

Spending Our Money Wisely:

**Improving America's Healthcare System By
Investing in Healthcare Information Technology**

The Health Technology Center

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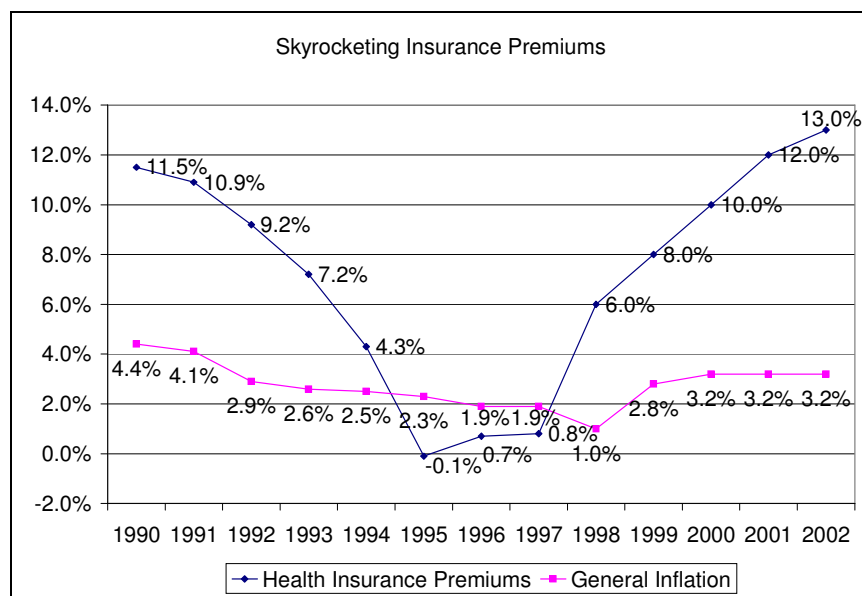
Abstract

This monograph sets forth the urgent need for the Federal government to play a leadership role in financing healthcare information technology infrastructure. The monograph first establishes that there is strong consensus among leading medical experts, policy makers, providers and public officials that information technology investment reduces the cost and increases the quality of healthcare services. Next, the monograph explains why the necessary investment in healthcare information technology will not take place without leadership by the Federal government. The problem is the lack of any vehicle to provide the support and funding necessary to facilitate long overdue structural technology improvements. Finally, the monograph sets forth a new proposal for the creation of a “Healthcare Information Technology Revolving Loan Fund Program,” which would supplement existing proposals to provide grant demonstration dollars to support information technology development. This public-private partnership would be modeled on successful revolving loan fund programs established by the Federal government to provide funding for local transportation and environmental initiatives. The “Healthcare Information Technology Revolving Loan Fund Program” would create an ongoing and permanent source of capital for investing in the information technology infrastructure that is necessary for the United States to reduce medical errors and curtail wasteful healthcare expenditures.

I. *The Need for Investment in Healthcare Information Technology*

The US healthcare system expends enormous resources—total healthcare spending was \$1.4 trillion in 2002, or 14% of GDP. Those costs have grown relentlessly, with the annual growth in per capita national healthcare spending rising from \$2738 in 1990 to \$4637 in 2000, climbing at an average growth rate of 6% per year in real terms.¹ Yet the healthcare system is failing on multiple fronts: not only are costs spiraling out of control, but the system suffers from doctors who are failing to keep pace with clinical practice standards, an unacceptable rate of avoidable medical errors, and an unwieldy administrative superstructure that burdens both physicians and patients alike.

Consider the following: It takes 17 years on average for new medical



practice standards to be adopted by most physicians.² Use of beta-blockers after heart attack was approximately 60% in 1999, ten years after they were accepted as a standard of care. Adoption of ACE inhibitors after heart attack and for congestive heart failure was nearly as slow.³ Nearly 10,000 clinical trials are conducted annually, generating a volume of information far beyond the capacity of any single practitioner to process and implement.⁴ Medical errors result in more deaths than motor vehicle accidents, breast cancer or AIDS—44,000 to 98,000 deaths annually, many more preventable injuries, additional healthcare costs in dealing with those injuries and complications, and needless distress for patients and their families.⁵ And all this occurs in a

¹2002 Data Compendium, Centers for Medicare and Medicaid Services, 2002.

² Andrew Balas et al., "Improving Preventive Care by Prompting Physicians," *Archives of Internal Medicine*, 160 (3), 2000.

³ Stephen Jencks et al., "Quality of Care Delivered to Medicare Beneficiaries," *JAMA*, 284 (13), 2000.

⁴ Mark Chassin, "Is Health Care Ready for Six Sigma Quality," *Milbank Quarterly*, 1998.

⁵ Institute of Medicine, *To Err is Human: Building a Safer Health System*, 1999.

system that wastes far too much money: 26% of US hospital expenditures or over \$100 billion annually are spent on claims processing and other administrative requirements.⁶ A large, nationwide study of the care of Medicare beneficiaries found that apparently arbitrary regional variations in the practice of healthcare result in a 30% health spending differential—a variance that extrapolates to \$450 billion of our \$1.4 trillion in healthcare expenditure—and that higher-spending regions receiving more medical services do not have better medical outcomes than lower-spending regions.⁷

Many of the interrelated problems confronting the American healthcare system result in whole or in part from poor information recording and transmission. We have built an environment in which much vital information is handwritten on paper; in which even electronic documents cannot follow patients through different parts of the healthcare system; in which providers must daily deal with hundreds of different billing forms and rules. It is no surprise that this environment is rife with errors, lack of communication and administrative waste.

The American healthcare system has pioneered dramatic advances in pharmaceuticals, medical imaging, and medical devices. But American healthcare is extraordinarily backward in even the most basic uses of information technology. Indeed, as Tommy Thompson, current Secretary of the Federal Department of Health and Human Services and former Governor of Wisconsin, has remarked, “Our healthcare system is even further behind technologically than our grocery stores.” To take only one sad and straightforward example, many primary care physicians have found that the only reliable way to learn what medications older patients with multiple conditions are taking is to instruct them to bring in all their medications in a brown paper bag. That this is true even for a highly transaction-based sector of medical information like prescriptions is a clear measure of the abysmal state of information retrieval and transfer technology in American medicine.

Moreover, these problems are only going to get worse. The number of people with multiple chronic conditions is expected to grow dramatically over the next two decades, exacerbating the shortcomings of a system in which communication within and across settings is

⁶ David Himmelstein and Steffie Woolhandler, “Costs of Care and Administration at For-profit and Other Hospitals in the United States,” *NEJM*, 337 (24).

⁷ Implications of Regional Variations in Medicare Spending, Part 1: The Content, Quality, and Accessibility of Care, *Annals of Internal Medicine*, Elliott S. Fisher, David E. Wennberg, et al., February 18, 2003; Implications of Regional Variations in Medicare Spending, Part 2: Health Outcomes and Satisfaction with Care, *Annals of Internal*

poor. The pace of scientific innovation in medicine is accelerating, putting even more pressure on a system in which adoption of new medical advances is already distressingly low. Patients increasingly expect to participate in medical decision-making. Purchasers, quality organizations and public authorities are making growing demands to evaluate routinely the process and outcomes of medical care, imperatives that are resource-intensive and unreliable for medical organizations that must draw on paper records to satisfy these demands.⁸

The need for better information technology is acute and systemic, and that need in and of itself justifies public involvement. Moreover, investing in the information technology infrastructure of healthcare supports major existing public policy objectives. Such investments will improve the quality of healthcare services to all Americans, including Medicare and Medicaid beneficiaries, support the government's longstanding efforts to ensure the integrity of its programs by minimizing healthcare fraud, improve public health agencies' ability to track and respond to bio-terrorism and other threats, and represent one of our best hopes for reducing the growth in Federal, state and private sector healthcare expenditures. Healthcare information technology investments will also support the government's more recent efforts to ensure the privacy of individual patient information and to empower healthcare consumers by providing them with greater knowledge about their choices.

Before describing the growing body of evidence demonstrating the benefits increased investment in healthcare information technology infrastructure can yield, it is important to define the term, "healthcare information technology infrastructure." The U.S. Department of Health and Human Services has suggested a comprehensive definition of healthcare information technology infrastructure, stating that this term should include "technologies, practices, relationships, laws, standards, and applications."⁹ While this definition points to the far-reaching scope of healthcare information technology infrastructure, a more specific definition is useful in considering the type of healthcare information technology projects in need of financing. Healthcare information technology infrastructure requiring financing includes three kinds of technological systems: (1) systems that enable users to enter analog data in digital formats; (2) systems that communicate relevant healthcare information digitally; and (3) systems that apply

Medicine, Elliot S. Fisher, David E. Wennberg, et. al., February 18, 2003; cited in Jeffrey Rose, "The Gordian Project: Improving health care one community at a time," 2003.

