Navigating American Health Care

*How Information Technology Can
Foster Health Care Improvement*

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Introduction and Summary

"**H**ere there be monsters," warned ancient mariners' maps of the uncharted corners of the seas and the creatures that lurked within. The oceans of paper and mountains of file cabinets required to track patients in the U.S. health care system today is akin in many ways to the murky depths, reams of maps and collections of chronometers and sextants which not long ago guided the global maritime industry. Since ancient times—Homer tells us that Odysseus relied on the Pleiades star cluster and the Herdsman and Bear constellations to steer him from Calypso's cave towards Ithaca—navigators have depended upon celestial navigation, enhanced by technology and coastal charts, to determine position and plan the movement of their vessels.

More recently, electronic navigation techniques such as radio navigation and radar, have enabled ship's officers to obtain the information they need to safely travel the seas. In the last twenty years however, the development of satellite navigation through the Global Positioning System largely displaced radio and radar. Today, GPS provides the fastest, most accurate method for mariners to navigate, measure speed, and determine location, and is used by merchant vessels, fishing fleets, and naval operations.

GPS enables real-time, completely automated understanding of vessel location and provides vital information for vessel traffic control in busy seaways. In addition, Global Information Systems technology provides critical tools for the management and operation of port facilities, facilitating the automation of container shipment movements. The information technology applications and systems enabled by GIS and GPS have changed how the world's maritime industry performs its basic (though still exceedingly complex) functions.

Similarly, IT applications and systems could help our nation's health care system, in which fewer than half of patients receive the right care at the right time, navigate the complex waters of coordinating care, reporting quality outcomes, understanding which drugs, devices and treatment plans offer the best course of care, and re-engineer the health care delivery process to improve quality.

Mapping clinical and payment data to health care outcomes could be as revolutionary for the U.S. health care system as GSP and GIS were for the maritime industry. Health IT systems, properly implemented, could transform how health care providers deliver care—resulting in a quality-focused health care system that improves lives, lower costs, and boosts health care productivity.

Health IT and Health Care Reform

In some ways, creating a 21st century health care system should be technologically simpler than transforming global maritime trade. We have many of our instruments and maps in hand, in the form of technological improvements and policy proposals. Two years ago, the Center for American Progress released its Plan for a Healthy America. One of its core tenets was to improve the value of health coverage by improving health care quality, health outcomes, and health system efficiency.

To take advantage of the efficiency and quality improvements promised by cutting-edge health information technology, the Center proposed a new health IT infrastructure improvement fund to further the adoption of standardized, compatible, and scalable IT solutions. This fund would be complemented by new federal leadership in advancing IT's promise of administrative and clinical efficiency through demonstration projects, such as changes in Medicare reimbursement, designed to encourage the implementation of new technologies.

Policymakers, academics, and industry leaders from both ends of the philosophical spectrum have embraced this approach, which would provide public support for health IT acquisition while leveraging the Medicare program's immense purchasing power to promote technological change within the health care industry. These ideas differ: some proposals would provide an add-on incentive for the use of health IT to Medicare payments; others would create modest bonus pools for quality care. All of them, however, embrace a Federal role in promoting health IT.

Then last year the Center proposed in Promoting Prevention and Preempting Costs: A New Wellness Trust for the United States that the federal government develop a personal electronic prevention record, either as a stand-alone personal health IT tool (akin to the Medicare drug discount cards available in 2004 and 2005) or as part of a larger electronic health record. This electronic prevention record would serve as the IT backbone for a national prevention program, permitting lifelong tracking of individuals' use of preventive services.

Today, the Center for American Progress presents a plan that expands upon these previous progressive proposals to improve the American health care system through the use of health IT. CAP sees health IT as a fundamental building block for a reformed health care system—one of the pieces that must be put in place as we work to provide affordable health coverage for all Americans. Health IT's promise for improving administrative efficiency, facilitating national health goals, improving the processes of health care delivery, and ultimately improving the quality of care, places it at the center of our commitment to improving the value of health coverage for all Americans.

This promise can be realized if we make the immediate policy changes necessary to promote the rollout of health IT systems and adopt a comprehensive strategy designed to integrate health IT, process and quality improvement into our health care financing system. This paper will outline the steps that need to be taken to convert our health care system into a results-based industry that reflects our progressive vision of a healthy life for all Americans.

