

By Melinda Beeuwkes Buntin, Sachin H. Jain, and David Blumenthal

DOI: 10.1377/hlthaff.2010.0503
HEALTH AFFAIRS 29,
NO. 6 (2010): 1214–1219
©2010 Project HOPE—
The People-to-People Health
Foundation, Inc.

Health Information Technology: Laying The Infrastructure For National Health Reform

Melinda Beeuwkes Buntin (buntin@rand.org) is a senior economic adviser in the Office of the National Coordinator for Health Information Technology, U.S. Department of Health and Human Services, in Washington, D.C. She is there on leave from RAND Health, in Arlington, Virginia.

Sachin H. Jain is special assistant to the national coordinator for health information technology.

David Blumenthal is the national coordinator for health information technology.

ABSTRACT The enactment of the Patient Protection and Affordable Care Act is a signal achievement on the road to reform, which arguably began with the passage of the American Recovery and Reinvestment Act of 2009. That statute's Health Information Technology for Economic and Clinical Health (HITECH) provisions created an essential foundation for restructuring health care delivery and for achieving the key goals of improving health care quality; reducing costs; and increasing access through better methods of storing, analyzing, and sharing health information. This article discusses the range of initiatives under HITECH to support health reform, including proposed regulations on “meaningful use” and standards; funding of regional extension centers and Beacon communities; and support for the development and use of clinical registries and linked health outcomes research networks, all of which are critical to carrying out the comparative clinical effectiveness research that will be expanded under health reform.

The passage of the Patient Protection and Affordable Care Act of 2010 marks a new era in American health care. Yet in many ways, this era began more than a year earlier, with the passage of the American Recovery and Reinvestment Act (ARRA) of 2009 and its Health Information Technology for Economic and Clinical Health (HITECH) provisions. Although HITECH may be viewed narrowly as legislation to stimulate the adoption of health information technology (IT), it is better understood as an essential foundation for our broader efforts to restructure health care delivery.

The rapid “wiring” of American health care that will take place under HITECH will do more than simply digitize paper-based work. It will facilitate new means of improving the quality, efficiency, and patient-centeredness of care. At the heart of our health reform efforts is the use of data to reform payment structures and procedures, manage clinical quality, improve

efficiency, and drive improvements in public health. Our nation's health IT infrastructure will enable and power these critical efforts—making possible the types of fundamental changes in access and health care delivery proposed in the new health reform law.¹

That law contains provisions to (1) improve quality of care through expanded measurement and reporting; (2) reduce costs by introducing new models of payment for services and improving efficiency of care delivery and administrative processes; and (3) improve access to care and broaden insurance coverage. The health care system envisioned in the legislation requires health IT systems that allow us to store, analyze, and act on patient- and population-level health information. The \$2 billion in HITECH programs budgeted for the Office of the National Coordinator for Health Information Technology and an estimated \$30 billion in Medicare and Medicaid incentive payments to physicians and hospitals to become users of electronic health records will

advance these health reform goals. The relationships between HITECH programs and reform objectives are summarized in Exhibits 1 and 2.

Improving Quality

The Patient Protection and Affordable Care Act stresses high-quality, affordable health care and mandates the development of a national strategy to improve health care delivery, patient outcomes, and population health by January 2012. Congress, recognizing that electronic data collection is critical to achieving those national quality goals, made coordination with the national health IT strategy, as outlined in HITECH, a central part of this effort.

HOW HEALTH IT CONTRIBUTES The legislation recognizes the value of health IT to efforts to improve quality and stipulates that quality measures should be collected using health IT. Health IT has the potential to make quality measurement and improvement efforts more relevant, effective, and timely. Measuring quality using structured electronic data captured during routine patient care can give us access to new measurement domains. For instance, it makes possible dynamic quality measures that can capture changes over time, be aggregated at different levels, and be risk-adjusted much more precisely. Progress reports could be customized for each level of aggregation, and responsibility for outcomes could be shared. Timely feedback could facilitate clinical improvement at the point of service. Multiple measures could be developed at little marginal cost, because data extraction would not be a manual process. Health IT also could eliminate duplication and waste by making

results of prior diagnostic tests and interventions available at all points of service.²