⁸ David Lawrence, M.D., From Chaos to Care: The Promise of Team-Based Medicine, Perseus, 2002

analytical tools to data and thereby support healthcare decision-making. For many, building a healthcare information technology infrastructure also requires tackling multiple other issues. These include developing healthcare data standards; establishing a universal methodology for identifying providers, patients, and facilities; creating a common healthcare technical nomenclature; and promulgating clinical guidelines upon which physicians providing quality medical services can rely.¹⁰

II. The Emerging Consensus on the Need for Information Technology Investment

There is strong consensus among leading national policy makers, providers, and public officials that information technology infrastructure investment will reduce the cost, and improve the quality, of healthcare services. The Institute of Medicine, which has led the recent national push for improved healthcare quality, declares healthcare IT to be a national imperative:

In the 20th Century, bricks and mortar constituted the basic infrastructure of the health care delivery system. To deliver care in the 21st century, the system must have a health information and communications technology infrastructure that is accessible to all patients and providers...The development of a secure [IT] platform to support clinical, administrative and financial transactions, as well as the use of computer-based clinical records, should over time reduce some administrative costs and dramatically improve the effectiveness, safety and timeliness of the health care system.¹¹

The President's Information Technology Advisory Committee (PITAC), a distinguished panel of technological and policy experts, faults both the U.S. healthcare system and the Federal government for failing to implement information technology innovations:

Information technology tools can provide the health care sector with unprecedented productivity and quality of care if there is a strategic vision and adequate research to ensure success. However, PITAC found that at present the U.S. lacks a broadly disseminated and accepted national vision for information technology in health care. In addition, the biomedical community, including the Federal agencies, is not focused on the basic, long-term information technology research required to provide the community with the state of the art tools necessary to take full advantage of the Information Age.¹²

The professional and business communities share the consensus on the urgent need for information technology implementation in healthcare. The Leapfrog Group, a coalition of

⁹ William A. Yasnoff, "National Health Information Infrastructure (NHII)," Department of Health and Human Services, 2002.

¹⁰ The national scope of these non-technological issues will require either Federal direction (most likely in multiple Federal agencies) or direct Federal encouragement. Both will be facilitated by our proposal, as Federal financial commitments provide leverage to mandate participation in new technical and clinical standards.

¹¹ Institute of Medicine, *Fostering Rapid Advances in Health Care*, 2002.

¹² President's Information Technology Advisory Committee Report on Transforming Health Care through Information Technology, 2001.

employers and other healthcare and health insurance purchasers organized to foster patient safety, made Computer Physician Order Entry (CPOE) systems one of its three top patient safety priorities for healthcare purchasers and hospitals. But it laments the financial obstacles to greater adoption:

Computer Physician Order Entry (CPOE) systems can be remarkably effective in reducing the rate of serious medication errors...Despite the considerable benefits, fewer than 2% of U.S. hospitals have CPOE completely or partially available and require its use by physicians. Why? The upfront cost of implementing CPOE is one major obstacle for hospitals.¹³

The consensus on the enormous value of healthcare information technology rests on a foundation of extensive independent research showing that intelligent information technology investment sharply reduces medical errors. Researchers have found that the availability of computer-based clinical information at the time of care delivery, together with clinical decision support systems, dramatically reduces adverse drug events and other medical errors; that information technology systems help physicians with dosing calculations, selection of drugs, catching potentially harmful interactions between drugs, and monitoring patients for adverse side effects; and that one common source of medication errors that computerized prescription systems prevent is simple legibility problems when pharmacists must interpret handwritten prescriptions.¹⁴ Additionally, the use of computer-based reminder systems that facilitate both physician and patient adherence to protocols makes patient care more consistent and more effective.¹⁵ Post-surgery infection, for example, is one of the most significant causes of avoidable complications in hospitals. Appropriate administration of antibiotics—more than two hours before surgery—can sharply reduce the risk of infection. A computerized reminder system in one large academic hospital increased rates of on-time antibiotic administration before surgery from 44% to over 99%.¹⁶

¹³ The Leapfrog Group for Patient Safety, Computer Physician Order Entry, November 2000.

¹⁴ David Bates et al., “Effect of Computerized Physician Order Entry and a Team Intervention on Prevention of Serious Medication Errors,” JAMA, October 21, 1998; “The Impact of Computerized Physician Order Entry on Medication Error Prevention,” Journal of the American Medical Informatics Association, 6 (4) 1999; Raschke et al., “A Computer Alert System to Prevent Injury from Adverse Drug Events,” JAMA, October 21, 1998; Paul C. Tang et al., “Use of Computer-based Records, Completeness of Documentation, and Appropriateness of Documented Clinical Decisions,” Journal of the American Medical Informatics Association, 6:245-251 (1999); “Physician Inpatient Order Writing on Microcomputer Workstations: Effects on Resource Utilization.” JAMA 1993; 269(3): 379-383.

¹⁵ Paul C. Tang et al., “Measuring the Effects of Reminders for Outpatient Influenza Immunizations at the Point of Clinical Opportunity,” Journal of the American Medical Informatics Association, 6 (1999); Balas et al., “Electronic Communication with Patients,” JAMA 278 (2), 1997.

¹⁶ Michael Millenson, Demanding Medical Excellence, University of Chicago Press, 1997, p. 87.

There are some notable examples of the power of information technology to improve the quality of medical care, which individual localities and selected individual payor/provider systems have initiated. These successful initiatives provide a growing body of evidence documenting the need for broader implementation of clinical information systems and streamlined administrative networks. Organizations with a documented record of improving system performance using IT investment include the Veterans Health Administration, the Palo Alto Medical Foundation, the University of Utah and LDS Hospital, and the New England Healthcare EDI Network.¹⁷

III. Is Healthcare Information Technology a Good Investment?

The capacity of healthcare information technology to reduce medical errors is clear, dramatic, and essentially undisputed. While calculating return on investment remains challenging, both independent research and larger-scale initiatives in government and private healthcare organizations demonstrate healthcare information technology can also lead to tremendous reductions in healthcare costs. A recent, rigorous literature review found that nationwide adoption of computerized order entry systems in ambulatory care would eliminate more than 2 million adverse drug events and 190,000 hospitalizations per year resulting in a savings of approximately \$44 billion per year in reduced medication, radiology, laboratory, and hospitalization expenditures.¹⁸ A separate study has found healthcare information technology investment reduces costs through other channels: researchers have shown that information

¹⁷ The Veterans' Health Administration has already built what is widely recognized, by the Institute of Medicine among others, as "one of the largest and most sophisticated health information systems in the nation." The system, currently known as VistA, was initiated in 1985, and it is now going through a complete systemic upgrade, called HealthVet. VistA reaches all 1320 sites of care in the large VHA system, serving 4.1 million consumers annually in a \$22 billion health system that includes 174 medical centers and employs 180,000 healthcare staff. Access to complete patient information greatly reduces medical errors and facilitates patient adherence to chronic condition care protocols. (John Demakis, et al., "Quality Enhancement Research Initiative," *Medical Care*, 38 (6), 2000.) The Palo Alto Medical Group is a large physician group practice affiliated with Sutter Health, serving as the primary care practice to approximately 150,000 patients. Palo Alto started an Electronic Medical Record (EMR) initiative in 1999 and a Web-based interface for patients in 2002. According to a senior administrator at the Medical Group, the EMR initiative has dramatically improved the completeness of physician notes and the frequency with which physicians review patient information when filling out or renewing prescriptions. (Personal Communication, Paul Tang, Palo Alto Medical Foundation, 2003.) LDS Hospital, the flagship facility in Utah-based Intermountain Health System, has pioneered prevention of medication errors and monitoring of care protocols using a computerized decision support system. The system reduced medication errors by 70% in just four years. (Michael Millenson, *Demanding Medical Excellence*, University of Chicago Press, 1997.) The New England Healthcare EDI Network is described in detail below.

¹⁸ *The Value of Computerized Provider Order Entry in Ambulatory Settings*, Center for Information Technology Leadership, 2003.

technology can shift outpatient care, where appropriate, to remote, electronic consultation rather than face-face office appointments;¹⁹ enable providers to avoid unwieldy eligibility and claims processes for each health plan and to replace them with simpler and far less expensive multi-payor submissions;²⁰ and reduce claims processing costs for insurers.

The Veterans Health Administration has shown it believes in the value proposition of information technology investment. The VHA currently spends about \$180 million annually to maintain its existing VistA system, and it is making a substantial up-front investment in the new system, \$150-175 million a year through 2005, including \$125 million in direct Federal appropriations annually. Although the primary justification for the VHA's ongoing investment is improved patient care, senior VHA administrators estimate a return on investment (ROI) at 2:1 at a minimum.²¹ In addition, HHS estimates that 20% of lab and x-ray tests are performed because prior results are unavailable and that 1 in 7 hospitalizations occur because prior patient information is not available.²²

There are an increasing number of mature and well-documented initiatives which show the potential of information technology to lower healthcare costs in the private sector. The private sector has developed a variety of computerized care monitoring and improvement systems for insurers, drawing on insurer databases to examine each patient's utilization for potential problems. A large recent randomized controlled 40,000-subject trial of one system, developed and operated by ActiveHealth, showed both improved healthcare quality and significant healthcare cost savings, reducing hospital admissions by 8.4% and hospital days by 9.3%.²³ Savings in the intervention group were almost \$20 per member per month (PMPM) in charges and almost \$10 PMPM in paid claims. An analysis in a forthcoming book by Newt Gingrich projects that ActiveHealth's system could save Medicare \$9 billion annually.²⁴

The New England Healthcare EDI Network (NEHEN) is a not-for-profit organization formed by a collaboration of providers and payors in eastern Massachusetts in 1998 to create a

¹⁹ Balas et al., "Electronic Communication with Patients," JAMA 278 (2), 1997.

²⁰ Donald Berwick, Plenary Address, National Forum on Quality Improvement in Health Care, December 9, 1999.

²¹ Personal Communication, Gary Christopherson, Veterans Health Administration.

²² William A. Yasnoff, M.D., National Health Information Infrastructure: Key to the Future of Health Care, UD Dept. of Health and Human Services, 2002.

²³ Jonathan C. Javitt et al., "Use of a Sentinel System for Medical Error Detection and Prevention: A Randomized Prospective Trial," Manuscript, 2003.