Health Information Technology Implementation: Step by Step

Current initiatives already underway

- *IT interoperability standards under development*

- *Regional Health Information Networks operating in Mendocino, California, Indianapolis, Indiana, Boston, Massachusetts, and other communities*

- *Growing use of personal electronic health records*

Immediate steps to be taken

- *Establish national health IT interoperability standards*

- *Expand health privacy protections for personal electronic health records*

- *Ensure the security of electronic health records*

- *Set up a health IT infrastructure improvement fund to lead investment in health IT systems for safety-net providers*

- *Create a health IT "information commons" to promote data sharing and research*

- *Make major public and private investments in comparative effectiveness research*

Medium-term goals

- *Launch process and quality improvement demonstration programs for diabetes, stroke and heart disease that integrate health IT as a key tool in health care improvement*

- *Establish additional IT funding for providers participating in demonstration efforts*

Long-term Goals

- *Develop outcomes-based payments systems for diabetes, stroke and heart disease based on demonstration results for public health coverage programs*

- *Expand outcomes-based payment to additional conditions*

- *Expand outcomes-based to private sector payers*

Changing the American Health Care System

I n repeated surveys, the American public identifies health care as the most pressing domestic policy issue.[1] This concern is well-founded. Nearly 45 million Americans lack health insurance, health care premium increases are dramatically outpacing wages and inflation, and our health care system is fraught with problems. The United States spends more per capita on health care than any other nation on the planet, yet experiences poorer health outcomes, higher levels of preventable illness and disability, and overall lower health status compared to other wealthy nations.[2]

Many Americans enjoy access to the very best that medical knowledge and medical technology can offer, but our health care delivery system is riddled with inefficiency, quality is uneven, and roughly half of all patients do not receive recommended care.[3] We must embrace changes that ensure affordable health coverage for all, improve the value of coverage for everyone—those with insurance today and those without—and make prevention a national priority.

One of the most critical steps towards reaching these goals is to transform how we deliver health care in ways that improve patient outcomes, lower costs, and improve health care productivity. Health information technology should play a major role in this transformation. A long-term progressive vision of the American health care system includes:

- Delivering high-quality, patient-centered care

- Enabling patients, providers and payers to access information on clinically-effective services, drugs, and devices as they make treatment decisions

- Ensuring seamless coordination of care across providers and payers, over time and across the country

- Creating processes for delivering these services that are as close to faultless as possible.

This system would pay for improved quality of care, avoid the costs associated with inappropriate care and medical errors, and benefit from the administrative efficiency, information sharing and decision support provided by new technologies.

Health IT is one of the backbones of this system—supporting and improving the process of care, providing the analytic infrastructure for clinical effectiveness research, and supporting administrative and payment systems that enable the right incentives to work

within the health care system. But health IT is not an end in itself, or simply a tool for administrative savings. Instead, it is a critical tool for reforming our health care system and improving quality of care.

Premises and Promises of Health IT

Health IT holds great promise to improve quality, improve outcomes, and improve efficiency within the health care system. Electronic tools such as computerized prescription orders, computerized test orders, personal electronic health records, and decision support tools such as computerized reminders have been demonstrated to improve administrative efficiency, improve adherence to guideline-based care, and decrease medication errors.[4]

For now, efficiency savings are one of the significant forces behind policymakers' interest in promoting health IT. Some analysts suggest that efficiency savings related to the use of health IT would be substantial. According to the RAND Corporation, if most hospitals and physician practices used inter-operable electronic health records, or EHR systems, efficiency savings from reduced hospitals stays, reduced administrative demands, and better drug utilization would equal $77 billion annually following a 15-year adoption period.[5]

Similarly, the Department of Health and Human Services' Office of the National Coordinator for Health IT suggests that the overall savings that can be realized from fully implementing health IT may approach 20 percent of national health care spending.[6] Naturally, the potential for reduced administrative spending is a powerful incentive for increasing the

use of health IT within the health care delivery system.

Other experts, however, take a more skeptical view, noting that the RAND estimates assume a seamless scaling-up of existing health IT successes to national implementation—an optimistic assumption—and also note that even $77 billion in annual savings would represent only 1.05 percent of aggregate health spending in 2019.[7] Whether cost savings from the implementation of health care IT systems are swift or slow to materialize, or large or small in scale, the more important issue is the drive to better quality health care that health IT can foster and spread throughout the health care system.

