ Quality is getting worse in one-third of the areas where measures exist, and improving only slowly in the rest.[16]	■ $76.6 billion is lost to drug-related illness and death resulting primarily from patient noncompliance and inappropriate prescribing and/or monitoring by health care professionals.[20]	■ The average California emergency room patient waits 56 minutes before being seen.[26]
	■ At more than $10,000 annually per doctor, transcription costs are excessive.[21]	■ Providers must manually fill out redundant reports for multiple payers and government agencies.
	■ One-third of U.S. hospitals lost money in 2004.[22]	

ment itself, which must stabilize its costs as the huge Baby Boom generation enters Medicare. The latest data from the Organization for Economic Cooperation and Development (OECD), which compare trends among 30 industrialized countries, show that the United States spent $5,267 per capita on health care in 2002 — 53 percent more than any other country.[27] In spite of that, Americans do not have access to a greater supply of health care resources than people in most other OECD countries. In fact, the United States has fewer hospital beds, physicians, nurses and CT scanners per capita than the OECD median.

In addition, Americans were the most likely to report not seeing a doctor when they were sick, not getting recommended tests or follow-up care, or going without prescription medications. Timeliness of access was a greater problem in the United States than elsewhere. While the majority of adults in New Zealand and Australia said they received appointments on the same day when they were last sick and needed medical attention, only one-third or less of U.S. adults reported such rapid response.

In sum, the extra dollars spent in America on health care are not yielding demonstrably better value on a population basis or higher patient satisfaction. The results of these shortcomings in health care are well documented, and clearly warrant action.

Clearly we must move forward. Reform that saves lives and money cannot and must not wait for universal buy-in, nor should it respect anything but the highest level of care. And, as in every other sector of our society, the ultimate arbiter of that quality is not the provider, but the public — whether buyer, consumer, student, citizen or patient. Indeed, one of the brightest promises of e-health lies in its democratizing potential — the potential that networked IT has unleashed in so many other fields for empowered individuals to become full and active partners in shaping the things that affect their lives.

A Practical Tool for Overcoming the Challenges

THE E-HEALTH READINESS GUIDE

In the center of this report, the Technology CEO Council offers the e-Health Readiness Guide, which provides benchmarks for progress in 22 categories that cover critical aspects of a comprehensive health care system. Individuals and organizations can use this guide, and the action steps we recommend, to move toward a healthy system in their communities and nationwide.

The opportunity

vision of a modern health care system

Modern, scientific medicine first appeared in the mid-18th century. For the past 250 years, we have seen remarkable progress brought on by advances and technologies that transformed medicine from theory into a science. Thomas Beddoes focused on the value of gases, and in doing so created nitrous oxide, the first anesthetic. William Withering created the first modern drug, using a plant called digitalis that healed ailing hearts. James Lind conducted the first clinical trial and, as a result, found a cure for scurvy with citric acid or vitamin C. These pioneers, and many others, created the breakthroughs that created modern medicine.

We are now at the dawn of a new breakthrough. The proliferation, digitization, networking and sharing of medical information will enable health care providers to combine the collective power of centuries of medical advances for the benefit of their patients. A fully integrated, networked system will create a fundamental shift in how we think about health care — and, perhaps, how we think about human possibilities more generally.

Today, health care is often based on trial and error. That's why they call them "clinical trials." But tomorrow, through bioinformatics, we'll be able to supplement trials by combining clinical and biological data to analyze and simulate complex biological systems *in silico* and in real time.

Our hope today is to move past curative health care to preventive health care. With genomic medicine, we will achieve individualized and even predictive care, based on an individual's genetic makeup.

EARLY LEADERS SEEING REAL RESULTS: THE CLEVELAND CLINIC

President Bush visited the Cleveland Clinic in 2005 to see first-hand why the clinic is at the forefront of health information technology.[28] The Cleveland Clinic has an electronic medical record system that helps connect its large physician practice (more than 1,200 physicians across northeastern Ohio). In addition, thousands of nurses and other allied health professionals use the same tool in their patient care. Together, they use IT to address patient safety, quality of care and efficiency.

The clinic's physicians wrote 2 million electronic prescriptions in 2004. The system checked each prescription to ensure that patients were not impacted negatively by an adverse drug event or bad drug interaction. The same system identified when patients needed health screening tests, promoting preventive activities more consistently — and identifying abnormalities early, when they were treatable. For efficiency, when more distant physicians' patients came to the main campus to receive care, their EHRs already were there, with no need for repetition, mailing or faxing.

Through the e-Cleveland Clinic My Chart program, patients can connect to the Internet from their homes to see their EHR, giving them access to their lab tests. They can schedule appointments, renew prescriptions and see customized health maintenance alerts, so that they can initiate care on their own when they need it. This information empowers patients to be partners in the health care decision-making process.

But the clinic's leaders recognize that to meet the goal of improving the quality of care for all Americans, they have to do more. As the clinic's Chief Information Officer, Dr. Martin Harris, acknowledges: "Our electronic medical records system has 3 million patients in it and 100 million data elements about those patients, but that's not enough. If we're going to meet the goal of improving the quality of care for all Americans, we have to be able to get to all the information about a patient, whether it's at a retail pharmacy, whether it's in another provider organization, whether it's in a payer organization, so that we can bring all the information related to a patient together at the right place, in front of the right person, so physicians and patients can make the best possible medical decision."

Imagine the day when your provider can partner with you to manage your health preemptively, based on deep knowledge of you as an entire person, rather than simply responding to problems when they arise.

In a 21st-century health care system, we will leverage the power of information to make doctors more informed and therefore better at what they do. Improved methods for measuring outcomes will bring greater accountability and enable improvements in quality. Employers will purchase health care based on total costs — considering both insurance premiums and the value of healthier employees (fewer sick days, higher productivity) — rewarding quality in the marketplace.

In this new system, providers instantly will access patients' complete medical records, whether in a doctor's office or an ambulance. This information will be available from any device, fixed or mobile, anywhere and anytime. E-health systems will ensure that doctors are aware of clinical best practices and the most current treatments — and even will search out subtle problems to bring to the physician's attention — greatly reducing preventable medical errors. Like stethoscopes and X-rays, health IT will cause a quantum leap in the care doctors provide to their patients. It will encourage medical innovation.

More broadly, a networked health care system will enable Americans to take an active role in their own health — and make it easy and attractive to

HOW INFORMATION TECHNOLOGY IS TRANSFORMING OUR ECONOMY AND SOCIETY

Since 1995, IT has played a critical role in doubling the rate of U.S. productivity. As much as 26 percent of productivity improvement since 1995 may be directly related to good information systems, and even more may be indirectly related to the actions people take to improve performance.[29] Indeed, as U.S. Federal Reserve Chairman Alan Greenspan has observed: "Before this quantum jump in information availability, most business decisions were hampered by a fog of uncertainty. Businesses had limited and lagging knowledge of customers' needs and of the location of inventories and materials flowing through complex production systems. ... Decisions were made from information that was hours, days or even weeks old."[30] Removing the fog of uncertainty unleashed huge economic gains in our increasingly dynamic, information-based economy.

As we look for lessons on how to leverage the power of networked IT to modernize our health care system, it's worthwhile to review how it has affected other industries.