²⁴ Saving Lives and Saving Money, Newt Gingrich, et al., forthcoming 2003.

single, common platform for insurance transactions between regional providers and payors.²⁵ NEHEN invested in software that member organizations could use with their existing systems, and developed a common standard for entering transactions and a set of security and usage guidelines. NEHEN began with eligibility determinations in 1998 and since 2000 it has moved referrals and claims processing onto its common platform as well as adding several large payors and providers to its membership. Today, NEHEN has achieved significant scale—its members include 36 hospitals, provider groups with 10,000 physicians and payors with over 2 million members. NEHEN has delivered substantial savings, with members estimating return on investment of over 2.5:1 within three years of adopting the platform.²⁶

Despite the fact that individual initiatives have shown significant returns, for many it is still difficult to predict on a project by project basis both the level of return and which participant in the healthcare system will benefit from the investment. As explained in detail below, in large measure the difficulty in calculating ROI results from the extraordinarily complex financial relationships that exist between healthcare consumers, payors and providers and the multitude of variables which influence healthcare costs. Nevertheless, the growing list of financially successful investments in healthcare information technology suggests that broader investment would lead to significant savings in healthcare costs. Although these savings would accrue initially to insurers and purchasers of insurance, including Federal, state and local government, ultimately a reduced rate of healthcare inflation would bring broader economic benefits.

IV. Why the Healthcare System Has Not Supported Investment in Information Technology Infrastructure

While a few recent limited information technology successes provide a ray of hope, the broader historical landscape is littered with failures. Efforts to institute electronic medical records and clinical health information networks date back at least to the 1960s, but they have repeatedly floundered on the structural and financial barriers created by the siloed American healthcare system.

²⁵ Blackford Middleton, “The New England Healthcare EDI Network,” *Journal of Healthcare Information Management*, forthcoming. NEHEN was largely an outgrowth of the pre-existing Massachusetts Health Data Consortium, a body under State sponsorship and incorporating virtually all of the large healthcare organizations in the state.

²⁶ Blackford Middleton, “The New England Healthcare EDI Network,” *Journal of Healthcare Information Management*, forthcoming.

The American healthcare system's dysfunctional character results in large part from the manner by which we pay for healthcare services. The dominant payors for health insurance in the United States are employer-sponsored health insurers and government. Together, they have created a dizzying patchwork of benefit plans, coverage and medical necessity requirements, and administrative processes, which can bury even the most diligent physician. From the practicing physician's perspective, the world this complex multi-payor environment creates poses significant obstacles to provision of quality healthcare services. Physicians are confronted with vastly different billing parameters and clinical guidelines with which they must comply for often small numbers of patients. Not surprisingly, physicians have come to see payors as largely motivated by self-interest and are often distrustful of payor attempts to streamline administrative processes or to promote quality improvement. In fact, some of the country's leading medical societies have joined in a nationwide class action suit to attempt to reform payors' business practices.²⁷

Barriers between different provider types are formidable as well: when patients see multiple doctors and receive care at multiple hospitals or post-acute facilities, there is no coordination across the silos and poor transfer of even the most basic clinical information among them. Significant legal obstacles related to payor-provider and provider-provider divisions also stand in the way of healthcare information technology advancement. Patient privacy and fraud and abuse statutes err on the side of preventing self-referrals rather than facilitating patient care; anti-trust issues limit the sharing of clinical and claims information among entities that together have regional market power.²⁸ Together, this bewildering array of regulations and laws creates massive misalignment of the elements of what we generically call the "healthcare system."

The fragmented healthcare financing system does not create incentives for payors and providers to work together to create administrative and clinical efficiencies or to promote the quality of care. Certain types of information technology infrastructure investments would benefit multiple parties in the healthcare system, but do not benefit any one party enough to justify making the investment. In many cases, parties other than the party making the investment

²⁷ *In re: Managed Care Litigation*, MDL No. 1334, US District Ct., So. District, Florida.

²⁸ Ironically, IT infrastructure development could significantly enhance efforts to protect patient privacy. One of the central objectives of federal privacy legislation is to track access to confidential patient information. This process is extraordinarily difficult with paper patient records and likely to create an additional layer of bureaucracy in routine healthcare encounters and transactions. A digital system, however, makes auditing of access to patient information relatively straightforward and efficient.

may very well be the beneficiaries of any return on investment (ROI) in healthcare information technology infrastructure. For this reason, efforts to develop community health information networks have often failed, even though the potential benefits of such networks are significant.

Many of the most vital healthcare information technology systems are capital-intensive, including electronic medical records systems, order-entry systems, systems that provide immediate access to computer-based clinical information such as laboratory results and radiological imaging, and computerized decision support systems. But both hospitals and physician groups generally lack substantial capital or sufficient positive cash flow to finance these large investments. Hospitals do not experience strong enough operating margins to support significant long-term investment in information technology. Hospital operating margins have been steadily declining since 1996; one in three hospitals nationwide had negative total operating margins in 2001.²⁹ Even hospitals with positive cash flows cannot amass the capital internally to make large IT investments. And hospitals are also having difficulty accessing the necessary outside funding to invest in capital projects like adding expensive information systems—Wall Street sees hospitals as a risky investment, leading to higher interest rates for funding. Six times as many hospitals had bond downgrades versus bond upgrades in 2001.³⁰ Most hospitals are not-for-profit institutions and lack access to equity markets. Charitable contributions to hospitals are highly correlated with stock market performance; as with other major charities, donations and endowments have lagged severely in the last three years of poor stock market performance.

Community outpatient physician practices deliver almost 90% of the primary care in the United States, and also play a major role in acute care decision-making, but have an almost total lack of access to capital. Net income at most primary care practices has been declining in real terms in recent years.³¹ Furthermore, implementation of an electronic medical record system requires major changes in office workflow and significant training for both physicians and their support staff. This means that at least in the short term, the switching costs of implementing an electronic medical record system impose added financial burdens on individual physicians. Yet such investments have little or negative returns to physician practices, at least in current reimbursement methodologies. Savings from improved management of complex, chronic

²⁹ American Hospital Association, “The State of Hospitals’ Financial Health,” White Paper, 2002.

³⁰ American Hospital Association, “The State of Hospitals’ Financial Health,” White Paper, 2002.

³¹ “Earnings Survey: More hours, more patients, no raise?” *Medical Economics*, 11/22/02.

conditions accrue to purchasers of healthcare and often lead to fewer patient visits and lower revenues.

Health insurers, who would reap most or all of the cost reductions resulting from information technology infrastructure development, generally do not control hospitals or physician practices. Their only leverage on providers results from their payment practices; that is, paying higher rates to providers who upgrade their technology or show quality improvements. With controversy over what defines “quality,” distrust between providers and payors leads many providers to see payment incentives as at best a marketing ploy and at worst a tool for cutting payment rates. Moreover, the fact is that most payors cover only a small portion of patients in any given physician practice. As a practical matter, this means that without collective action on the part of all payors – something that is unlikely to occur among companies in fierce competition with each other—any single payor acting alone has relatively limited ability to influence physician behavior.

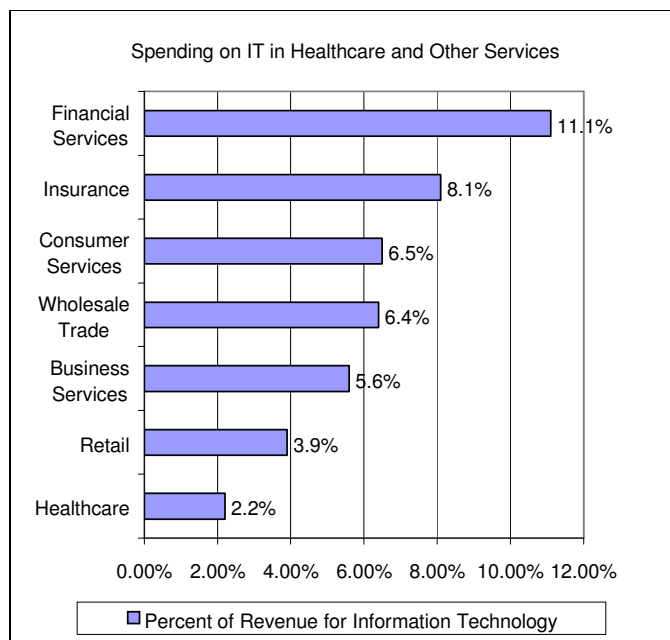
Significantly, payors that operate proprietary hospitals and outpatient systems and are consequently not saddled with the typical barriers preventing payor/provider cooperation spend significant amounts on information technology. As described earlier, one of the largest payor/provider systems in the United States, the Veterans Health Administration, has made major investments in electronic medical record systems, peer-to-peer networking, and other integrative initiatives. Similarly, Kaiser Permanente, a large staff model health maintenance organization that covers and cares for 8.4 million members in 9 states and employs 12,000 physicians, recently announced a \$1.8 billion investment to adopt more comprehensive and portable Electronic Medical Records and networked billing and scheduling system-wide in three years.

