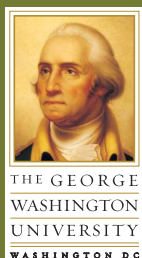# Health Information Technology in the United States:
On the Cusp of Change, 2009

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Introduction

Catherine M. DesRoches, Dr. P.H., and Ashish K. Jha, M.D., M.P.H.

In our inaugural report in 2006, *Health Information Technology in the United States: the Information Base for Progress*, we detailed the challenges faced by policy-makers working toward the goal of increased adoption of health information technology (HIT). Since that time the role of health information in helping to promote higher quality, more efficient health care has taken a central position in the current debate over health care reform. Methods to speed HIT adoption have received bipartisan support among U.S. policy-makers and the recently signed American Recovery and Reinvestment Act of 2009 (ARRA) has made promoting a national interoperable health information system a priority and authorized significant resources to achieve this goal.

As we have shown in earlier reports, despite broad consensus on the potential benefits of HIT, U.S. physicians have been slow to adopt these technologies. Prior reports have focused on adoption of electronic health records (EHRs) by individual physicians while also noting the potential of EHRs to improve care in the hospital setting.[1, 2] However, there has been scant data on EHR adoption among U.S. hospitals and much of the existing data has suffered from serious methodological shortcomings. Prior data on hospitals' adoption of EHRs or key EHR functions (such as computerized physician order entry [CPOE]) suggest levels of adoption ranging between 5 percent[3] and 59 percent[4], reflecting differing definitions of what constitutes an EHR, convenience samples and low survey response rates. To provide more precise estimates of EHR adoption among U.S. hospitals, the Office of the National Coordinator for Health Information Technology (ONCHIT) of the Department of Health and Human Services (HHS) commissioned a study to measure the current prevalence of EHR adoption in American hospitals to facilitate tracking of these levels over time.

In *Health Information Technology in the United States, 2009: On the Cusp of Change*, we use the data collected for ONCHIT to focus on EHR adoption in the inpatient setting. We report on several important policy issues. These include the rate of adoption of EHRs among U.S. hospitals generally and among safety-net hospitals, changes in both state and federal policy, and the potential of EHRs to change the quality measurement enterprise.

Major Content Areas

Chapter 1, *Beyond the Doctor's Office: Adoption of Electronic Health Records in U.S. Hospitals*, describes the results of our 2008 hospital survey and provides estimates of the adoption of both basic and comprehensive EHRs among U.S. hospitals. Further, the chapter discusses both barriers to and incentives for adoption at the hospital level.

In Chapter 2, *Adoption of Electronic Health Records Among Hospitals that Care for the Poor*, we provide estimates of the adoption of basic and comprehensive EHRs, and key clinical functionalities among safety-net hospitals in the U.S. This chapter also examines the relationship between EHR adoption and quality metrics among these hospitals.

In Chapter 3, *State Roles in the Advancement of Health Information Technology*, we review what is known about state level initiatives to promote EHR adoption and use. This chapter highlights current state roles in the dissemination of HIT and the unprecedented financial opportunities afforded under the Health Information Technology Economic and Clinical Health Act (HITECH), part of ARRA, which could further foster adoption by providing resources to states with present fiscal struggles.

In Chapter 4, *Recent Federal Initiatives in Health Information Technology*, we examine the American Reinvestment and Recovery Act with a particular focus on "meaningful use" incentives and how these will affect providers caring for vulnerable populations.

Finally, Chapter 5, *Potential Implications of Widely Adopted Meaningfully Used HIT: Is Quality Measurement and Reporting About to Take Flight?*, reviews the issue of public reporting of quality data. This chapter focuses on a potentially important effect of EHR adoption: how their widespread adoption will change public reporting of quality data. This technology may make clinical data extraction both efficient and inexpensive, which would facilitate large-scale clinical performance measurement efforts.

Previous Work

Our team draws from several institutions with relevant expertise: the George Washington University School of Public Health and Health Services' Department of Health Policy; the Institute for Health Policy at Massachusetts General Hospital/Partners HealthCare System; and the Harvard School of Public Health. Previous projects of this group include: our RWJF-funded 2006 and 2008 reports; studies of the costs of developing a national health information network and establishing national rates of adoption of EHRs among physicians and hospitals; an RWJF colloquium on measuring the diffusion of health information technology; and an RWJF analysis of the legal barriers to widespread adoption of electronic health records.

Also critical to our research process was the creation of an Expert Advisory Group (EAG) that provided advice and feedback on the development of our hospital survey. This group, comprised of hospital information technology (IT) leaders and survey experts, provided critical insights on both the development of the survey and interpretation of the data. In addition, our Expert Consensus Panel (ECP) continues to play a critical role in our research project. This panel, consisting of national experts in relevant areas, helps guide our development of methodologies and analysis for measuring the adoption and effect of EHRs. We are extremely grateful to these individuals for their enormous contributions to these efforts and for their generosity in donating their time.