Improved Quality

- Advanced IT systems enable manufacturers such as Black & Decker to monitor production systems, rapidly identifying potential problems and reducing defects by 20 percent.[31]
- FedEx uses information systems to move more than 6 million packages around the world every day with 98 percent reliability on next-day delivery.[32]
- Over the past several years, the Federal Bureau of Investigation digitized millions of inked fingerprint cards that had been accumulating in metal filing cabinets. Plugging this data into a high-powered computer system, the bureau can now scan its 46 million sets of prints in minutes, a process that used to take six months by hand. They are using the system to solve old crimes; support local law enforcement around the nation; and even conduct employee background checks for school districts and private businesses, bringing in $152 million last year.[33]

Reduced Cost

- Retailers such as Wal-Mart can maintain global supply chains that use standards-based, horizontally integrated IT to recognize and react to market demand instantly, keeping shelves full and costs low.
- At Dell Inc.'s manufacturing facilities in Texas and Tennessee, online orders go directly to the production area, where employees pull all the parts and assemble custom-ordered PCs. Software is loaded and systems are tested before they are boxed for shipment, saving time and money.

Enhanced Convenience

- Through IT, consumers go online to pay their bills, buy and sell stocks, and securely manage their financial statements. Financial organizations are all linked electronically, permitting $3 trillion in global transfers daily and significantly enhancing possibilities for worldwide commerce.[34]
- In the air travel industry, with annual revenues exceeding $130 billion, nearly 50 percent of ticket sales occur exclusively online and more than 64 million consumers use the Internet to research their trips prior to purchase.[35]

do so. Much like people manage their 401(k) or 403(b) retirement plans through their financial institutions, they will be able to manage their health care benefits and needs through their health plans. People will be able to move beyond the passive role of the "patient." Rather than seeking care only when they are sick or during random and infrequent check-ups, Americans will pursue wellness regimens that prevent problems before they arise, using remote medical equipment to assess diagnostic information in real time. They will become more aware of their health care choices, empowered through better information and the control it provides.

People suffering from chronic diseases, such as diabetes, will be better able to monitor their conditions wherever they are, saving them numerous visits to the doctor.

Health care consumers will be able to review data about the quality and performance of providers and facilities — which will, like any value-based mechanism, significantly improve the quality of health care overall. Using this information, citizens will determine which facilities and medical practices are best suited to care for them.

A very large proportion of health care will move out of hospitals and into the home — just as much of our work, education and entertainment already has. When someone does need to make a health care visit, personal information and medical history will reside in the EHR. These digital records will be complete and protected against inadvertent destruction — but accessible only to those authorized to see them. The $300 billion we now waste annually on unneeded and redundant medical tests will look primitive, indeed. And by extending telemedicine into homes, people in rural or remote areas for whom health care has been unavailable will be able to receive real-time care from specialists.

Access to EHRs will be strictly protected, managed and controlled. The security-management system will be built to make distinctions between a psychiatrist and a gynecologist, between data that identify the patient and data that do not, between information relevant to a specific health problem and information that is not relevant. Health providers will receive only the patient information that is relevant to the care they provide.

The ability to store, access, dynamically analyze and develop predictive models with health information will advance our understanding of treatments and predict outcomes. Knowledge databases that provide detailed and/or aggregate health information will enable doctors to tap into the latest techniques and best practices. Event-triggered alert mechanisms will notify doctors to new issues relating to drug allergies or complications, so that they can rapidly adjust care as appropriate. And it will make possible significant improvements in national and global epidemiology and response to outbreaks.

Case in Point

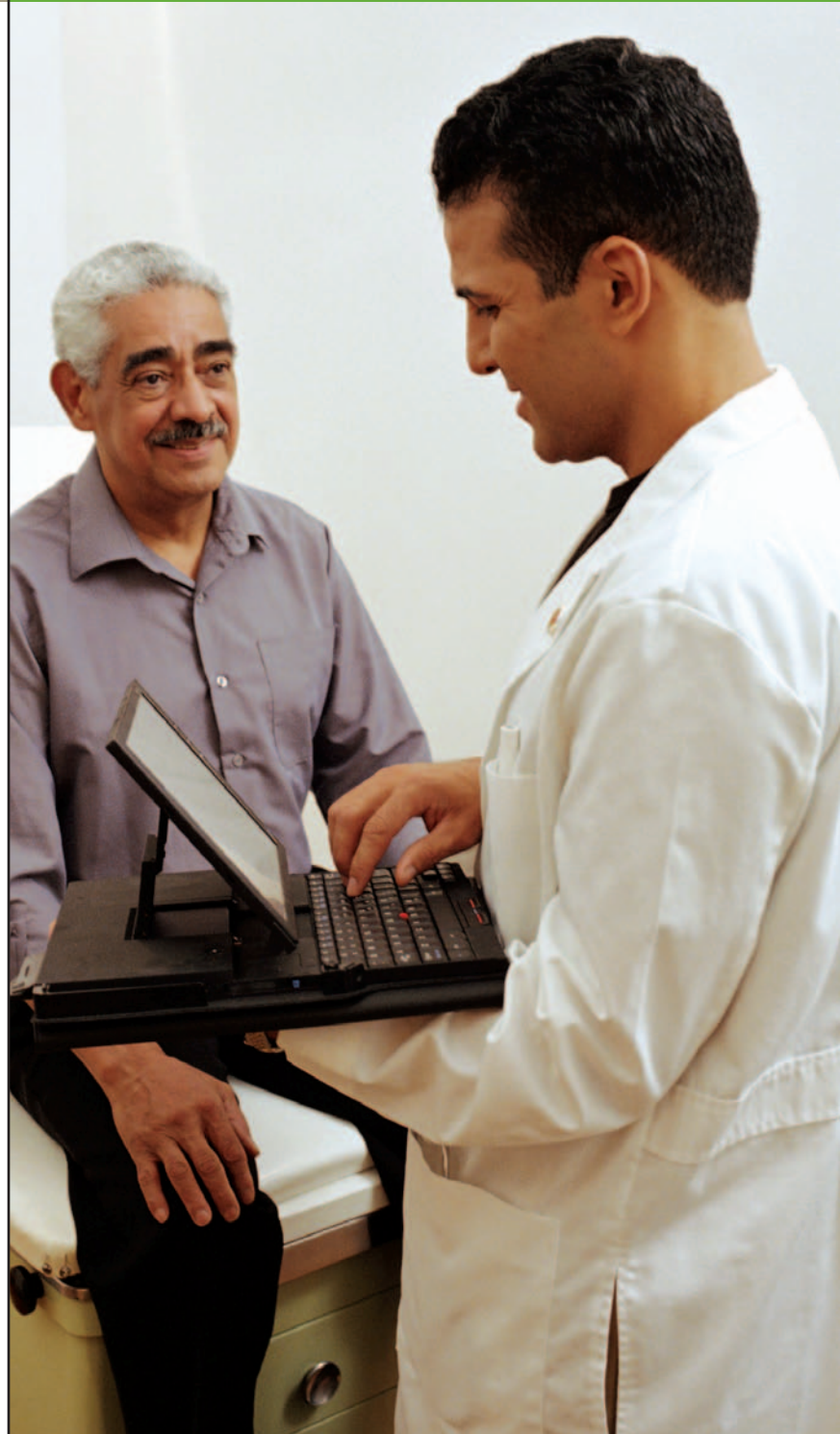## EARLY LEADERS SEEING REAL RESULTS: INTERMOUNTAIN HEALTH CARE

In the early 1980s, Intermountain Health Care of Utah implemented one of the nation's first EHR systems to improve quality of care. Using the statistical data that the system generated, Intermountain was able to pinpoint problems, including toxic drug interactions and delays in administering antibiotics to surgery patients, and take steps to correct them. The effort to improve reliability grew even more systematic in the mid-1990s under the guidance of Executive Vice President William Nelson, who prompted a redesign of the EHR system and the addition of outside doctors and nurses to peer-review each department's work.