Quality Improvement from Health IT

Health IT may or may not lead to significant savings in health system administrative costs within a Congressional budgeting window, but it clearly holds promise for improving quality of care. By collecting, combining, and analyzing data on disease, related health services, and health outcomes, we can take enormous steps in understanding the effectiveness of common clinical services.

Health IT will facilitate the rapid growth and development of clinical-effectiveness research—one of the most promising avenues for providing patients, providers, and payers with meaningful information on which services, medications, and devices are most likely to result in improvement or cure. As the costs of health care services, drugs and devices continue to escalate, clinical-effectiveness research can help all stakeholders make clinical decisions and coverage decisions that are both cost-effective and best for the patient.

Health Care Privacy and Health Information Technology

One of the most frequently-cited barriers to the spread of health IT is patient privacy. Medical records typically include personal data, such as names, addresses, phone numbers, and social security numbers, as well as clinical and financial information that call for a high degree of security. The United States has struggled to adopt, implement and enforce appropriate patient privacy protections for paper records as well as electronic data.

Most recently, the Health Insurance Portability and Accountability Act of 1996, or HIPAA, required the Department of Health and Human Services to issue federal health privacy rules, which directly apply to health plans, health care clearinghouses and many health care providers who electronically transmit health care information for financial or administrative purposes, such as payment and billing, eligibility and enrollment, and referral authorizations. Under HIPAA, it is a crime to improperly disclose private health information, although HIPAA does not protect patient privacy in all situations and for all organizations and individuals. Enforcement has also been limited.[8]

Public concern about the privacy and security of their personal health information remain strong—and represents a barrier to broader implementation of electronic health records and other health IT components. Multiple surveys indicate that consumers' greatest misgivings about widespread use of EHRs relate to concerns about privacy and data security. One-in-eight patients say they have put their health at risk through privacy-protective behavior, such as asking their doctor to fudge a diagnosis or avoiding a test.[9]

In part, policy choices can create a more secure environment for personal health data and create a greater sense of public confidence in EHRs and other components of health IT infrastructure. Consumer advocates, for example, emphasize the need for consumers to manage and control their personal health information. Similarly, the health care industry must grapple with developing and implementing adequate security measures and working out data-sharing arrangements within the context of state and federal privacy laws.

The public sector must also determine and enforce appropriate sanctions for privacy breaches. One starting point may be to expand the reach of existing privacy protections to ensure that these protections apply to new applications and new industry players. For example, all personal EHR providers could be required to comply with HIPAA, regardless of whether their services are reimbursed by insurance coverage, coupled with muscular enforcement of HIPAA's privacy protections.

This research is dependent upon the data that can be collected and made available through health IT systems, with appropriate privacy protections (see sidebar, above, on proposed privacy safeguards).

A particularly compelling reason for promoting the adoption of health IT is the promise it has shown as a tool for improving the processes of health care—the routines and rhythms through which all levels of providers, including hospitals, nursing homes, doctors, nurses, and institutional staff deliver health care services. Process improvement in health care, which encompasses changes as simple as new forms for tracking a patient's vital signs, and as complex as choreographing the multiple steps required to perform a balloon angioplasty on an emergency department patient in a timely manner, holds great potential for improving quality and outcomes.

In Hackensack, New Jersey, for example, Hackensack Regional Medical Center used process improvement techniques to reduce their "door to balloon" time and reduce mortality for their heart attack patients. (see sidebar, page 7).

Led by the Institute for Healthcare Improvement, a non-profit organization based in Cambridge, Mass., and hospitals across the country, the U.S. already has a growing movement dedicated to improving the processes of health care. And as hospitals, physician practices and other providers have experimented with re-designing their methods for delivering health services, medical errors have declined and patient safety and health outcomes have improved.[13] Health IT components, such as electronic patient registries, computerized medication order systems, and the analytic power of electronic information systems, have been used in some of these demonstration programs.

These programs, for example, have shown that health IT can help trauma and cardiac services redesign their protocols for treating heart attack patients, reducing mortality to half of the national average. Another innovative pilot used data drawn out of EHRs to identify problematic procedures, reform the care process in surgical services, and reduce surgical infection rates.