These two organizations have made significant commitments to healthcare information technology in large part because they control total health costs and spending for their enrollees. But only a small minority of Americans receive care from large, integrated healthcare systems such as these. The fact is that there are few parties in the American healthcare system with both the resources and the incentives to make substantial investments in healthcare information technology infrastructure, outside of the Federal government, which to date has not seen such technology as a priority. As a result, the level of information technology investment in healthcare compares poorly to the level in other transactional industries, such as financial

services. The median physician practice spends 2% of its operating budget on information technology.³² Hospitals spend only slightly more, averaging 2.3-2.5% of operating budgets and 2.2% of total revenue in recent years.³³ By contrast, companies in the financial services industry typically spend 11% of total revenues on information technology.³⁴

With the burst of the Internet bubble it is also unlikely that independent healthcare information technology companies will make great strides in helping to build out health information technology infrastructure. Healthcare retailing and online content companies have failed catastrophically, much as their counterparts in other industries did with the collapse of the Internet boom in 2000. Companies focusing on industrial applications such as computerized order entry, electronic medical records, and electronic data interchange have seen slow acceptance among purchasers and mediocre support in the stock market, with few companies holding market capitalizations of over \$1 billion.³⁵ E-health companies suffered \$4.9 billion in aggregate losses in 2000 and \$8.2 billion in aggregate losses in 2001.³⁶

Compounding these financial limitations, the professional culture of physicians places an enormous emphasis on professional autonomy. This commitment to the independence of practitioners limits both communication among doctors, particularly across settings, and their willingness to work under routine external scrutiny and to accept care protocols. The American healthcare system was built around a paradigm in which the doctor-patient relationship is sacrosanct: individual physicians generate medical information and transmit it to patients on a



³² Marhula and Shannon, "E-Health 2.0," US Bancorp Piper Jaffray, 2000.

³³ Lewin Group Analysis of AHA Annual Survey, Advancing Health in America 1990-2000, cited in Jeffrey Rose, "The Gordian Project: Improving health care one community at a time," 2003.

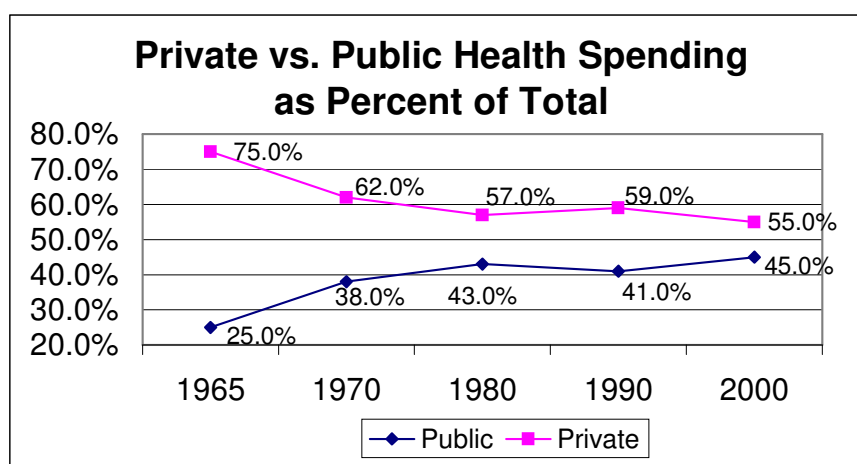
³⁴ *Ibid.*, Note 7, p. 31.

³⁵ J. Souter, et al. "Healthcare Information Technology and Distribution," SG Cowen Securities, October 4th, 2002.

confidential basis. The organizational complexity, clinical urgency, and volume of medical information are much greater than that paradigm can sustain on its own. But the healthcare system has not been able to shift to a new paradigm, in which information is digital and follows patients through different parts of the system, and in which real-time patient databases and evidence-based protocols prevent errors and improve care plans. As we have seen, left alone the private sector in our current system has failed to capitalize on the gains that information technology investment can yield.

V. *The Current Status of Public Investment in Healthcare Infrastructure*

Our healthcare system as a whole spends a great deal on administration but very little on information technology. Public expenditure on Medicare, Medicaid and other health programs is a large share of national healthcare expenditures—over \$650 billion in 2002, 45% of the nation’s healthcare spending, not including the additional 5% of national health expenditures that goes to cover the care of government employees. Over the long term, this share is growing: public spending was only 24.9% of national health expenditures in 1965.³⁷



In other sectors—transportation, the Internet, and genomics to take three high-profile examples—the Federal government has been the major investor in technological infrastructure development. Yet in healthcare, in which the Federal role is so prominent, public involvement in technology infrastructure is conspicuously limited.

Direct Federal investments in fostering healthcare information technology take place in several Federal agencies, including the Agency for Healthcare Research and Quality (AHRQ),

³⁶ Carl Mercurio, “Online Strategies of Leading Managed Care Organizations,” eHealth Insider Industry Forum, April 12, 2002.

³⁷ Center for Medicare and Medicaid Services, Office of the Actuary, National Health Expenditures, 2002.

the Health Resources and Services Administration, the National Institutes of Health, the Centers for Disease Control and the Centers for Medicare and Medicaid Services (CMS). These agencies focus upon the development of best practices and research and development of new technologies—no agency is equipped to finance integrated, system-wide technological change. In 2002 AHRQ made grants totaling \$70 million to programs that include healthcare information technology projects among their priorities. These include \$10 million in grants to study the impact of the “Healthcare workplace” on safety, \$55 million in Patient Safety Research Grants, and \$7 million for “translating research into practice” development grants. Only a portion of each of these grant programs is allocated to information technology. CMS, which operates Medicare and oversees the Medicaid program, has an Office of Research, Demonstrations, and Information that pursues a wide variety of healthcare-related research. In 2001, about \$10 million of its \$139 million research budget was for clinical information technology-related research.³⁸ Other agencies have small grant programs that include some healthcare IT research or pilot projects. Federal investment in national healthcare IT infrastructure totaled about \$100 million in 2002.

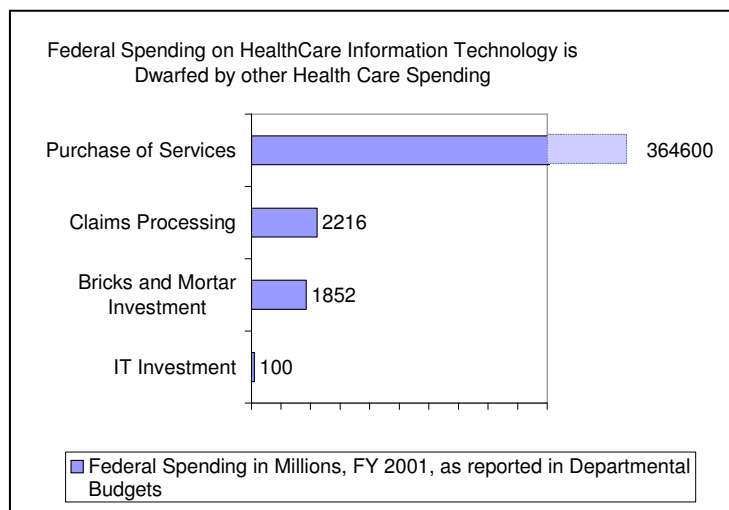
The Medicare and Medicaid programs have also made small and relatively narrow internal investments in information technology. These investments have focused primarily on improved claims processing, fraud prevention, and better recording and analysis of encounter data. In fiscal 2000, the Federal government’s Medicaid Management Information Systems program gave states \$72 million for design and installation and \$791 million for operation of upgraded Medicaid information systems. In 2001, CMS was pursuing 102 major information technology projects for internal Medicare operations, including 17 that cost over \$2.5 million a year, virtually all of which went for information systems for claims processing and recording.³⁹ This expenditure was part of the approximately \$1.4 billion the agency spent on program management including \$625 million it spent on fraud detection and other efforts to ensure the accuracy of claims through its carriers and intermediaries, a significant portion of which goes to information systems. Total spending on all program management and integrity was about 1% of Medicare expenditures.

³⁸ Centers for Medicare and Medicaid Services, “Active Projects Report,” July 2002.

³⁹ General Accounting Office, “Medicare: Information Systems Modernization Needs Stronger Management and Support,” September 2001.

While the Federal government has spent modest sums on healthcare information technology, it has invested heavily in supporting hospital bricks and mortar. The Federal government has long financed the construction of hospitals and other health facilities through loans, loan guarantees, and other financing mechanisms. Such financing began with the Hill-Burton Act, with which the Federal government contributed to a hospital construction boom following World War II, and it has continued with Federal mortgage insurance. The Federal Housing Administration of the U.S. Department of Housing and Urban Development makes mortgage insurance available for non-profit hospitals and non-profit and public nursing homes. Since 1968, the Section 242 program has insured 311 hospital mortgages, for a total of \$9.3 billion. This program is supplemented by Section 223 refinancings and special loans for hospitals in urban areas. Total commitments to healthcare loan insurance, refinancing and direct loans in the 2002 HUD budget were \$1.6 billion. In addition, the Federal government directly pays for the construction of healthcare facilities through congressional “earmarks” to individual local projects in the budgeting process. The Health and Human Services budget in 2001 included \$252 million earmarked for Healthcare Facility Construction and Renovation.⁴⁰

In a system whose central challenge is reduction of medical errors, the chart shown here reflects the extent to which the American healthcare system has neglected IT. We need to devote resources to building an effective infrastructure for managing our healthcare information on a scale commensurate with our immense public commitment to healthcare. To do so, we should create a substantial program—a program representing a meaningful portion of public expenditures on healthcare services, which represent 45% of total national healthcare spending—that will foster a national information technology infrastructure to support quality and reduce administrative waste and unnecessary utilization.



⁴⁰ FY 2001 Consolidated Appropriations Act.

VI. A Proposal for a Public-Private Partnership Program to Finance Healthcare Information Technology Infrastructure

In this section we outline a proposal for the Federal government to legislate and fund the establishment of a Healthcare Information Technology Revolving Loan Program, a public-private partnership program which will combine the resources and energy of the Federal government, state and local governments and the private sector. First, we will describe several current legislative proposals supporting investment in healthcare information technology infrastructure. Second, we discuss the success of Federal Revolving Loan programs created to fund essential infrastructure in the transportation and environmental sectors. Third, we set forth a new proposal to create a “Healthcare Information Technology Revolving Loan Fund Program.”