"The main reason that health care fails these days," explained Intermountain Executive Director Brent James in an interview, "is not people or training: It is complexity." By using software and peer reviewers to enforce the use of best-practice protocols and search out unexpected interactions, Intermountain helps doctors navigate through the complications of modern medicine to harness all of its benefits.

As a result, Intermountain patients experience post-surgical infections at only one-fourth of the national rate. New protocols also reduced death from congestive heart failure by 22 percent. Improved care is not just a matter of enforcing static guidelines: Because kidney function declines over time in hospitalized individuals, Intermountain carefully monitors patients and changes drug doses to match what their bodies can tolerate on any given day. And patients are not the only ones to benefit. Changes in standard procedures have saved Intermountain $10 million annually in the obstetrics department alone.[36]

recommendations for action

Every stakeholder in the health care community has an important role to play in digital migration. Any effort to create an action plan must examine and highlight these critical catalysts.

The Technology CEO Council believes that providers, payers, regulators and American citizens all must act to accelerate the modernization and transformation of our system.

An Action Plan for 2006

The Technology CEO Council proposes a seven-point action plan that can, with the right leadership, be substantially in place by the end of 2006:

1 Employers should raise the bar for quality, efficiency and safety by adopting principles that drive better health care results.

The business community has long lamented the rising costs of health care for employees and retirees. With General Motors spending more per car on health care than on steel, this issue is directly challenging the global competitiveness of our economy.[37]

Why, then, don't more employers offer incentives to health care providers to make available more and better data on quality and outcomes? Businesses need to reassess health care value — the total cost of health care — since higher-quality systems may cost more up front but yield fewer sick days and less disability, making quality-focused providers better investments. The business community owes it to itself and its employees to become a more sophisticated health care purchaser.

Companies should buy and reward health care based on quality as well as efficiency, which will recognize providers and networks investing in measurement, accountability and interoperability. Such employer leadership is essential to catalyze different ways of providing and receiving care. Many have already stepped forward to lead through initiatives such as Bridges to Excellence and the Leapfrog Group, profiled on page 24.

The companies of the Technology CEO Council have taken a leadership role as well. IBM Corporation, for instance, is working in the Hudson Valley region of New York with providers as part of the Taconic Health Information Network and Community (THINC). This project ultimately will interconnect the 2,300 provider members of the Taconic Independent Practice Association in a community health information exchange with local hospitals, laboratories, payers, employers and government entities to share vital health information, all with appropriate privacy and security safeguards. As one of the region's largest employers, IBM is chairing THINC's payer support committee to facilitate the development of incentives for providers to adopt and use the new technology in their health care practices.

Dell Inc., meanwhile, offers its employees online health maintenance tools, customized to individual interests and health care needs, as a feature of its employee wellness programs. These programs provide methods and incentives for employees to better manage and, ultimately, improve their health and wellness.[38] Motorola, Inc., 3M and other companies, working through the Consumer Purchaser Disclosure Group, have brought together more than 60 purchaser and consumer organizations to commit to the goal of enabling Americans by January 2007 to select hospitals, physicians, physician groups/delivery systems and treatments based on public reporting of nationally standardized measures for clinical quality (safe, timely and effective); consumer experience; equity; and efficiency.[39]

THE LEAPFROG GROUP DRIVES PATIENT SAFETY IMPROVEMENTS

In November 2000, following an explosive 1999 report by the Institute of Medicine (IOM) of the National Academies suggesting up to 98,000 patient deaths each year are the result of preventable medical error, a number of large companies and organizations that buy health care banded together to establish the Leapfrog Group for Patient Safety. The Leapfrog Group's mission has been to promote great "leaps" forward in the safety, quality and affordability of health care by supporting informed decisions by purchasers and promoting high-value health care through incentives and rewards.

The IOM report recommended that large employers provide more market reinforcement for the quality and safety of health care. Toward that end, the Leapfrog Group members (now totaling 170 and including four member companies of the Technology CEO Council: EMC Corporation, IBM Corporation, Intel Corporation and Motorola, Inc.) work to initiate breakthrough improvements by mobilizing employers. Comprising large private and public health care purchasers that provide health benefits to more than 34 million Americans in all 50 states, Leapfrog

members and their employees spend tens of billions of dollars on health care annually. They have agreed to base their purchase of health care on principles that encourage quality improvement and consumer involvement, and that recognize hospitals that implement significant improvements in quality and safety.

The Leapfrog Group identified (and later refined) key hospital quality and safety practices as the focus of its health care provider performance comparisons and hospital recognition and reward. Based on independent scientific evidence, these quality practices are:

- Computer physician order entry (CPOE)
- Evidence-based hospital referral
- Intensive care unit (ICU) staffing by physicians experienced in critical care medicine
- A hospital "safe practices score"

According to Leapfrog's Web site, the first three of these practices alone "have the potential to save up to 65,341 lives and prevent between 567,000 and 907,600 medication errors each year (Birkmeyer, 2004). Implementation also could save approximately $41.5 billion annually."

2 The health care community must adopt data and technology standards.

The companies of the Technology CEO Council will adopt EHRs based on open standards and we will make a private, personal and portable EHR available to each of our U.S.-based employees as soon as possible.

Health care records and systems should use open standards developed through transparent, public processes. This is the only way to enable national interoperability. Data standards are a gating factor for our ability to upgrade the U.S. health care system. Without these standards, our doctors, nurses, pharmacists, hospital administrators, clinicians and laboratory technicians will not be able to interact effectively.

Applied Materials Inc. already makes available to all employees a tool that enables creation of personal — and portable — health records. With this tool, employees can create a customized, single repository of their health information. Data from a variety of health care providers, including insurance companies, labs and others (if they support the feature), can be imported and stored. This tool can be used to identify potentially harmful drug interactions, track lab test results, decipher complex medical terminology via a "Consumer Health Thesaurus," and provide other useful and relevant information to

drive better health care decision making by the employee. The tool is secure, yet allows for remote access via mobile phone while traveling or in the event of an emergency.

Government agencies also should adopt market-based open standards for their own receipt of data, developed through transparent, public processes to enable national interoperability.

Right now, the U.S. Food and Drug Administration (FDA) requires that adverse event reports use a paper-based reporting format, known as MedRA, instead of the open standard electronic format for drugs identified by the HHS secretary. Similarly, CMS currently requires that quality reports be submitted manually in unique formats rather than the open standards identified by the HHS secretary for sending in clinical information electronically (Q-Net Exchange). And HHS's Centers for Disease Control and Prevention (CDC) gets the bulk of its public health reporting through reports submitted by physicians over the phone or on paper, rather than electronically via the open standards identified by the HHS secretary for reporting the results of laboratory tests documenting various diseases (Logical Observation Identifier Names and Codes, or LOINC). While EHRs and e-health systems are quite properly being offered in the marketplace by multiple vendors, the government should buy and subsidize only those systems that can link up with one another in a digital health marketplace.