In behavioral health, too, a state health agency partnered with providers to analyze prescribing patterns with specially designed software, ultimately reducing antipsychotic poly-pharmacy. By changing prescribing protocols to reduce the use of multiple antipsychotic medica-

Process Improvement and Health IT

"Time is muscle," according to doctors, nurses, and others who work with heart attack patients. During a heart attack, the heart loses oxygen and other nutrients, and heart muscle cells begin to die. If a patient's coronary artery is cleared quickly, and blood flow to the heart is restored, the patient has a better chance of recovery.[10]

A standard procedure to treat a heart attack is a balloon angioplasty, which breaks the clot, opens the artery and keeps blood flowing to the heart by using a catheter balloon and stent. According to the American College of Cardiology, emergency departments should aim for a "door-to-balloon" time of 90 minutes or less for patients with ST-elevation acute myocardial infarctions, or STEMIs, a type of heart attack, to have the best possible result.[11]

Hackensack University Medical Center in Hackensack, New Jersey decided to improve care for the approximately 600 heart attack patients they see in the emergency department every year. They set specific goals—patients who arrive with a suspected heart attack should immediately receive aspirin and beta-blockers, receive an electrocardiogram within 10 minutes of arrival, and (if appropriate) have a catheterization of their coronary artery within 90 minutes, and balloon dilation within 120 minutes.

The hospital set about figuring out how it could use technology and teamwork to change their standard processes and speed up care for their cardiac patients. One way was to have paramedics save time by taking EKGs en route to the hospital, and then digitally transmit these results to the waiting emergency department staff. When an EKG shows that a patient has a STEMI, an automatic page goes out to the catheter lab and the cardiologist to put them on alert, while the emergency staff gives the patient aspirin and beta-blockers upon arrival and hurries them to the catheter lab for the procedure.

The Hackensack University Medical Center implemented a number of other changes in their regular routine of caring for heart attack patients, such as standing referrals from primary care providers and non-interventional cardiologists, which eliminate the wait for attending physicians to call emergency staff back with a name, and giving nurses greater responsibility for administering aspirin and beta-blockers. With all of these process changes—some of them, such as the digital transmission of EKG results, enabled by health information technology—the university hospital has reduced their heart attack mortality rate to less than half the national average.[12]

tions to control psychotic symptoms, the initiative reduced the risks of significant metabolism-related side effects such as diabetes and obesity, and related health care costs. [14]

One of the advantages of pairing process improvement and adoption of health IT tools is that this partnership sidesteps one of the great traps related to health IT—the risk that the health system will simply digitize existing processes of care. Many of the existing patterns of care delivery today are riddled with inefficiencies, and often are of questionable benefit to patients or providers.

Nurses, for example, currently spend less than half their time delivering direct patient care—up to 28 percent of their time is spent in patient care documentation. By changing the record-keeping process and devoting more time to patient care, outcomes can improve. An increase in available nurse hours of 30 minutes per patient day is related to a 4.5 percent decrease in urinary tract infection, a 4.2 percent decrease in pneumonia, and a 2.6 percent decrease in thrombosis.[15]

Barriers to Health IT Implementation

Health care providers in the United States have been slow to adopt information technology—both in comparison to the health industry sectors in other countries and in comparison to the implementation of information technology in other economic sectors, such as international trade.[16] In spite of health IT's potential for contributing to improved processes of health care, greater efficiency, and enhanced understanding of clinically-effective care, financial and other barriers persist that result in comparatively low

penetration rates for electronic medical record systems, computerized order entry systems, and other IT systems that could ultimately improve health care delivery in this country.

These barriers include acquisition and implementation costs, the absence of interoperability standards, skepticism about the business case for either investments in health IT or in improved performance, uncertainty about system longevity, and psychological barriers related to uncertainty and change. For health IT adoption to facilitate improvements in the process of care—rather than the digitization of existing processes—even greater degrees of change will be required for hospitals, physicians, and other providers who must re-engineer how they deliver care, in addition to adapting to health IT systems.