MEANINGFUL USE HITECH's incentive program lays the groundwork for delivery system reform by linking an estimated \$30 billion in incentive payments for demonstrating meaningful use to a host of quality-related applications of health IT. The definition of what constitutes at least the first stage of meaningful use is part of a rule-making process that will not conclude until later this year. However, it is clear that the aims articulated for meaningful use—improving the quality, safety, and efficiency of care while reducing disparities in access and health; engaging patients and families in their own care; promoting public and population health; improving care coordination; and promoting the privacy and security of electronic health records—are consistent with and complementary to the goals in health reform.³

Over the next several years, *meaningful use* will be redefined in two additional stages to expand the expected applications of health IT. Under the current proposal, only providers who demonstrate meaningful use in all three stages will qualify for all incentive payments and not be subject to penalties in Medicare and Medicaid reimbursement. The future of the regulations is still uncertain, but the second stage will probably expand upon the criteria of the first stage in disease management, clinical decision support, medication management, support for patients' access to their health information, transitions in care, quality measurement and research, and communication with public health agencies.

The third stage will focus on achieving improvements in quality, safety, and efficiency—

EXHIBIT 1

How Health Information Technology For Economic And Clinical Health (HITECH) Programs Relate To Provisions In The Patient Protection And Accountable Care Act Of 2010

HITECH program	Improving quality		Reducing costs			Increasing access and coverage	
	Better measurement	Rewarding quality	Payment reform	Care coordination	Administrative simplification	Patient engagement	Affordability
EHR adoption and meaningful use	XX	XX	X	XX	X	XX	X
Regional extension centers	X	X					
Health information exchanges	X		X	XX		X	XX
Workforce							
Beacon community grants	X	XX	XX	XX			XX
NHIN	X		X	XX		X	XX
Policy and standards	X				XX	XX	X

SOURCE Authors' analysis. **NOTES** XX denotes primary driver. X denotes secondary driver. HITECH was passed as part of the American Recovery and Reinvestment Act of 2009. EHR is electronic health record. NHIN is Nationwide Health Information Network.

EXHIBIT 2

How Health Information Technology For Economic And Clinical Health (HITECH) Programs Advance Health Reform Goals

Health reform objective	Complementary HITECH program	HITECH funds
PRIMARY OBJECTIVES		
Better quality of reporting and measurement	Medicare and Medicaid incentive program: incentive payments to “meaningful users”	Up \$2 million per hospital and up to \$63,750 per physician
	Regional extension centers: up to 70 centers will help providers through the process of selecting and implementing EHRs	\$643 million
Improved efficiency	Health information exchange: state programs to ensure the exchange of health information within their jurisdiction	\$564 million
	Nationwide Health Information Network and standards and certification: creation of a common platform for health information exchange; development of interoperability specifications	\$64.3 million
Breakthrough examples of delivery reform	Beacon community grants: 15 demonstration communities in which clinicians, hospitals, and consumers show how EHRs can achieve breakthrough improvements in care	\$250 million
SECONDARY OBJECTIVES		
Improved health care delivery infrastructure	Strategic health IT advanced research projects: projects focused on breakthrough advances in health IT including security of health IT, patient-centered cognitive support, health care application and network platform architectures, and secondary use of EHR data	\$60 million
Workforce development	Workforce training programs: supporting education of up to 45,000 new health IT workers	\$118 million

SOURCE Authors’ analysis. **NOTES** HITECH was passed as part of the American Recovery and Reinvestment Act of 2009. EHR is electronic health record. IT is information technology.

specifically, decision support for medical conditions that are of high national priority, patients’ access to self-management tools, access by all providers to comprehensive patient data, and improved population health outcomes.⁴ In this way, meaningful use establishes health IT as not merely a medium for streamlined information management, but also as a platform for a reformed delivery system that rewards efficiency, effectiveness, safety, timeliness, equity, and patient-centeredness in the care that is delivered.⁵

REGIONAL EXTENSION CENTERS Getting to meaningful use will not be without its challenges. Accordingly, the Office of the National Coordinator for Health Information Technology (ONC) has funded sixty regional extension centers that cover most of the United States.⁴ The goal of the program is to provide outreach and support to at least 100,000 high-priority primary care providers within two years, to help them become meaningful users of health IT. In addition to supporting vendor and system selection, centers will help medical practices with the change management that meaningful use of health IT necessitates—including those concerned with quality of care. A Health Information Technology Research Center will support the regional extension centers with relevant information on best practices in electronic health record adoption, effective use, and provider support.