LEADING BY EXAMPLE AT THE U.S. DEPARTMENT OF VETERANS AFFAIRS

In the mid-1990s, prompted by patient complaints and poor performance statistics, the U.S. Department of Veterans Affairs (VA) health network underwent system-wide reform. Structurally, it encouraged its hospitals to cooperate on a regional basis and created hundreds of new ambulatory care centers. Technologically, the VA aggressively implemented IT to control costs and improve quality for patients.[40]

The results were impressive. Between 1995 and 1997, screening for breast, colorectal and cervical cancer rose by 20 percent to 30 percent. Heart care also improved. In 1995, only 70 percent of heart patients received betablockers before being discharged, and 89 percent received aspirin. By 2000, both treatments were administered to more than 95 percent of indicated patients, and the numbers continue to rise.[41] The VA continued to work to improve the system, adding a new computerized patient record system with a graphical interface in 1997 and bar code identification for medication in 1999. One study showed that this bar coding reduced certain errors by 85 percent.[42]

A 2003 study in the *New England Journal of Medicine* found that the quality of care in veterans' health facilities was "significantly better" than that of the Medicare fee-for-service program in all 11 measures analyzed.[43] And a 2004 study in the *Annals of Internal Medicine* found that in all seven measures of quality it measured, the VA provided superior care to diabetes patients than commercial managed-care systems."[44]

The VA has continued to pursue improved health care IT. In 1998 it began to develop, with the U.S. Department of Defense, an interface that would allow the two departments to share information from their separate EHR systems. By 2004 the two departments had implemented the first stages of interoperability with a system that offers many lessons for future attempts to interconnect private hospitals. The VA also is working to enhance its Veterans Health Information Systems and Technology Architecture (VistA) open standard EHR with a more patient-focused architecture, Health*e*Vet, which among other features allows patients to access their own EHRs over the Internet. As with all of the VA's software, the new system will be available to any private practice wishing to adopt improved IT.[45]

Such standards also should be adopted by private organizations such as the National Quality Forum, the National Committee for Quality Assurance, the e-Health Initiative or other multi-stakeholder bodies rather than codified into government regulation. They then can be referenced in CMS as authority for payment.

The linchpin for such standards is the EHR. There are numerous versions of EHRs available today, including several that are free of charge, having been developed through open-source approaches. The Technology CEO Council is not recommending a particular format. Rather, we believe it is important that common platforms be developed based on open standards, so that any EHR can integrate and interoperate, regardless of its source.

3 The federal government must serve as an exemplar and change agent.

Government should begin accepting and, by 2007, require federal agencies to receive and transmit health information electronically, using interoperable standards.

The federal government is the largest single player in the health care marketplace today: as a payer through such programs as Medicare and Medicaid; as a provider through such agencies as the U.S. Department of Veterans' Affairs and the U.S. Department of Defense;[46] and as a researcher and regulator through such agencies as CDC, CMS, FDA and the National Institutes of Health (NIH).

The challenge of providing health care worthy of our soldiers, veterans and their families is immense. In an average week, The Military Health System (MHS) gets 1,600,000 prescriptions filled and has 1,008,000 outpatient visits, 674,000 dental procedures, 11,000 medical admissions and 1,900 births. Unisys Corporation is working with the Defense Department to train health care providers and staffs to operate the department's worldwide Electronic Health Record "Composite Health Care

System II" (CHCS II), which already is providing electronic medical records that track all of these interactions for more than half of the 9.1 million military health care beneficiaries. The MHS EHR, in this phase of training and deployment, is targeted to reach 410 sites across 11 countries, constituting the largest single deployment of an EHR in the world.

It is appropriate and necessary for the federal government to continue seeking similar ways by which it can more prudently manage its immense public investments, particularly where government itself is the biggest market player. Government needs to lead in each of its three roles: provider, payer and regulator.

We already have seen effective government action through the VA, highlighted on page 26, which has transformed itself into a leader in IT-enabled quality transformation. The U.S. Navy is a leader today in using telemedicine, both through provider collaboration at sea and also for remote care delivery. Federal agencies must continue to lead in using and integrating health IT tools in clinical practice; in accepting (and by 2007, requiring) electronic information reporting; and in developing reimbursement systems that use measurement and accountability to maximize value.

4 States must catalyze local change and establish the building blocks of a national system.

State policymakers should convene community dialogues to consider ways of improving health care through better information management, including comprehensive legislation.

Political and policy leaders at the state and local levels have an important role to play in accelerating the electronic transformation of health care. Employers, providers and patients all form a community with common interests, and much data is held within state boundaries.

At a minimum, state leaders should convene all relevant players in the health care ecosystem — patients, providers, payers and government — and assess where their state is and where it can go to improve health care quality, particularly through better information management. The enclosed e-Health Readiness Guide is intended to assist with just such discussions.

State legislatures should pass comprehensive legislation to:

- base Medicaid reimbursements on value, with additional incentives for health IT adoption;
- encourage formation of regional health information initiatives (RHIOs) through loans, grants and/or regional tax-exempt bonding authority;
- remove legal and regulatory impediments;
- make better use of health care data collected by state public health agencies; and
- enable telemedicine through licensing reforms and Medicaid reimbursement.

A discussion summary draft of Model Legislation begins on page 35 of this report. A complete discussion draft can be found at:

www.techceocouncil.org/modelhealth.

RHIOs provide a way for hospitals, physicians' offices, laboratories, pharmacies and other health organizations in a defined geographic area to exchange health data efficiently, securely and electronically. They have emerged as critical breeding grounds for health care reform in communities across the country. State policymakers need to continue their efforts to promote the development and expansion of regional initiatives through funding and policy support.

For example, Hewlett-Packard Company (HP) has worked with SafeHealth, a RHIO designed to address the needs of 800,000 residents served by clinics, payers and providers in central Massachusetts. HP is working with the key architects to help design the infrastructure for information exchange.

5 Medicare and Medicaid reimbursement programs must pay for performance — providing incentives to drive higher quality, greater efficiency and the spread of best practices.

Congress should pass legislation currently under consideration in both houses, which enables and requires pay-for-performance, or P4P, systems (for example, by setting aside 2 percent of Medicare spending to fund such programs).

As the largest purchaser of health care through Medicare and Medicaid, the federal government should use its market power to promote higher quality and lower costs. Providers who follow appropriate clinical standards can expect complete reimbursement, while those who ignore known and published best practices may receive smaller reimbursement. The aim is to pay doctors for keeping patients healthy, a marked contrast to the current fee-for-service system that simply rewards quantifiable patient processing. As the government acts like a smarter buyer, smaller purchasers of health care also can begin differentiating based on quality.

Government is pushing for universal adoption of EHRs, e-prescriptions and electronic health reporting. We support these efforts. To drive these objectives in the immediate term, government should offer temporary and transitional pay-for-implementation or pay-for-use models. Pursuing pay-for-use of health IT tools and systems advances current practice and provides a stepped approach for doctors who may find the prospect of a multistep transformation daunting.

Government has the power to improve e-health economics, offering loans or direct assistance to providers and consortia. Importantly, in scoring such investments, budget planners must recognize that the return on such investments will usually take longer than 365 days. The Budget Reserve Fund adopted by Congress as part of the 2006 Budget Resolution correctly anticipates this possi-

THE SUCCESS OF A
TENNESSEE REGIONAL HEALTH INITIATIVE

Tennessee offers a clear demonstration of how political leaders at all levels of government can assist the private sector in improving health care. Led by Gov. Phil Bredesen, a former health care executive, Tennessee in 2004 added $7 million of its own funding to a $5 million federal grant and $750,000 from Vanderbilt University to create the Tennessee Volunteer eHealth Initiative. In addition to financial support, the state has encouraged information exchange, facilitated negotiations among stakeholders, and begun to consider standards and policies needed for statewide interoperability.

As a first step to networking health care providers throughout the state, the eHealth Initiative built a best-practice regional health effort in the southwest corner of the state. This pilot regional health effort serves a population of almost 1 million that spans both urban Memphis and the rural areas surrounding it in Tipton, Shelby and Fayette counties. Because 35 percent of residents receive insurance from Medicare and Medicaid, improving the quality of health care in the region promises great savings to the government.