A. A Review of Current Proposals

Healthcare information technology investment has attracted increasing legislative attention as healthcare cost inflation and medical error rates have emerged as high priority issues. To date, proposals for Federal funding both in Congress and from outside government all involve demonstration projects funded through appropriations, transfers from the Medicare Hospital Insurance Trust Fund, or through the Medicaid program.

Recent Congressional proposals set forth a broad array of approaches, but these are generally variations on a Federal ‘Technology Grant Program.’ This approach involves Federal appropriations for grants to assist healthcare entities in purchasing, developing, and implementing information technology systems. The Federal government would develop and administer the selection process. In the recent 2001-2 Congress, eight bills were introduced along these lines, with funding ranging from \$100M to \$388M.⁴¹

The Bush Administration also has made proposals relying on centrally administered grants. Recently, HHS Secretary Thompson called for the creation of a mini-Hill Burton Program to finance healthcare information technology infrastructure development in hospitals, but the details of this proposal have yet to be disclosed. Such a program would apparently

⁴¹Health Information Technology and Quality Improvement Act of 2001; Patient Safety Improvement Act of 2002; Patient Safety and Quality Improvement Act; Medication Errors Reduction Act of 2001; The Efficiency in Health Care (eHealth) Act of 2002; Department of Defense-Department of Veterans Affairs Health Resources Improvement Act of 2001; National Emergency Telehealth Communications Act of 2002; Rural Health Care in the 21st Century Act of 2000; Patient Safety Improvement and Medical Injury Reduction Act.

involve direct funding of providers based on a statutory funding formula and Federal conditions of participation.

The Institute of Medicine recently has proposed funding demonstration projects in five areas, one of which is “Information and Communications Technology Infrastructure.”⁴² IOM states that demonstration projects are intended to be “budget neutral” over the long-term but will involve initial start-up costs, the amount of which is not specified; elsewhere, the IOM has suggested a \$1 billion Innovation Fund for pursuing healthcare information technology among other quality initiatives.⁴³

While their proposals represent a good start, they should be supplemented by an approach that will provide the necessary ongoing and permanent source of capital, through the creation of public-private partnerships to transform the nation’s healthcare information technology infrastructure. Specifically, we propose the creation of a “Healthcare Information Technology Revolving Loan Fund Program” to finance healthcare information technology infrastructure.⁴⁴ There are compelling models for this approach: successful public-private partnerships, in which the Federal government, state government and the private sector have joined forces to meet America’s transportation and environmental infrastructure needs.

B. The Track Record for Revolving Loan Funds for Transportation and Environmental Infrastructure.

A revolving loan structure, administered at the state level in partnership with the private sector, has allowed the Federal government to leverage its resources and to work through state and local agencies. Revolving loan funds (“RLFs”) use an initial amount of capital to lend money to qualifying infrastructure projects and then recycle debt repayments and other revenues into further loans. This structure has a substantial, successful track record in multiple programs established since 1987. These programs have benefited from the leveraging of revolving debt financing and the knowledge of the community that comes with local administration. All of

⁴² Fostering Rapid Advances in Health Care, 2002.

⁴³ Crossing the Quality Chasm, op. cit.

⁴⁴ We believe this proposal is consistent with an important Legislative initiative, the proposed Patient Safety and Quality Improvement Act, which recently passed the House of Representatives and is presently under consideration in the Senate. This Legislation calls for, among other things, the creation of Patient Safety Organizations, the promotion and diffusion of interoperability of information technology systems involved with health care delivery, and the creation of a Medical Information Technology Advisory Board. These measures would create an important foundation for any larger Federal effort to support investment in healthcare information technology infrastructure, as standard-based investments will ensure broad public use of such infrastructure.

these programs are voluntary. Each program imposes a state or local “matching funds” requirement (generally 20%, or \$1 for every \$4 in Federal funds), although Federal appropriation dollars have encouraged most states to participate.

These programs have operated successfully in two areas of infrastructure building—transportation and water pollution control—and a third program will begin to operate this year to fund brownfield restoration. The State Infrastructure Bank Pilot Program, administered by the U.S. Department of Transportation, provided seed funding in 1996 and 1997, out of existing Federal grant allocations for highway and transit infrastructure programs, to 32 state-administered revolving loan funds (“RLF”). The state administered RLF programs have entered into over 245 loan agreements to provide over \$2.8 billion to private and public entities undertaking highway construction projects and transit capital projects. The Clean Water State Revolving Fund (CWSRF), administered by the Environmental Protection Agency, provides annual grants to State RLF programs, which in turn provide funding for projects involving water pollution control and abatement. The total Federal appropriation for FY 2002 was \$1.3 billion. Since the late 1980s, CWSRF programs have been financed with over \$25 billion from Federal and State governments. The Drinking Water State Revolving Fund (DWSRF), also administered by the EPA, provides annual grants to State RLF programs, which in turn provide funding for projects involving the provision of safe drinking water, including installation and replacement of treatment and storage facilities and transmission and distribution systems. The total Federal appropriation for FY 2002 was approximately \$850 million. DWSRF programs have been funded with over \$5 billion from Federal and state sources since 1997. Finally, the Brownfields Initiative, administered by the EPA, will make grants to States and local governments and non-profits to set up RLF programs, which in turn provide funding for projects that prevent, safely clean up, and reuse brownfield sites. Initial grants are available in amounts of up to \$1 million. \$100 million will be available to make up to 200 grant awards in FY 2003.

These programs address infrastructure problems with important similarities to healthcare information technology. Most fundamentally, a compelling, national policy objective motivates each of these programs: wastewater treatment; clean drinking water; transportation infrastructure; reclamation of tainted sites. Each program is motivated by a recognition that, left alone, state and local government would lack direction and resources to achieve national objectives. Still, since these programs are directed at mainly local systems and problems, each

has vested project-level decision-making (project selection, design of financing vehicle) in state hands, within broad Federal qualification standards. Each program is founded on the principle that most infrastructure projects funded by the program should pay for themselves over time: these are financing programs, not giveaways.

Funds to sustain existing RLF programs after initial capitalization have come from repayment of the loans, generated either through private sector user fees for the infrastructure or from tax revenues from the locality that benefits from the improvement that repay the loans. Each RLF program recycles the repayment streams into further infrastructure improvements. Public funds can have their impact leveraged in two ways—as they are repaid and recycled through the revolving loan agency, and as the administering state agency securitizes the expected repayments and borrows against them to channel more up-front money into the program. The effect of these two forms of leverage is reflected in the difference between public dollars committed and the funding commitments for projects financed described in the adjacent table.

State flexibility in these programs has led to innovative and varied program administration and lending practices. Federal legislation allows states to decide how to implement the program. Some states vest program administration in an existing state agency. Some states create a new public benefit corporation or independent authority to administer program. The Federal administering agency also allows wide latitude in the design of financing structures: Federal/state funds can be used to make direct loans to localities, to not-for-profits or to private businesses. Interest on Federal/state bonds can be used to reduce interest rates on program loans—New Jersey’s Clean Water State Revolving Loan Program, for example, makes loans to infrastructure projects partially from bond proceeds and partially from Federal/state funding; infrastructure loans benefit from a “blended” interest rate that is lower than the interest rate on the revolving loan fund bonds. States can

Federal Revolving Loan Fund Programs Total Funding Commitments and Amount of Projects Financed (Figures are aggregate through June 30, 2002.)			
	Federal Grant Dollars	State Matching Funds	Principal Amount of Projects Financed
Clean Water SRF (1988-2002)*	\$19.54 billion	\$4.16 billion	\$35.49 billion
Drinking Water SRF (1997-2002)*	\$4.37 billion	\$1.02 billion	\$7.08 billion
State Infrastructure (1995-2002)*	\$2.8 Billion	Varies by state	\$4.06 billion

create programs that use Federal/state funds or loan repayment streams as collateral for bond financing programs to further increase available pool of program dollars—Clean Water State Revolving Loan Programs in New York and California pool loans to infrastructure projects and issue bonds collateralized by pooled loans and reserves; loan repayments repay bonds, and freed-up reserves are re-used to collateralize additional bond issues.

These programs offer several lessons for the establishment of a Healthcare Information Technology Revolving Loan Program. First, a financing program that commits public dollars to private enterprises can serve the public interest if it is bound by clearly defined national policy objectives. Second, a national healthcare information technology financing program should combine state and local administration with Federal funding and oversight. Third, we should use a revolving loan fund financing model that can both leverage government monies and allow for flexible financing terms. As funding recipients repay funding plus interest and/or user fees, the revenue can be used to fund additional projects. Fourth, the revolving loan funds and, by implication, most of the projects they fund must eventually pay for themselves either completely or to a major extent that is specified in statute. The selectivity this requirement enforces on lending agencies will ultimately lead to better infrastructure and broader adoption of the new systems.

C. A Proposal To Create a “Healthcare Information Technology Revolving Loan Fund Program”

1. *Overview of Proposal*

The basic structure of our proposal is to use Federal and state dollars to create Federally-authorized RLF programs to support healthcare information technology infrastructure projects. Following the pattern of other successful RLF programs, Federal authorizing legislation would create the program and annual grants would be made to state agencies, subject to (i) contractual agreements by the states to make revolving loans according to the broad Federal conditions of participation and (ii) states matching funding at the rate of \$1 in state funding for every \$4 in Federal funding. State administering agencies could create additional leverage by entering the tax-exempt bond market as many states have done in other revolving loan programs. The state revolving loans would provide funding to newly-formed community-level not-for-profit

corporations called Health Information Technology Corporations (HITCs). Eighty percent of the funds would flow to the HITCs as loans, and twenty percent as grants.