Financial Barriers

Simply put, health IT systems are expensive. One study suggests that initial EHR costs average nearly $44,000 per full-time-equivalent provider, with another $8,500 in ongoing costs per year, for small group practices.[17] In 2006, hospitals' median capital spending per-bed for health IT acquisition was $5,556, while median operating costs per-bed equaled $12,060—for a 200-bed hospital, a $1.1 million capital investment and $2.4 million in related operating costs.[18]

Safety net providers—those hospitals that serve a disproportionate share of uninsured patients, community health centers, and other providers with a limited stream of third-party reimbursements—face particularly acute problems making this investment. Many physician practices and community hospitals must also carefully consider the economics of implementing health IT.

BASIC ELECTRONIC HEALTH RECORD FUNCTIONS, AS DEFINED BY THE INSTITUTE OF MEDICINE

CORE FUNCTIONS	KEY ELEMENTS
Health Information and Data	Medical and nursing diagnoses, medication lists, allergies, demographics, clinical narratives, and test results
Results Management	Computerized laboratory test results and radiology procedure result reports, automated display of previous and current test results
Order Entry Management	Computerized physician order entry (CPOE); patient laboratory, microbiology, pathology, radiology orders; electronic prescribing of medication orders; nursing orders; ancillary service and consult referrals
Decision Support	Screening for correct drug selection, dosing, interactions with other medications; preventive health reminders; clinical guidelines; management of chronic diseases
Electronic Communication and Connectivity	Electronic communication tools for use among health care team members, between physicians, laboratories, radiology and pharmacies and with patients; telemedicine or electronic communications between providers and patients who reside in remote areas; home telemonitoring
Patient Support	Computer-based patient education; home telemonitoring for patients with chronic diseases
Administrative Processes	Electronic scheduling system for hospital admissions, procedures and visits; insurance eligibility, claim authorization and prior approvals; identification of patients eligible for clinical trials
Reporting and Population Health Management	Clinical data represented with standard terminology and in a machine-readable format to meet federal, state, local and public health reporting requirements; also to meet organizational reporting requirements for key quality indicators

Source: Health Information Technology in the United States: The Information Base for Progress

Even if they can manage the initial acquisition and implementation costs, including hardware, software, physician and staff training, and initial decreased productivity as staff adjusts to the new system, health care providers still must remain confident that a health IT system will improve efficiency or otherwise cover its initial and ongoing costs to make this kind of investment.

In addition, some providers' reluctance to adopt health IT may be a rational response to skewed financial incentives. Our health care system today provides little financial incentive for quality improvement. To the extent that electronic health records result in better preventive care and lead to fewer physician visits and hospitalizations, it is the insurance company (or other payers) that reaps the financial benefit—not the provider who has invested in this infrastructure.

In addition, many health care payment systems reward inefficient or sub-optimal care, which generates additional visits, tests, and procedures and hence additional revenue. This dynamic is reinforced by focus group findings in which physicians express their belief that no financial incentives exist for adopting EHRs.[19]

Regulatory and Technical Obstacles

Additional barriers to the spread of health IT that may be overcome by

policy decisions include legal and regulatory concerns and technological issues. Technological barriers to health IT adoption stem, in part, from the evolutionary nature of these systems. Providers are concerned about rapid obsolescence.[20] The lack (to date) of standards or criteria for interoperability also slows adoption. Without these technical specifications that enable interoperability, data exchange between providers who use different health IT systems is severely limited.

While the Department of Health and Human Services has worked with international standards-setting organizations to define the functions needed in EHRs, these standards are not yet finalized and transmission standards have yet to be developed. Other regulatory barriers have included the application of anti-kickback and self-referral prohibitions to network relationships that may involve the provision of IT hardware and software between hospitals and individual providers who admit patients to the hospital in question,[21] certification criteria for EHRs and other health IT applications, and privacy and security issues.

Implementing Health IT

Converting the American health care system from today's uneven patchwork of coverage and quality to a seamless tapestry of affordable coverage that provides access to high-quality, patient-centered care will take plenty of effort, experimentation, and systemic change. Between current health care quality initiatives—such as IHI's work on improving care processes—that use health IT as a critical tool, and the realization of a quality and outcomes-focused health care system that integrates health IT into its processes of

care, lie immediate policy steps and public investments alongside longer-term program demonstrations and policy changes.