The Tennessee initiative chose several clinical areas — the emergency department, Group B Strep, diabetes management and immunizations — for initial improvement efforts. Each area had the potential for rapid and significant cost reductions, once enhanced by EHRs and other IT tools. And 99 percent of the people treated by area emergency departments, for example, were repeat patients who would visit at least one other emergency department over the course of the year. Networking these emergency departments so they can share EHRs will streamline the treatment process, dropping expenditures by a projected $5.5 million within five years.

Thus far, the Tennessee initiative has focused on low-tech solutions, following its stakeholders' request for the simplest systems that would produce a positive effect. Simply increasing the exchange of data will save millions in duplicate tests and inaccurate care. Yet through these efforts, Vanderbilt University Medical Center, a leading participant in the Tennessee Volunteer eHealth Initiative, has earned the distinction of being named one of the 100 most wired hospitals in the country in 2005 by *Hospital and Health Networks* magazine.[47]

INCORPORATING
CLINICAL STANDARDS OF CARE
INTO DIGITALLY ASSISTED MEDICINE

CDSS's promise was borne out in New Zealand, where a nationwide effort to adapt the paper charts used as a clinical risk assessment tool for cardiovascular disease into a Web-based system increased doctors' use of the standards four-fold. The software, called PREDICT, reduces confusing and time-consuming calculations to a five-second process. After assessing the patient's risk, it provides doctors with patient-specific recommendations for care. PREDICT was so successful among doctors that its creators soon expanded it to cover diabetes risk assessment as well.

As an added benefit, PREDICT allows health officials to easily develop risk profiles for populations based on aggregated statistics delivered in a standardized form. Such a tool would be an invaluable addition to projects like the New York City effort to track anonymously the ways in which diabetics manage their disease. With adequate network support, a CDSS can both increase doctors' use of standards and subject the standards to a continuous process of self-improvement.

bility and allows for payback over a five-year horizon. The U.S. Office of Management and Budget and the Congressional Budget Office, as well as their state counterparts, should review the RAND analysis projecting returns on these investments of up to $165 billion a year from investments in health IT and subsequent systemic transformation, and approach direct incentives as investments to achieve this longer-term return. The revolving funds for IT investment should have no interest or principal repayments for a minimum of three years, extended to five years or more for the poorest regions.

We have ample evidence that we can substantially improve our health care process by reducing unnecessary variation and wasted time. For example, a UCLA study[48] found that American hospitals currently administer heart care inconsistently. Among other failures, 31 percent of ideal candidates for ACE inhibitors, a class of drugs used to treat high blood pressure, do not receive the recommended medications. Doctors also do not consistently educate patients on the risk factors and dangers of heart disease. In part because of the repeat events caused by this uneven care, 40 percent of Medicare funding goes toward cardiovascular heart failure every year.

One powerful information tool that could help alleviate this problem is a CDSS, which ensures that all patients receive the optimal tests and treatments by reminding the doctor of the necessary recommended steps. Such support systems already exist in paper form. For example, the American Heart Association has developed a series of 12 recommended treatment steps for patients suffering from heart failure. If these recommendations were incorporated into interactive software that could alert doctors about appropriate treatments, they would be more consistently applied.

6 Public and private actors must ensure patient privacy and data security.

A connected and accessible electronic health care system — with its great promise for improved quality, cost and convenience — poses meaningful security and privacy challenges. The technologies that allow us to communicate with anyone, anywhere also make it possible for interactions to be monitored, saved, analyzed and transmitted — which is good when we want that and problematic when we do not.

Americans' views of the promise and the perils of EHRs are difficult to pin down. According to a February 2005 survey by Harris Interactive, people are split almost evenly about whether the benefits of health care IT outweigh privacy concerns.[49] Conversely, in a new consumer study from Accenture's Health and Life Sciences division, more than nine out of 10 consumers were found to believe that electronic health records can improve medical care and reduce the number of hospital errors — and more than half of those surveyed said they would be willing to pay more if their records were kept in electronic format.[50]

What seems clear is that significant numbers of people — even many who believe in the potential of EHRs — have concerns that the migration to electronic records means greater vulnerability to information leakage. Among the fears are that employers (or potential employers) might get access to EHRs to make hiring or firing decisions. Others fear that personal information will be sold to marketers, other medical services or media.

Public and private actors should review existing federal, state and health network systems and practices to ensure they neither impede data sharing and network interoperability nor imperil patient privacy or information security. The evolution toward a truly interoperable and networked health care system will depend largely on successfully addressing these privacy and security concerns. Any system

must guarantee that health information is protected from unauthorized access and will be used only to improve health care and health plan operations. Americans must feel confident that private health care records will remain so.

Indeed, policymakers and payers must reward providers that utilize sophisticated role- and identity-management systems to minimize the exposure of health data.

Providers and insurers must continue to take the lead on these critical issues and work with technology providers and the government to define a technical and policy approach that simultaneously protects individual patients, doctors and the public health. That means technology companies not cutting corners to launch products prematurely that are easily hacked, businesses not choosing "cheap" over "secure," insurers not using patient data to sell affiliated products and health care providers recognizing that the security procedures for paper files are inadequate for digital records. Federal regulations already exist to cover medical data. Insurers and others can either design systems that are compliant and forward looking, or else expect additional layers of regulation and oversight.

7 Policymakers must provide consistent leadership through adequate funding and engaged oversight.

Congress must fully fund the Office of the National Coordinator for Health Information Technology (ONCHIT) in the FY 2007 budget.

Just as the changes needed to make health care more patient-centric and quality based will take time, they will demand sustained leadership from public and private sectors. While President Bush and Congressional leaders from both parties have shown interest and enthusiasm in 2005, this effort will require sustained leadership and staying power. We will learn a lot about the federal commitment to

health care transformation when the President proposes and Congress determines the FY 2007 budget.

On April 27, 2004, President Bush issued Executive Order No. 13335, which announced the formation of ONCHIT within HHS to spearhead federal efforts to transform health care. Led by Dr. David Brailer, ONCHIT has emerged as the most visionary and effective point of leadership in the federal government, coordinating activities across agencies, ensuring industry engagement and participation in the process, financing demonstration projects that will help gauge the effectiveness of health care IT, and working to establish best practices for even broader adoption throughout the health care industry.

This leadership will remain critical in the months and years ahead if we are to realize the President's ambitious goals. But ONCHIT cannot succeed unless Congress fully funds its efforts at the requested levels, which failed to happen in 2004 and only partially occurred in 2005. The many leaders in Congress who are currently stepping up to the challenge need to recognize the importance of consistent leadership and fund this important agency.

In addition to ONCHIT, other HHS agencies are also making valuable contributions. In 2006 and beyond, Congress should provide as much funding as possible to the electronic health efforts at the Agency for Health Research and Quality (AHRQ), Health Resources and Services Administration (HRSA), and the CDC. The federal government has backed the launch of regional health initiatives, awarding nearly $140 million in grants and contracts to projects promoting the adoption of health IT and the exchange of health information.[51] Local and regional grants can assist pioneering physicians, hospitals and communities in demonstrating just how IT can transform health care.

Conclusion

none of us is as healthy as all of us

America finds itself today at a unique inflection point. We are being hit simultaneously by a massive demographic shift (an aging population) and by the onrush of globalization, both of which will place unprecedented pressures on our health care system. What will we do? Will we demonstrate the leadership and the vision that have characterized America so often throughout our history?