As providers begin to make meaningful use of health IT, the extension centers and research

center will be vital in demonstrating to physicians how health IT can be used to measure and improve quality. Health reform will benefit from having a physician workforce that is increasingly attuned to quality management; the meaningful-use incentive payments and regional extension centers will be critical to changing the mind-set of the workforce.

Reducing Costs

The improvements in quality envisioned in the Patient Protection and Affordable Care Act are to be reinforced and rewarded by incentives to provide better care more efficiently. The law specifies several pilot programs for payment reform. Health IT is a critical component of these programs and is explicitly mentioned as a tool in a number of health reform provisions.

SHARED SAVINGS For example, the law calls for the establishment of a new “shared savings,” or gain-sharing, payment reform program. In this program, groups of providers in a community who work together to achieve measurable reductions in health spending growth and improved quality and safety would be eligible to retain a portion of the savings their efforts helped produce. Electronic reporting through electronic health records may permit improved cost accounting and the rapid assessment of quality and its incorporation into payment.

PAYMENT BUNDLING The health reform law also requires the secretary of health and human

services (HHS) to establish a payment bundling program to coordinate care around hospitalizations. This pilot program is intended to improve the coordination, quality, and efficiency of health services. It will include reports on quality measures and the submission of data through electronic health records to permit ongoing assessments of the program's effectiveness. Similarly, the law creates a new Center for Medicare and Medicaid Innovation to support care coordination for chronically ill individuals at high risk of hospitalization. It will use a health IT-enabled provider network that could include care coordinators, a chronic disease registry, and home telehealth technology.

Most of these demonstrations recognize that key deficiencies in U.S. health care delivery are its fragmentation and the overuse of services, especially those that offer no benefit. Disparate hospitals, providers, laboratories, and diagnostic imaging facilities lack secure modes of rapidly communicating and sharing information. Tests are repeated frequently, increasing cost and potentially imposing unnecessary risk on patients. Some emergencies are poorly managed because the treating providers lack information available elsewhere in patients' records.

ACCESS TO DATA ACROSS PROVIDERS In the wired health system envisioned in HITECH, a treating provider will be able to privately and securely query all of a patient's health records—from all of his or her points of care—and obtain a synthesized health record including all points of contact. Care that takes place across a variety of settings can be centrally documented. The Nationwide Health Information Network aims to provide hospitals and doctors' offices with a common platform and set of protocols for information exchange to realize this vision. The network is in its infancy, but its members already include a number of large providers such as Kaiser Permanente, Cleveland Clinic, and the Department of Veterans Affairs (VA).

As HITECH programs have taken further shape, the ONC has developed an additional modality for the Nationwide Health Information Network known as National Health Information Network Direct, which will allow physicians and hospitals to send health information securely to other providers. It will be augmented by state efforts to promote health information exchange through the ONC's state Health Information Exchange program. The nationwide network and the \$564 million in Health Information Exchange programs launched with HITECH funding will be a key component of enabling payers to manage the administrative demands of coordinating care—and will probably minimize repetition of tests by making health information

available when needed. The Interim Final Rule on Standards and Certification, released in December 2009, is a first step in adopting standards, implementation specifications, and certification criteria that will enhance the interoperability, functionality, utility, and security of health IT.

BEACON COMMUNITY GRANTS Finally, our Beacon community program has the same goals as many of the payment reform demonstrations⁶ and may serve as a catalyst for these communities to participate in other demonstrations (Exhibit 3). Through a competitive application process, the ONC has selected fifteen recipients for grants totaling \$250 million for the Beacon community program. The program will fund communities' efforts to achieve measurable improvements in health care quality, safety, and efficiency and in population health through health IT. In response to the large number of excellent applications, the ONC has announced an additional \$30 million for Beacon grants.

HHS has not yet established how the Beacon program will fit with its other reform efforts, but it will be an important demonstration of novel models of care delivery and methods that we will continue to draw on as we reshape our health system.