Many of the building blocks are already underway. Since the release of CAP's Plan for a Healthy America, Congress has considered (although not yet enacted) legislation that would make new investments in health IT and create an infrastructure for further activity. The Department of Health and Human Services has moved forward with establishing guidelines for interoperability and other standards critical to the spread of health IT.[22]

In addition, philanthropies, providers, and communities have demonstrated the promise of so-called regional health information networks, or RHINs. And large employers—including semiconductor giant Intel Corp., retailer Wal-Mart Stores Inc., and oil producer BP plc—are moving to implement personal electronic health records for their employees.[23]

All of these steps represent progress, and many require ongoing commitment and follow-up. Yet these changes in isolation, without a comprehensive, public strategy for health IT adoption throughout the health care industry, may fail to realize many of the powerful potential benefits of health IT—particularly its promise as a tool for redesigning health care processes. Building a health care system that pays for improved quality, reduces errors and unnecessary services, and uses health IT as an essential tool for better health care requires an underlying policy infrastructure.

A series of near-term policy changes and public investments will begin building this foundation. But we need a long-term approach that also builds and sustains

significant changes in our health care system. Specifically, Congress and the federal government must create the right payment incentives that not only promote health system improvement but also encourage health care providers to integrate health IT into process and quality improvement.

Immediate Steps

Short-term strategies for spurring the adoption of health IT include grappling with some thorny problems, such as privacy and security concerns, interoperability standards, and resolving continuing concerns about anti-kickback prohibitions that inhibit health IT partnerships between hospitals and community-based providers. Significant policy work has been done on these issues; in some cases, the remaining challenges are primarily political. For example, federal agencies have identified and adopted messaging and terminology standards that facilitate interoperability across federal health programs, and external advisors have recommended three sets of interoperability specifications. Ensuring that these standards and technical specifications are also adopted by private vendors and other stakeholders, however, may require a significant regulatory push.

In other cases, new public investment may be necessary to build health IT infrastructure. Some health care providers, including disproportionate share hospitals, small community hospitals, small physician practices, community health centers and other safety-net providers—may lack either the financial security or credit-worthiness to finance the purchase and implementation of health IT systems. These providers should be particular targets for public investment.

Options for financing the purchase of health IT systems by financially vulnerable providers include grant programs, revolving loan funds, and add-on payments to normal reimbursements made on behalf of patients with publicly-financed insurance coverage. With appropriate legislation, these mechanisms could be available through either state or federal financial support.

To ensure that publicly-funded health IT system purchases provide the greatest possible utility, these public infrastructure investment strategies should limit funding to health IT systems that include certain critical capabilities such as decision support and reporting capacity. Publicly-funded IT acquisition programs should enable participating organizations to build their quality improvement capacity while spurring IT vendors to market products that serve the larger public goal of health care improvement.

An additional short-term step would be to develop an "information commons" that would permit researchers to access data from Medicare, state Medicaid programs, and large health care insurers to draw on a vast trove of payment data and clinical information. Research based on this data would further our knowledge about which treatments, drugs, and devices are less costly and more effective than available alternatives. Researchers would access these data under data use agreements that assure the confidentiality of individual patient records.

Working out the permissions and other agreements necessary to submit data to and use data from the commons would accelerate outcomes and clinical effec-

tiveness research, which could be further enhanced by committing new public and private funds into this work. A major investment—ideally $4 to $6 billion per year—dedicated to understanding the comparative strengths and effectiveness of competing treatment options would provide much-needed information to support health care decision-making. All sectors of our health care system would use this information, and should be engaged in funding and managing its work. This approach should also provide a political shield for potentially controversial analytic findings.

In summary, specific, immediate policy changes to promote health IT adoption and health system improvement include:

- Establishing and enforcing national standards for interoperability across different health IT platforms

- Expanding the privacy protections for electronic transmission of health care information created by the Health Insurance Portability and Accountability Act by requiring all personal EHR providers to comply with HIPAA, regardless of whether their services are reimbursed by insurance coverage, in combination with muscular enforcement of HIPAA violations

- Establishing a federal health IT infrastructure improvement fund, using a combination of grants and loans, to enable safety-net providers to acquire and implement appropriate health IT systems

- Creating add-on payments for health IT use through Medicare and Medicaid for these providers

- Establishing an information commons to facilitate clinical effectiveness research and other analyses focusing on health system improvement

- Making a major investment in comparative effectiveness research, with funding and governance from the public and private sectors.