The HITCs would be substantively accountable to the federal administrative agency. The HITCs would make individual project loans and grants for healthcare information technology infrastructure projects that are designed to reduce medical errors, increase interoperability, drive clinical decision-support, and enhance patient access to individual health information. A variety of mechanisms would subsidize or support the participation of organizations that provide significant amounts of care to the indigent or uninsured as well as other important policy objectives—the HITCs would have the resources and the authority to make loans and grants on varying terms that would be calibrated to the borrowers' needs, their ability to repay, and their potential contribution to program goals. Federal loan guarantees would be available as well to support the repayment obligations of critical borrowers with limited credit.

2. *Funding Amounts and Services*

We propose that the level of federal funding that should be made available to create state revolving loan funds for healthcare information technology infrastructure investment be \$1 billion per year for a minimum of five years, \$800 million from the federal government and \$200 million through state matching commitments.

\$5 billion over five years is enough to jump-start information technology infrastructure development significantly, particularly when multiplied and recycled through an RLF program structure. Still, given the scale of investment needed and the size of the healthcare system as a whole, an annual \$1 billion appropriation is fiscally conservative by any number of measures. This allocation would represent less than one tenth of one percent of national health spending, only \$3,000 per physician in the United States and about \$3.50 per capita. As noted earlier, Kaiser Permanente is investing \$1.8 billion over three years to establish an electronic medical record for 8.4 million members. The Veterans Health Administration, with 4.1 million members, is spending \$600-700 million in a similar timeframe to complete a total IT system upgrade.

It is also important to bear in mind the unusual character of this funding. First, the spending will go to finance private investment infrastructure projects, and it will be recycled through revolving loans over an indefinite period. As with other RLF programs, the proposal will enable ongoing private investment rather than give money away. Second, healthcare cost reductions will produce large offsetting reductions in federal spending. Recent, rigorous studies

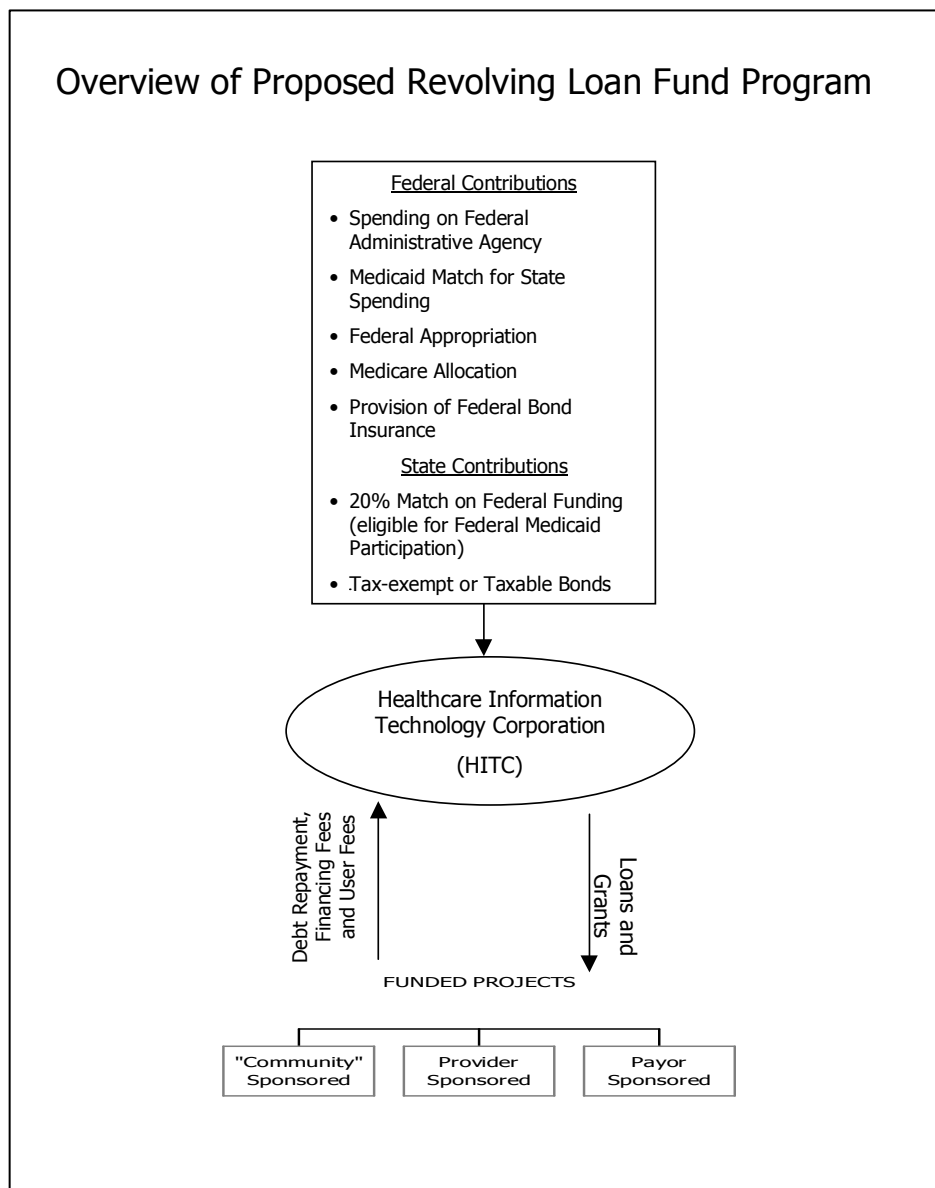
have found that nationwide adoption of computerized order entry systems in ambulatory care would save approximately \$44 billion per year and that a leading computerized care management system reduces hospital admissions by 8.4 percent and hospital days by 9.3 percent.⁴⁵ Both of these analyses show dramatic ROI for healthcare information technology investment, 400-500% for computerized order entry and 300-700 percent for computerized care management in the Medicare and Medicaid populations. A 400 percent return on a \$1 billion annual investment would produce short-term savings to state and federal governments of \$1.8 billion (45 percent of annual savings to the system of \$4 billion with public spending representing approximately 45 percent of national health spending) without taking into account the large multiplying effects produced by the private investment activity catalyzed by federal financing and the recycling of federal funds through an RLF structure. (As noted earlier, an independent analysis projects that ActiveHealth's system could save Medicare \$9 billion annually if fully implemented.⁴⁶) In the longer term, it is reasonable to expect more dramatic savings as information technology investment is catalyzed by this public commitment of financing and organization. While obviously difficult to quantify, these long-term savings to Medicare and Medicaid could easily yield budget reductions that dwarf a \$5 billion appropriation to seed private healthcare IT investment.

⁴⁵ The Value of Computerized Provider Order Entry in Ambulatory Settings, Center for Information Technology Leadership, 2003; Jonathan C. Javitt, et al., "Use of a Sentinel System for Medical Error Detection and Prevention: A Randomized Prospective Trial," Manuscript, 2003.

⁴⁶ Saving Lives and Saving Money, Newt Gingrich, et al., forthcoming 2003.

3. *Schematic Overview of Program*

The following schematic illustrates the operation of our proposed concept:



4. *The Reasons Behind the Structure*

Our proposal is founded on the history of successful government sponsored RLFs for national infrastructure objectives. As has been the case with the Clean Water and Drinking Water Revolving Loan Funds, our proposal recognizes that expenditures in one community may significantly or even principally benefit those “downstream” from that community; and

therefore, only the federal government has enough self-interest to establish and fund initiatives in many or most localities. As has been the case with all of the federal-state revolving loan fund concepts, our proposal recognizes that an individual state can and should be free to implement the revolving loan program in ways that are consistent with its own particular circumstances.

Unlike prior revolving loan fund precedents, however, our proposal recognizes that a new structural element may be needed to implement thorough-going, intelligent, community-minded investment in healthcare information technology. The planning, building, and operation of water systems, transportation systems, and even environmental reclamation projects has long been largely the province of local government, of public authorities, or of public utilities. There is no analogous local structure that exists in the healthcare delivery system as it is currently configured. That objective will require new, regional-level organizational capacity as well. Our proposal does not contemplate the establishment of a new organ of government but rather the use of a vehicle that is a public-private partnership organized, like many elements of the healthcare delivery system, as a not-for-profit corporation. These community-based not-for-profits Health Information Technology Corporations (HITCs) would be responsible for deciding what projects should receive loan financing or grant funding and on what terms.

One of the primary goals of HITCs would be to create and finance new consortia, integrating multiple entities into a unified information technology infrastructure. For healthcare information technology to achieve its potential, it must enable not only clinical and administrative functions within an institution but also create shared, integrated capacity across caregivers and institutions to improve patient care. There are several trendsetting initiatives that provide an exciting vision of what is possible through the development of community-based information and communication initiatives. The Santa Barbara Data Exchange, funded and originated by a county-affiliated nonprofit and a California foundation, is an important example of the potential of integrated IT development when a local community agency takes the lead.⁴⁷ Similarly, the community-level Regenstrief Institute led a consortium of large healthcare institutions in and around Indianapolis, Indiana, to develop the “Regenstrief Medical Record System (RMRS), one of the first and now one of the oldest and largest electronic medical record

⁴⁷ The Santa Barbara County Data Exchange is a three-year, community-wide initiative to deploy Internet-based technologies, making patient information readily available at the point of care both within and across organizations. Nearly 75 percent of healthcare providers in Santa Barbara County participate in the project, including hospitals,

systems.⁴⁸ The Gordian Project is an innovative proposal to automate an entire medical community by providing a comprehensive set of IT tools and then offering financial incentives to physicians to adopt them.⁴⁹

Another important aspect of creating revolving fund infrastructure financing programs is the identification of the stream of dollars that the borrowers use to repay their revolving loans. This definable, dependable stream of repayment funds not only turns the Loan Fund into a permanent investment platform but provides the essential foundation for leveraging transactions that states have used to magnify the resources the federal government has made available to them. When a state agency can demonstrate to bond markets that it has a dependable annuity stream coming in from revolving loan borrowers, the state agency can securitize those repayment streams by borrowing against the expected future loan receipts and thus derive more capital resources to loan out to borrowers more quickly.