Our economic strength and competitive position — and our people's physical health — hang in the balance. If we do not step up to this challenge, we could easily precipitate a national crisis with major economic and societal ramifications, potentially causing a flow of business, capital and talent to other parts of the world.

If we do the right things, by contrast, we could rapidly and dramatically increase the quality of Americans' health; their protection against devastating disease; and their energy and productivity, at home and work. One of the massive and tragic consequences of Hurricane Katrina is that the paper-based medical records of thousands of Americans may have been destroyed, leaving health care providers without the necessary information to treat them, often in emergency situations.
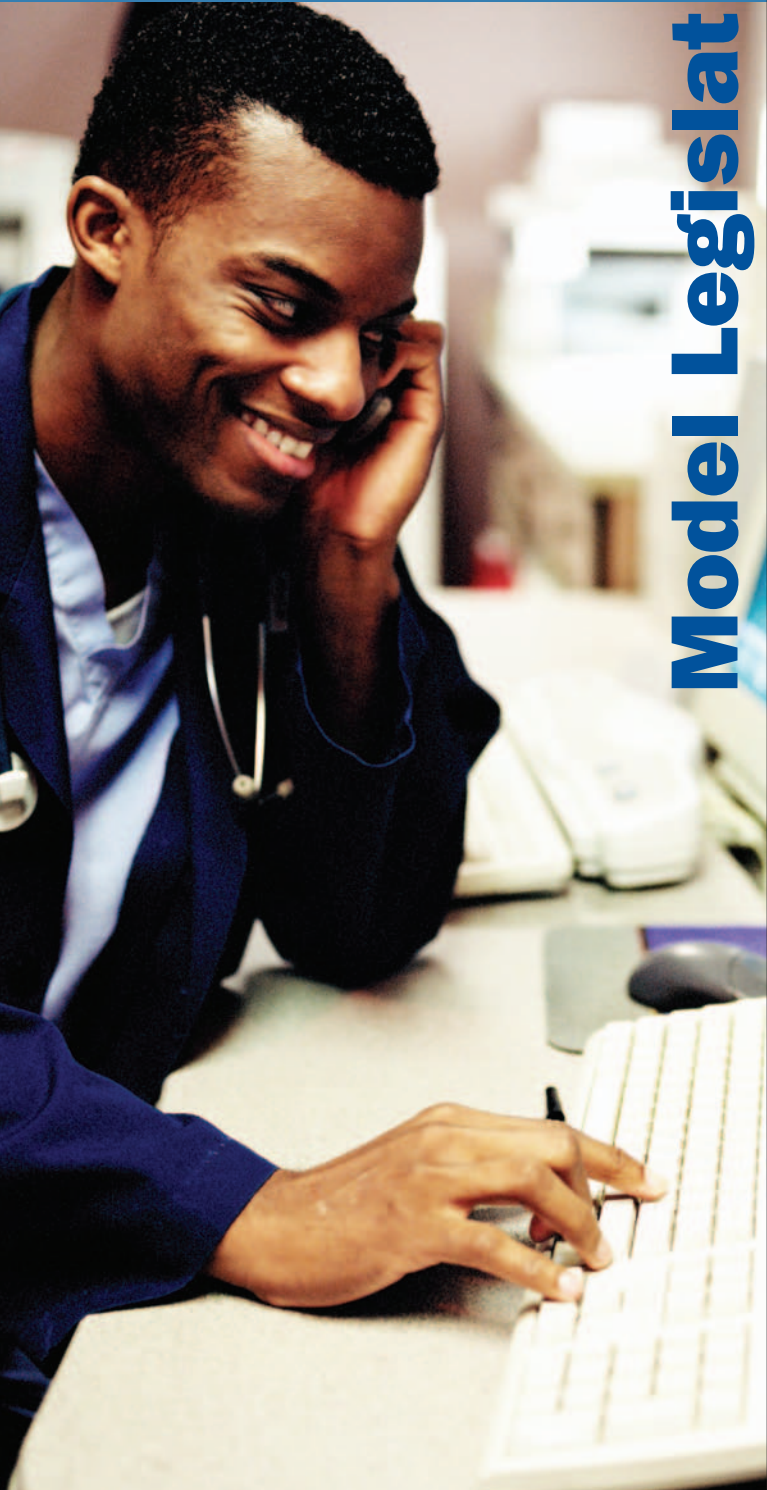
In addition, a fully connected, electronic health care information infrastructure will do more than improve the quality and efficiency of existing care, as crucial as that is. It also will enable new business models and innovations in managing our

nation's health that will bring lifesaving care to millions of people who haven't been able to afford or access it.

In essence, we have the chance to create an informational immune system for all Americans: a system that will at once contain the data needed to respond rapidly to a potential epidemic — indeed, that will be smart enough to "see" most outbreaks before they become dangerous — and at the same time know enough about an individual to bring the latest and best knowledge to bear on his or her unique physiology.

At the broadest level, the need for a true health care system is the same as for any of the systems by which we organize society. It's not simply about efficiency, but also about simultaneously empowering individuals and pooling our resources to survive and advance. In *The Wisdom of Crowds*,[52] economist James Surowiecki draws on network science and studies of complex adaptive systems to validate the old adage that "none of us is as smart as all of us." With the creation of a networked, 21st-century U.S. health care system, we can begin to envision a future where "the health of American society" takes on a whole new meaning. To achieve such a system requires choices and action. It's time to lead.

Model Legislation

a summary for states

This is a summary of potential Model Legislation for states interested in improving health care through better information management.

Health Care Improvement Through Deployment and Adoption of Information Technology Model Act

Section 1.

TITLE

Section 2.

LEGISLATIVE FINDINGS AND PURPOSE

This section finds that health care lags significantly behind other industries in the use of information technology (IT) and that more effective use of such technology could lead to significant improvements in the quality, safety and efficiency of health care.

Section 3.

DEFINITIONS

This section provides definitions for the terms health IT, interoperability, standard electronic format and telemedicine.

Section 4.

OFFICE OF HEALTH INFORMATION TECHNOLOGY

This section calls for the creation of a new office within the health department or comparable state agency to develop a health IT plan for the state (following extensive consultation with all relevant stakeholders), encourage the adoption and effective use of health IT through various initiatives, identify and promote the use of data standards for

the electronic exchange of health information, and submit an annual report to the governor and relevant committees of the legislature. It also requires state agencies to comply with data standards adopted by the new office when purchasing health IT. Finally, it requires state agencies collecting health information to take steps to allow for the submission of such information in a standard electronic format rather than on paper or through other inefficient means.

Section 5.

HEALTH INFORMATION TECHNOLOGY ADVISORY COMMITTEE

This section calls upon the governor to appoint a broadly representative Health Information Technology Advisory Committee to provide input about a wide range of health IT issues and help identify ways for accelerating the deployment and effective use of such technology within the state.

Section 6.

FINANCIAL INCENTIVES FOR DEVELOPING HEALTH INFORMATION NETWORKS

This section authorizes a program of grants and loans to encourage the development of local and regional networks for exchanging health information among health care providers, health plans, public health agencies and other authorized users. It also authorizes the issuance of state revenue bonds to support the health information network loan program.

Section 7.

MEDICAID VALUE-BASED PURCHASING PROGRAM

This section directs the state Medicaid program to revise Medicaid payment policies to implement a Value-Based Purchasing Program, under which financial incentives are provided to health care providers meeting certain reporting or performance criteria relating to health care quality and efficiency measures, including improvements in quality through the electronic exchange of health information.

Section 8.