Comparative Effectiveness And Outcomes Research

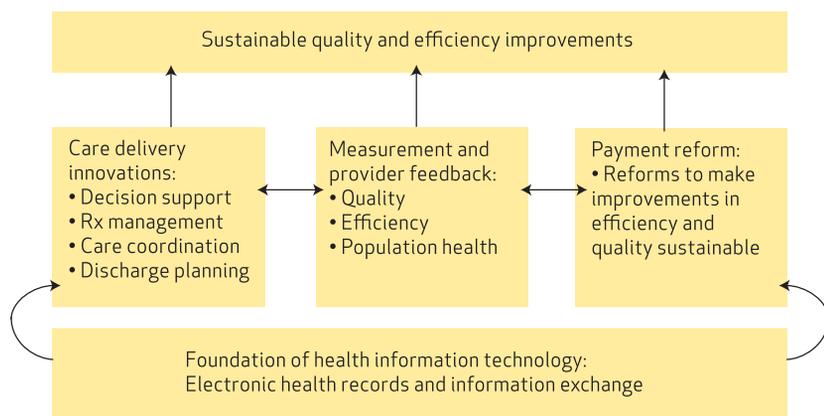
The Patient Protection and Affordable Care Act establishes a Patient-Centered Outcomes Research Institute to invest in research that will help providers, patients, and payers make informed decisions about effective treatment.

One provision specifically calls for the coordination of federal health programs to build data capacity for comparative clinical effectiveness research, "including the development and use of clinical registries and health outcomes research networks, in order to develop and maintain a comprehensive, interoperable data network to collect, link, and analyze data on outcomes and effectiveness from multiple sources, including electronic health records."⁷

The provision also requires helping users of health IT to develop clinical decision-support tools to incorporate research findings into clinical practice. The HITECH-funded incentive program will help make this a reality: Decision support is a requirement for electronic health record certification in the Interim Final Rule, and only that certification will qualify a provider for a meaningful-use incentive payment. In addition, the ONC can facilitate the development of large-scale clinical registries and data networks within Beacon communities and regional exten-

EXHIBIT 3

Model For The Beacon Community Grants Program And Overall Health Reform



SOURCE Authors' analysis.

sion centers, using the Nationwide Health Information Network.

Administrative Simplification And Efficiency

The new health reform law requires the coordination of health IT standards for uniform implementation and integration of administrative and financial data transactions (for example, insurance enrollment, claims submission, and payment) with the clinical data activities spurred by HITECH. In short, the law seeks to standardize and integrate clinical and administrative data, to achieve greater efficiencies. Through the creation of standard operating rules for transactions, data should allow for more seamless administrative transactions that will reduce costs and hassles for patients, providers, and payers.⁸ The health reform legislation calls on the ONC to solicit input from its two federal advisory committees—the Health IT Policy and Health IT Standards Committees—to develop standards in support of these aims.

Increasing Access And Extending Coverage

The most-discussed provisions of the health reform legislation are those implementing insurance mandates and creating health insurance exchanges. Projections that thirty-two million Americans will become newly insured depend on assumptions that include the expected effects of the cost containment and efficiency-enhancing aspects of the law.⁹ Using health IT to implement payment reform and streamline administrative processes is thus key to achieving expectations of health insurance enrollment. In

addition, information is critical to managing risk in any insurance market. The data collected through electronic health records could support the risk-adjustment activities outlined in the law and help insurers manage the care of new enrollees with preexisting conditions.

Increased protection of privacy and security of health information will be critical as more patients are enrolled in health plans and more clinical and administrative health information is placed in electronic form. HITECH stipulated that health care organizations appoint a chief privacy officer, and it expanded funding for breakthrough research on privacy and security technology to ensure that health information is stored and exchanged in an enhanced privacy framework. The work of the ONC's advisory committees on administrative simplification will facilitate a heightened focus on privacy and security as health reform continues to take shape.

Other Provisions Enhanced By Health IT

We have touched on the key ways in which health IT is critical to the implementation of health reform, but two more out of the dozens of mentions of health IT in the reform law merit discussion.