While in many cases borrowers will have the financial capacity to repay loans, the program must also accommodate the elements of the healthcare delivery system that are already financially overburdened and, therefore, lack creditworthiness as a result of the proportion of indigent patients that they serve. This will happen in three ways. First, each HITC would be able to receive revolving loans and grant funding from the applicable state agency and, in turn, use the proceeds to make loans (80 percent by dollar volume) and grants (20 percent by dollar volume) to providers in the HITC's local or regional jurisdiction. Second, the HITC would have the flexibility to make loans on customary financial terms to borrowers with the ability to repay market-rate financing on market terms as well as the ability to make loans on concessionary terms (longer than usual repayment terms, below-market interest rates, unusual subordination features, and the like) to spread the benefit of the new investment broadly across the HITC's community. Third, we propose an expansion of the hospital mortgage insurance program

medical groups, clinics, laboratories, pharmacies, and payors. Participants use the Care Data Exchange a system developed, built, and implemented by CareScience to access information on an estimated 300,000 patients.

⁴⁸ The RMRS includes virtually all radiological and laboratory results as well as pathology reports, diagnostic studies, operative notes, and discharge summaries; it works in tandem with a physician order entry system. The RMRS integrates both physician practices and the emergency departments at all five major Indianapolis hospital systems into a citywide shared information repository. Regenstrief researchers have published more randomized controlled trial studies of the effect of computers than any other U.S. Center. (McDonald CJ, Overhage JM, Tierney WM, et al., "The Regenstrief Medical Record System: a quarter century experience" *International Journal of Medical Informatics* 1999; 54:225-253. "Physician Inpatient Order Writing on Microcomputer Workstations: Effects on Resource Utilization." *Journal of the American Medical Association* 1993; 269(3):379-383.)

⁴⁹ Jeffrey Rose, "The Gordian Project: Improving Health Care One Community At A Time," 2003.

administered by the Federal Housing Administration of the Department of Housing and Urban Development (“HUD”). Over the years, HUD mortgage insurance has provided a total of \$9.3 billion in hospital mortgages to support critical components of the hospital delivery system nationwide. No out-of-pocket funding is required to insure a mortgage; instead, the balance sheet of the federal government is afforded as a credit support to allow a provider to borrow in the marketplace. We propose that this HUD program be amended to allow HUD to insure the loans made to providers by HITCs to fund information technology infrastructure. HUD’s existing hospital underwriting process, which provides insurance to credit unable to obtain credit enhancement in the private market, could be utilized to qualify loans for HUD insurance. The financial market’s familiarity with and recognition of HUD hospital loan insurance would facilitate the impact of this program feature.

5. *The Federal Role at the Program Source: Policy Standards and Grant Funding*

As has been the case with each successful RLF precedent, the starting point for the program is the federal government.

First, it must articulate and define the policy objectives and modalities of the healthcare technology infrastructure investment program and confer administrative authority for the program upon an agency of the federal government. Federal legislation should broadly define program goals, eligible borrowers, and eligible projects. The legislation should create an inclusive definition of healthcare information technology infrastructure, including clinical information systems, systems to increase interoperability and drive decision-support, and administrative and claims processing systems as well as the technological underpinnings of these systems. On the clinical side, it can incorporate electronic medical records; immediate access to computer-based clinical information such as laboratory results and radiological imaging; computerized decision support systems; computerized reminder systems to aid patients in adherence to medical protocols; and Internet-based communication between patients and clinicians as well as the underlying communications/networking, desktop support, security, and other supports that provide for the unified delivery of specific applications. Some or all of these kinds of systems can operate at every level in the healthcare system: at the level of the patient, the provider, the payor or the community. This is true of both clinical and administrative data. Eligible borrowers should include both for-profit and nonprofit organizations; most physician practices are for-profit, and for-profit hospitals provide critical care in many American

communities. Particularly important as borrowers will be new consortia that integrate many healthcare organizations across a community or region.

Second, the federal legislation should mandate administering agencies to give preference to borrowers who adopt technical data, quality reporting, and security standards (as well as other evolving federal standards) promulgated through ongoing federally sanctioned activities.

Technological data and security standards for healthcare information technology have been developing at a rapid rate over the last several years and can be expected to continue to evolve in the future. As with other national standards, the federal administering agency should have the authority to use incentives to reward projects that adhere to emerging technical data and security standards in an effort to accelerate or to solidify standard adoption. Federal requirements would mandate strict adherence to federal healthcare privacy law; as noted earlier, the transition from paper to digital healthcare records holds great potential to enhance patient privacy by making it easy to track who has access to medical records. In keeping with the fundamental objectives of the program, borrowers would be required to provide quality data to the federal government to allow rigorous tracking of the impact of investments on patient care. Borrowers would comply with open federal standards for messaging and terminology in their quality reporting.

Third, federal legislation should provide for annual grants to be made not to individual providers but to revolving loan fund administrative agencies, which, in turn, will pass these funds to regional HITCs. As has been the case with other successful RLF programs, federal grant dollars should be recycled at the state and local level through the relending of loan repayment dollars, but the state agencies that receive the federal grant funds should not be asked to repay this funding. The federal government should view its payback as coming through a reduction in the growth of federal health insurance costs as a result of the reduction in medical errors and through the achievement of the public health objective of dramatically enhanced patient access to and control over individual personal health information.

As has been the case with other federally-funded RLF programs, a state-matching share contribution should be required in the magnitude of \$1 of state contribution for every \$4 of federal contributions. The state-matching contribution concept imposes fiscal discipline and recognizes the interest that states and local government have, as significant funding sources for the Medicaid program, in reduction of overall system costs through reduction in medical errors. Still, particularly given current fiscal circumstances, states should be permitted to meet their

matching obligation through using Medicaid administrative dollars, which are heavily subsidized through federal financial participation.⁵⁰ States would be able to utilize up to a set percentage of the federal share of their Medicaid administrative-cost allowance.

Fourth, in order to facilitate provider-physician joint investment in collaborative information technology that improves care, the Secretary of HHS, through its Office of Inspector General (“OIG”), should implement a safe harbor, pursuant to its authority under Section 1128B(b) of the Social Security Act, protecting certain types of investment from adverse scrutiny under the Medicare/Medicaid antikickback statute. As discussed earlier, fraud and abuse statutes aimed at preventing self-referrals pose a major obstacle to investments in care coordination and multiprovider quality initiatives. As with existing safe harbors, the purpose of this OIG rule-making would be to define criteria for appropriate collaborative investments while minimizing the risk that hospital and other providers will use their information technology platforms to induce or influence patient referrals.⁵¹

⁵⁰ Federal financial participation (“FFP”) is available for expenditures relating to several categories of administrative expenditures, including compensation and training of skilled professional medical personnel, and staff directly supporting such personnel, of the state agency or any other public agency; mechanized claims processing and information retrieval systems (Medicaid Management and Information Systems, or MMIS); implementation and operation of an immigration status verification system; family planning services and supplies (whether provided directly or on a contract basis); establishment and operation of a Medicaid fraud control unit; any other amounts “as found necessary by the Secretary for the proper and efficient administration of the State plan.” (See 42 USC 1396b(a) for these categories.) Of particular note is the 90 percent matching that is available for expenditures for MMIS. Specifically, matching is available for “the design, development, or installation of such mechanized claims processing and information retrieval systems as the Secretary determines are likely to provide more efficient, economical, and effective administration of the plan and to be comparable with the claims processing and information retrieval systems utilized in the administration of [Medicare], including the State’s share of the cost of installing such a system to be used jointly in the administration of such State’s plan and the plan of any other State....” 42 U.S.C. 1396b(a)(3)(A)(i). As part of a comprehensive federal program encouraging investment in IT, Medicaid statute should be amended slightly to make clear that state investment in HITCs would also qualify for 90 percent FFP.

⁵¹ Among the criteria that the OIG should consider – and that, in turn, would define appropriate investment strategies – are the following:

- (i) To qualify for participation in a collaborative, provider-based IT project, the physician (or other eligible practitioner) must be credentialed, with unrestricted privileges, on the provider’s medical staff and must have his or her primary medical office within the locality traditionally served by the provider.
- (ii) The provider must not condition the physician’s participation on his or her prior or expected volume of referrals, must refrain from tracking the physician’s actual referrals, and must not limit (either in staff bylaw provisions or otherwise) the physician’s ability to join the medical staff of any competitive facility.
- (iii) The amount of IT infrastructure, capacity, or functionality that the provider furnishes to the physician’s office, or otherwise subsidizes, must be based on objective, consistently applied criteria (*e.g.*, size of office, patient panel or number of physicians), not the physician’s anticipated or actual referral volume to the provider and its affiliates.
- (iv) The provider must annually report, on a form to be prescribed by the Secretary of HHS, the annual dollar value of IT investments made on a collaborative basis with its nonemployee (*i.e.*, voluntary) medical staff physicians.