Taking these immediate steps—some of which are already in train—would go a long way toward ensuring that the purchase and rollout of new health IT systems would contribute to improved quality of care, not merely administrative cost savings.

Medium- and Long-Term Changes

Longer-range steps towards a system that pays for improved quality, reduces errors and unnecessary services, and uses health IT as an essential tool for better health care involve two major components: integrating health IT systems to improve health care processes and quality, and developing payment incentives to spur this activity.

Today, health care providers are typically paid on a per-service basis, which is sometimes adjusted for the intensity of service or the severity of the patient's condition, but which is very often unrelated to the ultimate outcome of the course of treatment. Until provider payment is more closely tied to the results of care, the best incentives for process and quality improvement (altruism, professionalism, and even improved efficiency) can be trumped by financial imperatives that drive institutional and individual provider behavior towards procedures and processes that maximize revenue.

In chronic illness care, in particular, recent efforts have shown the efficacy of care management to improve outcomes and reduce costs. For example, programs that focus on diabetes management and self-care for particularly vulnerable populations have helped patients improve their health status and avoid complications—at the extreme, limb amputation—with costs that reverberate through the acute and long-term care systems.[24] These programs feature low-intensity, comparatively low-reimbursement services and address one of the most costly and prevalent chronic diseases in our nation today.

Although exact estimates are difficult, a select group of chronic conditions—namely heart disease, stroke and diabetes—represent approximately 20 percent of American health care spending. Yet the cost of these illnesses—and the results for patients—can be particularly influenced by efforts to improve care processes and care coordination. A focus on these conditions would also provide an opportunity to demonstrate health IT's ability to connect community-based and institutional providers, clinical and lay providers, and individuals who are monitoring and managing their own care, thus improving quality of care across entire systems of care.

A demonstration program that focuses on improving care processes for a short list of prevalent and well-studied chronic diseases would also demonstrate the potential for IT-enabled process improvement to boost adherence to best practice guidelines, deliver appropriate care, control the progress of chronic disease, and reduce health spending for patients with these conditions.

We therefore propose an intensive effort to explore how care processes and quality of care can be improved for patients with heart disease, stroke, and diabetes within public health coverage programs. These demonstration programs should be designed to provide insight into the development of payment systems that can ultimately be based on patient outcomes rather than on the volume or intensity of provided services.

Policymakers have already demonstrated an interest in using Medicare demonstrations to better understand how to improve quality of care. For example, Medicare has already embarked on a variety of quality improvement experiments for specific services, such as a pilot program that tests whether modest payment bonuses for top-performing hospitals can improve quality of care. This pilot provided small bonuses (one percent to two percent of the cost of care) for treatments related to joint replacement, coronary artery bypass graft, heart attack, heart failure, and pneumonia, with mixed results.[25]

Other experts have also noted that paying for quality improvement is one way to advance greater utilization of health IT. In their 2005 recommendations on strategies to improve care within the Medicare program, the Medicare Payment Advisory Commission, or MedPAC, endorsed the inclusion of information technology's quality-enhancing functions as measures for its broader recommendations on pay-for-performance initiatives. Measures related to reduced drug interactions, for example, could encourage hospitals to use computerized physician order entry, or CPOE, to place pharmacy orders—a systematic process change enabled by

health IT. MedPAC also noted that providers would want to adopt health IT to the extent that it makes quality measurement and reporting easier.[26]

Our proposal differs from these initiatives by expanding the scope beyond Medicare to include Medicaid, the Veterans Administration, the Department of Defense and other public health coverage programs, and by placing a greater initial focus on improving care processes and quality of care, with health IT as an enabling component of process change. We then propose to use data derived from the early stages of these demonstrations to develop new payment systems, rather than starting with a payment system test and observing whether care improves.

In some cases, EHR systems and other IT applications will be an integral part of improving care processes. In others, the quality improvement steps within these projects will themselves be low-tech, and health IT will be a critical tool for reporting outcomes. For this reason, demonstration participants should have adequate support for acquiring and applying health IT to their chronic disease improvement work, even as payment systems are under development.

These demonstration projects should therefore include either add-on payments for health IT-enabled activities, loan financing, or other financial support for health IT infrastructure. These demonstrations should show how the transformed incentive structure of outcomes-based payment brings new urgency and emphasis to quality improvement and process improvement for individual and institutional providers, and provide real-life examples of how changes in the process of care result in improved outcomes.