MEDICAID COVERAGE OF TELEMEDICINE SERVICES

This section directs the state Medicaid program to expand the list of Medicaid-covered services to include telemedicine services — services that are similar to already covered services involving face-to-face contact with the patient but that also can be provided safely and effectively using interactive video teleconferencing or store-and-forward technology.

Section 9.

REMOVING LEGAL BARRIERS TO THE ACQUISITION AND EFFECTIVE USE OF HEALTH INFORMATION TECHNOLOGY

This section requires the secretary of health or comparable state official to submit a report to the governor and legislature regarding barriers to the adoption and effective use of health IT within the state, together with recommendations regarding corrective legislation or other actions to address these barriers. The report must specifically address barriers to patient access to telemedicine services provided across state lines by out-of-state physicians due to state professional licensure policies and practices.

Section 10.

SEPARABILITY

Section 11.

EFFECTIVE DATE

Please visit **www.techceocouncil.org/modelhealth** to see a complete discussion draft of Model Legislation.

Endnotes

[1] Kohn, Linda T.; Janet M. Corrigan; and Molla S. Donaldson, eds. To Err Is Human: Building a Safer Health System, Washington: National Academy Press (2000) 29 Nov. 1999 <http://www.nap.edu/open-book/0309068371/html/>

[2] <http://www.annals.org/cgi/content/full/138/4/273>

[3] Employer Health Benefits 2004 Annual Survey, The Henry J. Kaiser Family Foundation and Health Research and Educational Trust, 9 Sept. 2004 <http://www.kff.org/insurance/7148/index.cfm>

[4] Hillestad, Richard; James Bigelow; Anthony Bower; Federico Girosi; Robin Meili; Richard Scoville; and Roger Taylor, "Can Electronic Medical Record Systems Transform Health Care? Potential Health Benefits, Savings, And Costs," Health Affairs, September/October 2005

[5] The World Health Report 2000 — Health Systems: Improving Performance, World Health Organization, 2000 <http://www.who.int/whr/2000/en/whr00_en.pdf>

[6] "Health care system needs doctoring," Atlanta Journal Constitution, 24 April 2004. Retrieved from Physicians for a National Health Program, <http://www.pnhp.org/news/2004/april/health_care_system_n.php>

[7] <http://www.investors.com/includes/edit/presscenter/2004JanuaryTIPPComputer.doc>

[8] TouchScript Medication Management System Financial Impact Analysis on Pharmacy Risk Pools, Cap Gemini Ernst & Young, Oct. 2000 <http://www.hp.com/sbso/solutions/healthcare/expert_insights/eprescriptionstudy.pdf>

[9] "Medicare Program; E-Prescribing and the Prescription Drug Program; Proposed Rule," Federal Register, 4 Feb. 2005 <http://a257.g.akamaitech.net/7/257/2422/01jan20051800/edocket.access.gpo.gov/2005/pdf/05-1773.pdf>

[10] "Report from HIMSS," Healthcare Informatics, June 2000 <http://www.healthcare-informatics.com/issues/2000/06_00/himss.htm>

[11] Borden, William, "Medco Study Finds Over-Medication of Seniors," Reuters News, 21 May 2003

[12] Hoffman, Jan, "Awash in Information, Patients Face a Lonely, Uncertain Road," New York Times, 14 Aug. 2005 <http://www.nytimes.com/2005/08/14/health/14patient.html?ex=1127793600&en=ec87b9b8de0ce8c4&ei=5070>

[13] Kohn, et al., 2000

[14] Goldman, Dana P., and Elizabeth A. McGlynn. U.S. Health Care: Facts about Cost, Access, and Quality, RAND Health, 2005 <http://www.rand.org/pubs/corporate_pubs/2005/RAND_CP484.1.pdf>

[15] Kohn, et al., 2000

[16] 2004 National Healthcare Quality Report, U.S. Department of Health and Human Services, Dec. 2004

[17] <http://www.annals.org/cgi/content/full/138/4/273>

[18] "The Practice of Medicine in 2005," a slide from the IBM presentation "Clinical Information Exchange — roadmap and methodology for maximizing the benefits of interoperability," 27 April 2005

[19] Perrone, J., "Designing a Safer, Smarter Health Care System: AMA Foundation Looks at Ways to Prevent Mistakes," American Medical News 40(40): 1 (27 Oct. 1997)

[20] Johnson, Jeffrey A., and J. Lyle Bootman. "Drug-Related Morbidity and Mortality: A Cost-of-Illness Model," Archives of Internal Medicine 155:1949-56 (9 Oct. 1995)

[21] Franczyk, Annemarie. "Electronic medical network gains support," Buffalo Business First, (31 May 2004 print edition) <http://www.bizjournals.com/buffalo/stories/2004/05/31/story1.html>

[22] American Hospital Association (AHA) Annual Survey, American Hospital Association, 2004 <http://www.aami.org/news/2004/121704.hospitals.html>

[23] IBM presentation, 2005

[24] IBM presentation, 2005

[25] IBM presentation, 2005

[26] Annals of Emergency Medicine, quoted by Langrath, Robert, "Fixing Hospitals: How a new vanguard of hospitals is fixing flaws that kill thousands of patients every year," Forbes, 20 June 2005

[27] Anderson, Gerald F.; Peter S. Hussey; Bianca K. Frogner; and Hugh R. Waters, "Health Spending in the United States and the Rest of the Industrialized World," Health Affairs, July/August 2005

[28] President George W. Bush, remarks at a White House briefing, 27 Jan. 2005; information provided by Dr. Martin Harris, chief information officer, Cleveland Clinic

29 Bosworth, Barry P., and Jack E. Triplett, Services Productivity in the United States: Griliches' Service Volume Revisited, Brookings Institution, 12 Sept. 2003 <http://www.brookings.edu/views/papers/bosworth/20030919.pdf>

30 Greenspan, Alan, "The revolution in information technology," Remarks before the Boston College Conference on the New Economy, 6 March 2000 <http://www.federal-reserve.gov/boarddocs/speeches/2000/20000306.htm>

31 "Black & Decker produces saw blades a cut above thanks to WinSPC," <http://www.winspc.com/BlackandDecker.pdf>

32 "FedEx Corporation Facts," <http://www.fedex.com/us/about/today/companies/corporation/facts.html> "Predicting risk, improving reliability: Multidisciplinary computer models make world safer, more reliable," Vanderbilt Engineering, vol. 45 no. 2, 2004 <http://www.vanderbilt.edu/alumni/publications/engnews_fa04.pdf>

33 Woellert, Lorraine, "The Web Smart 50 — Streamlining," Business Week online, 24 Nov. 2003 <http://www.businessweek.com/magazine/content/03_47/b3859631.htm>

34 "Brief for Amicus Curiae" from The New York Clearing House Association in response to TPI v. Winter Storm Shipping, 2003, p. 24, <http://www.theclearinghouse.org/reference/amicus_curiae/000565.pdf>

35 "Annual Revenue and Earnings," Air Transport Association <http://www.airlines.org/econ/d.aspx?nid=1034> "Online Travel Purchases Split Evenly Between Travel Agencies and Suppliers' Web Sites," Nielsen//NetRatings, 21 June 2005 <http://direct.www.netratings.com/pr/pr_050621.pdf>"Travel Commerce Report," JD Events, 15 Sept 2004 <http://www.travelcomexpo.com/travelcomreport_issue.asp?IssueID=1053>

36 Langreth, Robert, "Fixing Hospitals," Forbes, 20 June 2005 <http://www.forbes.com/business/global/2005/0620/054.html>

37 Appleby, Julie, and Sharon Silke Carty, "Ailing GM looks to scale back generous health benefits," USA Today, 24 June 2005 <http://www.usatoday.com/money/autos/2005-06-22-gm-healthcare-usat_x.htm>

38 "Well at Dell: Dell Employee and Family Health Improvement Program." Dell has implemented a single nurse line for all health plans to create a common interface for all enrollees, with referral capability to all other health vendors (health coaching, employee assistance program and disease management). The company uses an online health resource and Web portal, customized for Dell and for each participant based on his or her responses to a health survey. All Dell health resources (health plans, benefits administrative resources and quarterly wellness programs) are linked from this site.