PUBLIC HEALTH AND DISEASE PREVENTION The law has an entire title devoted to public health and the prevention of chronic disease. Health IT can be used in innovative ways to carry out this agenda. For example, Medicare coverage of annual wellness visits is expanded under the law, which dictates that Medicare should “encourage the use of, integration with, and coordination of health IT (including use of technology that is compatible with electronic health records and personal health records) and may experiment with the use of personalized technology to aid in the development of self-management skills and management of and adherence to provider recommendations in order to improve the health status of beneficiaries.”¹⁰ These types of technologies will undoubtedly grow in sophistication and effectiveness, and the government has a role to play in ensuring that public programs use them well.

The law also seeks to enhance public health surveillance through an Epidemiology and Laboratory Capacity Grant Program. This program will award grants to help public health agencies improve surveillance for, and responses to, infectious diseases and other conditions of public health importance by enhancing lab practices and systems for reporting test orders and results electronically and by developing and maintaining an information exchange. These efforts will be aided by groundwork being laid through the

HITECH standards development and interoperability framework.

WORKFORCE AND PROVIDER EDUCATION The health reform law includes provisions to incorporate health IT education into the professional development of primary care physicians. Although many practitioners participate in generic continuing education, health IT will allow practitioners to establish their individual educational needs based on their practice patterns, making continuing medical education more personalized and productive. The ONC was already initiating collaborations with medical societies and licensing bodies to incorporate health IT use into medical education more formally before health reform passed.

The new law also establishes a National Health Care Workforce Commission, which will develop evaluations of education and training activities to determine whether the demand for health care workers is being met. The topics of immediate high priority include an analysis of the nature, scopes of practice, and demands for health care workers in a workplace with enhanced information technology and management. In anticipation of the greater demands on the health care workforce, the ONC announced several HITECH

grant awards totaling \$118 million to support the training and development of more than 45,000 new health IT professionals.

Conclusion

In early 2009, Congress made it a priority to commit tens of billions of dollars from the stimulus package to create incentives for the meaningful use of health IT. In doing so, it began to lay the groundwork for successful health reform. Health reform's three primary goals—improving quality, reducing costs, and increasing access and coverage—require better methods of storing, analyzing, and sharing health information than our current infrastructure allows. Complementing the Patient Protection and Affordable Care Act, HITECH builds this infrastructure through incentive payments for meaningful use to doctors and hospitals, and through programs that address specific obstacles to health IT adoption and exchange.

President Obama signed the American Recovery and Reinvestment Act on 17 February 2009. History may remember that as the first of his two major accomplishments in improving the value of health care that all Americans receive. ■

The authors thank their colleagues Emily Maxson, Aaron McKethan, and Farzad Mostashari for their contributions to the conceptualization of the Beacon community program and how it relates to health reform.

NOTES

- 1 Blumenthal D. Stimulating the adoption of health information technology. *N Engl J Med*. 2009; 360(15):1477–9.
- 2 Siström CL, Dang PA, Weilburg JB, Dreyer KJ, Rosenthal DI, Thrall JH. Effect of computerized order entry with integrated decision support on the growth of outpatient procedure volumes: seven-year time series analysis. *Radiology*. 2009;251: 147–55.
- 3 Brailer D, Blumenthal D. Guiding the health information technology agenda. *Health Aff (Millwood)*. 2010;29(4):586–95.
- 4 Blumenthal D. Launching HITECH. *N Engl J Med*. 2010;362:382–5.
- 5 Berwick D. A user's manual for the IOM's "Quality Chasm" report. *Health Aff (Millwood)*. 2002; 21(3):80–90.
- 6 McClellan M, McKethan AN, Lewis JL, Roski J, Fisher ES. Putting accountable care into practice. *Health Aff (Millwood)*. 2010; 29(5): 982–90.
- 7 Patient Protection and Affordable Care Act (HR 3590), sec. 6301, part (b). 2010 Mar.
- 8 Casalino LP, Nicholson S, Gans DN, Hammons T, Morra D, Karrison T, et al. The cost to physician practices of interactions with health plans. *Health Aff (Millwood)*. 2009;28(4): w533–43.
- 9 Congressional Budget Office. An analysis of health insurance premiums under the Patient Protection and Affordable Care Act [Internet]. Washington (DC): CBO; 2009 Nov 30 [cited 2010 May 3]. Available from: <http://www.cbo.gov/ftpdocs/107xx/doc10781/11-30-Premiums.pdf>
- 10 Patient Protection and Affordable Care Act (HR 3590), sec. 4103, part (b). 2010 Mar.