These projects should also show whether and how health IT plays an integral role in this transformation.

Ultimately—pending the results and refinements of these demonstration efforts—Medicare and other federal health programs should develop and adopt outcomes-based payment for specified chronic diseases to be applied to all providers. This step will be technically and politically difficult, and may require a transition period from standard fee-for-service payments. Transition options may include an initial bonus payment for outcomes above a benchmark or for adherence to guideline-based care.

These new programs will seriously disrupt existing practices but will also force new and much-needed focus on improving quality of care through payment, the most powerful of incentives. It will force a systemic approach to care, connecting the different players involved in chronic illness care, including patients, family, community providers, and institutional providers. The public sector's sheer size and significant responsibility for paying for services related to chronic diseases make this step extremely complex, but will also magnify the effect of this change.

Over the long term, these new outcomes-based payments system would be extended to additional conditions and ultimately all services. We anticipate that other health care payers would follow public programs' lead and also adopt outcomes-based payments. Process improvement would be firmly embedded in daily care routines as well as the health care payment system and health care providers would have financial incentives for sustaining these efforts, while health IT would be an integral part of process and quality improvement.

The specific experiments and policy changes necessary to promote wide-spread health IT adoption and health system improvements include:

- Establishing a nationwide set of demonstrations, across federal health programs, focused on improving outcomes for people with heart disease, hypertension, and diabetes, with the explicit intent of marrying health IT and process improvement techniques

- Following the conclusion of these demonstrations, requiring Medicare and other public payers to draw on demonstration data and other sources to develop payment methodologies based on patient outcomes

- Implementing outcomes-based payment across federal health programs for specified chronic conditions.

At this point, prior to any demonstration effort, it is impossible to lay out what the ultimate payment system should like. Nonetheless, it will be important to design the demonstration projects with this ultimate goal in mind. Through these projects, we should learn to what degree health IT enables providers to achieve the process and quality improvements necessary to prosper under an outcomes-based payment system, and whether payment incentives for improved quality of care can adequately compensate providers for the costs of health IT. To this end, demonstration components should include:

- The use of health IT to measure and report progress

- The integration of health IT into process improvement strategies

- Funding for demonstration sites to invest in the health IT hardware, software, and staff training necessary to the project design, including reimbursement methods to pay for health IT utilization through the demonstration phase.

These demonstrations could be defined by geography, by participating health system, or by other variables, but they should be established on a sufficient scale that results can be used to develop national changes in reimbursement for these conditions.

Conclusion

Just as Global Information Systems technology provides the information base for Global Positioning Systems, which in turn has transformed maritime trade, search-and-rescue, aircraft navigation, and military technologies, so too can health information technology provide the information infrastructure and electronic communication systems for health care processes and quality improvement that will in turn revolutionize the American health care system.

We could continue to use the health care equivalents of sextants and coastal charts to improve health outcomes and quality of care—cumbersome chart reviews that profile a provider's pattern of care, time-consuming clinical studies that evaluate a drug's safety but do not compare its effectiveness to alternative treatments, and modest quality bonuses that make, at best, marginal differences in overall outcomes. Or we could dedicate ourselves to improving the quality of care, and take immediate and long-term steps to use the tools at our disposal, including health IT, to reach this goal.

We know the coordinates of this goal—a health care system that delivers high-quality, patient-centered care through faultless processes based on evidence of comparative effectiveness to make treatment decisions, and one that rewards providers for achieving good health outcomes, not for delivering resource-intensive services. We don't know exactly how to chart our course, but we know some of the landmarks along the route.

First, we need to move forward with public support for health IT investments and comparative effectiveness research, work to remove regulatory obstacles to the expanded use of health IT, and seriously address privacy concerns. Second, we must launch significant demonstration efforts designed to improve quality of care for chronic diseases through the use of financial incentives for high-quality care—and establish these demonstrations in a manner that enables providers to develop new quality improvement strategies that are enabled by health IT.

We can then learn from these experiments and develop the payment systems and quality incentives our health care system so deeply needs. These changes will take political will, public investment, experimentation, and time. And they will disrupt the health care sector by challenging it to do things differently and forcing it to respond to different incentives.

But the goal—improved quality and better value for patients, payers, and providers—will be well worth the effort.

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