Finally, the federal legislation should vest authority in a federal agency to make grants to state agencies and administer the federal program. In other RLF programs, this administrative function has not required a massive federal agency staff. Federal conditions of participation are generally quite simple and involve designation of a state participating agency, establishment of contractual terms for the grant funding from the government and recordkeeping, and simple reporting requirements. The agency should also establish a basic scoring methodology for RLF programs to evaluate potential borrowers, incorporating the strength of specific proposals, the experience of the applicant organization, and the strategic significance of the investment. The federal agency administering the program can oversee these elements of participation without establishing a bulky bureaucracy. However, the designated agency also should serve as a source of expertise for state agencies administering the program.

In many metropolitan areas, major healthcare providers treat large numbers of patients from two or more states. In order to coordinate infrastructure development when healthcare markets cross state lines, HITCs should participate in multistate regional councils. The federal administering agency would mandate this participation; the regional councils would serve a strictly advisory function.

6. *The State Agency Role: Loans and Grants to Community HITCs and Leveraging Program Funds through Capital Markets Financing*

Federal grant funding for health information technology infrastructure should flow into state agencies for several reasons. States have a natural and appropriate interest and role in validating the program concepts to be deployed within their borders and in monitoring and auditing the use of their matching state contributions. States also have individualized existing healthcare system regulatory and funding structures with which the information technology revolving loan program should be coordinated. To a degree that varies from state to state, states also have public entities such as state university medical centers and the array of state, county, and local public providers of acute, ambulatory, and long-term care whose interests the states will want to bear in mind in structuring their individual state revolving loan programs.

Most importantly, however, states have long-established agencies that are experienced and expert participants in tax-exempt capital markets borrowing transactions. An important

(v)The cost of the provider's IT investment must be accurately apportioned among the the provider's patient service units (if applicable) – and, more importantly, between the provider and its voluntary physicians – in order to ensure

component of the revolving loan fund concept that magnifies the impact of federal grant dollars is the ability of the entity that makes revolving credit loans to borrow against a pool of collateral (consisting essentially of the flow of loan repayment dollars) to generate more capital for more and more immediate revolving fund loans than would be the case absent such borrowing. For these borrowings to be tax-exempt, they must be done at a level of government below the federal government. While there are many local agencies that are experienced borrowers, the most consistent source of nationwide tax-exempt borrowing experience is to be found at the state agency level. The federal legislation and the federal administering agency should encourage states to house responsibility for the healthcare information technology revolving loan fund in a state agency that is a frequent and sophisticated participant in tax-exempt capital markets transactions. This type of state agency will have already in place human resources and administrative skill as well as credibility with underwriters, credit enhancers, rating agencies and investors. These resources will be essential for the agency to effectively design and implement a financing program at the state level that leverages federal resources through capital markets transactions tailored to the state's own program concepts for deploying healthcare information technology infrastructure revolving loans. Particularly after the initial years of the program, and once loan repayments from borrowers begin to flow into the HITCs, this leveraging technique should be able to generate funding to HITCs on the order of \$150 to \$180 million per year for each \$100 million of grant funding to state agencies each year.

Of the funds available to state revolving loan fund administering agencies, 80 percent should be required to be loaned to HITCs, and 20 percent should be provided in the form of grant funding. The 20 percent grant component could be used in part to fund initial HITC operations, but the majority should be required to be provided by the HITC as grants to those providers that are essential participants in the delivery system but that have no realistic prospect of repaying funding for healthcare information technology infrastructure that is provided in the form of a loan. These should include qualifying projects or providers that deliver a substantial amount of charity care, including providers serving rural and urban health professional shortage areas (HPSAs) and urban medically underserved areas (MUAs), rural providers, and individual

physician practices as specified by the federal administering agency.⁵² Grants for charity care will account for all project spending attributable to charity care minus a fixed amount based on the size of the organization implementing the project. The result is that all projects with substantial charity care costs receive some grant funds, but proportional eligibility for grants grows with the amount of charity care they provide.

7. *The HITCs: Public-Private Partnerships to Implement IT Infrastructure Investment at the Community Level*

Public-private partnerships are widely used to implement the accomplishment of public policy goals where the vehicles of implementation are largely private commercial enterprises (whether not-for-profit organizations or for-profit enterprises). The public-private partnership provides a forum for melding policy objectives with private needs that is relatively insulated from traditional political forces and demands. Public-private partnerships have shown themselves to be especially useful in areas where a high priority is placed on technological expertise that must be shared among a number of participants in order to attain the desired policy objective.

Our proposal seeks to marry the widely used concept of the public-private partnership with the historically successful federal-state RLF concept. The challenge of implementing community-focused investments in health information technology will present environmental challenges that seem best addressed by combining these two formulas for innovation.

The Health Information Technology Corporations (HITCs) would be not-for-profit corporations authorized by the states on a local or regional basis, depending on population density, delivery system characteristics, and other similar considerations. Each HITC would be substantively responsible to the federal agency administering the program. Each HITC would have a small but expert technical staff steeped in the technology of health data collection, storage, and exchange.

The mission of each HITC would be to receive revolving loans and grant funding from the applicable state agency and, in turn, use the proceeds to make loans (80 percent by dollar volume) and grants (20 percent by dollar volume) to providers in the HITC's local or regional

⁵² The latter provision will accommodate a possible "mini-Hill-Burton" program proposed to fund physician IT investment.

jurisdiction in order to provide for the broad and equitable implementation of investment in healthcare information technology infrastructure. Borrowers could be existing not-for-profit or for-profit providers or payors, new coalitions, other parties who demonstrate the capability and leadership to serve the program objective. The HITC would have the flexibility to make loans on customary financial terms to borrowers with the ability to repay market-rate financing on market terms as well as the ability to make loans on concessionary terms (longer than usual repayment terms, below-market interest rates, unusual subordination features, and the like) to spread the benefit of the new investment broadly across the HITC's community. HITCs could use the grant funding provided to them to make grants for information technology investment by providers that face particularly demanding cash flow constraints or to reduce the interest rate on certain loans to qualifying providers. The HITC could establish vehicles that utilize venture capital financing techniques, tax-exempt leasing concepts, and other innovative financing modalities to accomplish their goals. The HITCs should also act as the initial qualifiers of applicants for HUD loan insurance. HITCs should also be permitted to charge eligible borrowers commercially reasonable fees, thereby creating a permanent source of funding to support HITC operational costs.

Each HITC would also serve the essential function of acting as a neutral community forum for sharing expertise, debating best practices, and building consensus around the ways for each community to use revolving fund loans to realize the promise of reducing medical errors through information technology. The HITCs serve an essential role in the structure of our proposal. To ensure independent, nonpolitical decision-making, state administrators of healthcare information technology RLF programs should be required by the federal conditions of participation to make loans only to HITCs.

VII. Conclusion

Every year, tens of thousands of Americans die, and hundreds of thousands receive suboptimal care because of avoidable medical errors. Many of these errors happen because our healthcare system fails to use readily available technologies: We continue to use written prescriptions although computerized prescribing has a well-documented record of reducing medication errors; we persist in relying on nearly the same process of disseminating medical standards of care that was put in place a century ago although healthcare organizations that have

placed decision support systems at the point of care have seen dramatic improvements in adherence to appropriate protocols; we continue to use paper patient records although electronic medical records greatly reduce the risk of misplaced patient information and greatly increase access to patient information as medical decisions are made.

Healthcare organizations that have made major IT infrastructure investments have seen powerful results in improved care and reduced costs. But their example has been emulated slowly or not at all. Because of the structural divisions in American healthcare, the financial disincentives on providers and other key players, and the closing off of capital to potential technology developers, the private sector has not been able to sustain healthcare information technology infrastructure investment on a sufficient scale to give us a minimally effective healthcare information system.

We need a permanent solution for the financing of healthcare information technology infrastructure. Only one sector in our healthcare system has both the capital and incentives to catalyze system-wide healthcare IT both financially and strategically – the public sector. We need to face the fact, that in addition to creating federal standards for the communication of healthcare information, we will need to invest billions of dollars in healthcare information technology infrastructure.

Federal legislation and funding must drive healthcare information technology infrastructure investment. Indeed, because it is by far the largest insurer of people with serious medical problems and the only insurer whose beneficiaries tend to stay on its rolls indefinitely, the federal government is the only party that will surely benefit from reduced medical errors and surely benefit the most. Furthermore, the healthcare information technology infrastructure has suffered from a lack of federal policy utilizing data standards and promoting interoperability. Federal involvement is justified strictly based on the government's status as the single largest purchaser of healthcare services. Merely adding dollars to current government efforts, however, will, at best, leave Medicare, Medicaid, private payors, and providers all pursuing independent information technology solutions, causing duplication and wasting limited resources while in the end providing fewer measurable benefits to communities and individual consumers.

The federal government should, therefore, make an investment in an essential asset that can reduce the alarming rate of medical cost inflation and help us avoid preventable medical error – the healthcare information technology infrastructure. States should also invest alongside

the federal government and use a variety of financing techniques to leverage state and federal dollars, and they should establish loan/grant programs that recycle dollars into multiple loans, leveraging federal outlays. Community-based not-for-profit HITCs subject to federal and state requirements should establish investment criteria and administer loans and grants that have as their sole objective the reduction of medical errors and the empowerment of patients to own their medical data.

Through comprehensive investment using a financing program like this, the promise of information technology can be made a reality in the daily interaction of the healthcare system with the American people. Without such an investment program, healthcare information technology will blossom in isolated patches to haphazard effect, and most of the population will remain largely untouched by one of the potentially transforming phenomena of the technological revolution.