Each employee who completes a health survey receives a personalized invitation to participate in a health improvement/health maintenance program based on his or her health risks. Dell's program offers something for everyone, regardless of health status. Health improvement programs are customized for health risks. No- and low-risk employees are asked to participate in low-intensity programs, while individuals who are at moderate to high risk or have disease conditions are asked to participate in more intensive health coaching or disease management programs. With primarily healthy, young employees whose average age is 36, the company believes programs that maintain low-risk health status (with physical activity and nutrition/healthy eating programs) are important. Health coaching (to reduce risks, such as smoking and obesity, and improve health) and condition management programs (to manage health conditions, such as cardiac, back pain and healthy pregnancy programs) are offered as well.

Dell uses the RFP process and performance measures to ensure that health plans and vendors provide needed services. Dell models its incentive program after its performance management programs, to encourage employees to engage in positive health behaviors through an incremental "pay-for-performance" design (an approach that fits Dell's pay-for-performance work culture). The incentive plan funds a Health Reimbursement Arrangement when the employees take their health survey/assessment, when they take action and enroll in a health improvement program, and again when they complete the program or achieve a milestone or goal. Employees can earn up to $200. Medically covered spouses/domestic partners also are eligible for this program (families can earn up to $400).

39 <http://healthcaredisclosure.org>

40 Perlin, Jonathan B.; Robert M. Kolodner; and Robert H. Roswell, "The Veterans Health Administration: Quality, Value, Accountability, and Information as Transforming Strategies for Patient-Centered Care," The American Journal of Managed Care, Nov. 2004 <http://www.ajmc.com/Article.cfm?Menu=1&ID=2767>

41 Jha, Ashish K., Jonathan B. Perlin, Kenneth W. Kizer, and R. Adams Dudley, "Effect of the Transformation of the Veterans Affairs Health Care System on the Quality of Care," The New England Journal of Medicine, vol 348: 2218-2227, no. 22, 29 May 2003 <http://content.nejm.org/cgi/content/full/348/22/2218>

42 McVicar, Nancy, and Ana M. Valdes. "Hospitals seek RX for drug mistakes; bar-coding, computers help cut errors. South Florida Sun-Sentinel, 7 July 2003

43 Jha et al, 2003

44 Kerr, Eve A. et al, "Diabetes Care Quality in the Veterans Affairs Health Care System and Commercial Managed Care: THE TRIAD Study," Annals of Internal Medicine, 17 Aug. 2004 <http://www.annals.org/cgi/content/full/141/4/272>

45 Kolata, Gina, "In Unexpected Medicare Benefit, U.S. Will Offer Doctors Free Electronic Records System," New York Times, 21 July 2005 http://www.nytimes.com/2005/07/21/health/21record s.html?pagewanted=2>

46 Sources about the Veterans Administration include:

"About VistA," World VistA (the open source development organization). This Web page offers a basic outline of VistA's history. <http://www.worldvista.org/AboutVistA/>

Brown, Steven H.; Michael J. Lincoln; Peter J. Groen; and Robert M. Koloder, "VistA – U.S. Department of Veterans Affairs national-scale HIS," International Journal of Medical Informatics, March 2003. This article gives a historical overview of VistA software development and describes current capabilities.

"Computer-Based Patient Records: VA and DOD Efforts to Exchange Health Data Could Benefit from Improved Planning and Project Management," Government Accountability Office, Washington, DC, June 2004. This report highlights VA and U.S. Department of Defense efforts to make their systems interoperable. <http://www.gao.gov/new.items/d04687.pdf>

"Medsphere Pioneers Adoption of the First EHR Based on an Open-Source Platform," Wasatch Venture Fund, 14 Feb. 2005. This press release comes from one of several companies that have made a business of customizing and installing VistA for private practices. http://www.wasatchvc.com/press_view.aspx?id=76

Robinson, Brian, "A model patient records system: The VA's VISTA software is tapped for expanded service," Federal Computer Week, 21 Feb. 2005. This article discusses private use of VistA before VistAOffice and encourages more doctors to adopt the system. <http://www.fcw.com/fcw/articles/2005/0221/spec -vista-02-21-05.asp>

"Veterans Administration Healthcare System — My HealtheVet," Center for Health Transformation. This case study describes the new, patient-centric My HealtheVet system. <http://www.healthtransformation.net/Transforming_Examples/Transforming_Examples_Resource_Center/142.cfm>

47 <http://www.hhnmag.com/hhnmag/jsp/articledisplay.jsp?dcrpath=HHNMAG/PubsNewsArticle/data/0507 HHN_CoverStory_WinnersList&domain=HHNMAG>

48 Wenger, Neil S., et al., "The Quality of Medical Care Provided to Vulnerable Community-Dwelling Older Patients, American College of Physicians, Nov. 2003 <http://www.annals.org/cgi/reprint/139/9/740.pdf>

49 "Health Information Privacy (HIPAA) Notices Have Improved Public's Confidence That Their Medical Information Is Being Handled Properly," Harris Interactive, press release, 24 Feb. 2005 <http://www.harrisinteractive.com/news/allnewsby-date.asp?NewsID=894>

50 Beaudoin, Jack, "Study: Consumers want EMRs," Healthcare IT News, 20 July 2005 <http://www.healthcareitnews.com/NewsArticleView.aspx?ContentID=3355>

51 Brailer, David, remarks at HIMSS 2005, 17 Feb. 2005 <http://www.hhs.gov/healthit/BrailerSpch05.html>

52 Leopold, Todd, "The crowd is smarter than you think," cnn.com, 14 July 2005 <http://www.cnn.com/2004/SHOWBIZ/books/07/14/wisdom.crowds/>

ABOUT THE TECHNOLOGY CEO COUNCIL

The Technology CEO Council is the information technology industry's public policy advocacy organization comprising chief executive officers from America's leading information technology companies.

Founded in 1989, and formerly known as the Computer Systems Policy Project (CSSP), the Technology CEO Council is dedicated to advancing policies that ensure and promote U.S. competitiveness through technology leadership. The CEOs regularly visit Washington to meet with policymakers about issues of importance to the high-tech industry and offer recommendations through reports and white papers on issues having a transformative impact on society.

Currently, the Technology CEO Council is focused on public policy initiatives related to health care information technology, telecommunications, international trade, innovation, digital rights management, export and knowledge controls, and privacy.

Technology CEO Council members are:

Craig R. Barrett
Chairman, Intel Corporation
Chair, Technology CEO Council

Mark V. Hurd
President and
Chief Executive Officer
Hewlett–Packard Company

Joseph McGrath
President and
Chief Executive Officer
Unisys Corporation

William Nuti
President and
Chief Executive Officer
NCR Corporation

Samuel J. Palmisano
Chairman and
Chief Executive Officer
IBM Corporation

Kevin Rollins
President and
Chief Executive Officer
Dell Inc.

Mike Splinter
President and
Chief Executive Officer
Applied Materials, Inc.

Joseph Tucci
President and
Chief Executive Officer
EMC Corporation

Edward Zander
Chairman and
Chief Executive Officer
Motorola, Inc.