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Endnotes

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Chapter 1: Beyond the Doctor's Office: Adoption of Electronic Health Records in U.S. Hospitals

Ashish K. Jha, M.D., M.P.H., Catherine M. DesRoches, Dr.P.H., Eric G. Campbell, Ph.D., Karen Donelan, Sc.D., Sowmya R. Rao, Ph.D., Timothy G. Ferris, M.D., M.P.H., Alexandra Shields, Ph.D., Sara Rosenbaum, J.D.

In our prior reports, we provided estimates of the rate of adoption of EHRs among ambulatory care providers, and noted the lack of methodologically rigorous data on adoption in the hospital setting. [1,2] In these reports we concluded through rigorous and defined assessment that methodology, quality, and results of previously administered hospital surveys measuring national adoption of HIT varied greatly.[3,4,5] These prior data suggested adoption rates for EHRs or for several of their key functionalities (e.g., computerized provider-order entry [CPOE] for medications) in hospitals ranged from 5 percent[6] to 59 percent[7] reflecting differing methods, convenience samples, and definitions of EHRs.

The recent authorization of nearly $30 billion in funding to spur EHR adoption reinforces the need for systematic, methodologically rigorous measures of EHR adoption in the hospital setting. Without such measures, it will be impossible to assess the effect of this funding, as well as other federal initiatives to create a nationwide health information technology infrastructure. In this chapter, we provide estimates of the adoption of EHRs and key individual electronic functionalities based on high quality survey data as a baseline against which we can measure progress toward this national goal.

Methodology

Survey Development

We developed our survey by first examining and synthesizing prior hospital-based surveys of EHRs or related functionalities (such as CPOE) administered in the previous five years.[8,9,10] We then convened an Expert Advisory Group (EAP), comprised of experts in HIT and hospital surveys to advise us and provide feedback on our survey instrument (see Introduction for a list of EAP members). In addition to this group, the survey was reviewed by several chief information officers (CIOs), other hospital leaders, and survey experts for feedback. As with our prior physician survey, our Expert Consensus Panel (ECP) was instrumental in providing input on the survey content and design (see Introduction for a description of the ECP). The final survey included questions assessing adoption of key clinical functionalities and barriers to and incentives for EHR adoption.

Survey Sample and Administration

We collaborated with the American Hospital Association (AHA) to survey all acute-care general medical/surgical member hospitals in the United States. The HIT Supplemental Survey was sent as a supplement to the AHA annual survey of members. Like the overall AHA questionnaire, the supplement was sent to the hospital's chief executive officer (CEO) who generally assigned it to the most knowledgeable person in the organization. Hospitals that did not respond to the initial mailing were contacted by telephone and reminder letters encouraging them to complete the survey. The survey recipients also had the opportunity to complete the survey online. The survey was initially mailed in March 2008 and our in-field period ended September 30, 2008.

Survey Content

Respondents were asked to report on the presence of 32 clinical HIT functionalities. Response categories were "fully implemented in all major clinical units," "implemented in one or more (but not all) major clinical units," and "not yet fully implemented in any unit in the hospital." We asked respondents to rate a series of financial and organizational factors as major barriers, minor barriers, or not barriers to EHR adoption. Finally, respondents were asked to assess the effect of specific policy changes on their likelihood of adoption. Response categories were "positive impact," "negative impact," and "no impact."

Development of Measures of EHR Use

Though the Institute of Medicine (IOM) has created an extensive list of potential electronic clinical functionalities that could constitute an inpatient EHR,[11] there currently is no consensus on what key functionalities are the critical elements necessary to define an EHR in the hospital setting. Therefore, similar to the process we employed to develop our definition of a basic and comprehensive EHR in the ambulatory setting, we asked our ECP to help us define the functionalities that constitute an inpatient EHR.[12] Using a modified-Delphi process, the panel reached consensus on the 24 functions that should be present in all major clinical units of a hospital to conclude that it has a comprehensive EHR (Table 1).[13] Similarly, the panel reached consensus on eight functionalities that should be implemented in at least one major clinical unit (such as the intensive care unit) in order for the hospital to have a basic EHR. The ECP disagreed on the need for two additional functionalities (the presence of physician notes and nursing assessments) to qualify as having a basic EHR. Therefore, we developed two definitions of a basic EHR, one containing nursing and physician notes, and the other without. In this report, we only present findings of the basic EHR that include clinician notes, but have reported data for EHRs without clinician notes in published work.[14]

We did not include electronic measurement or reporting capabilities in either of our comprehensive or basic definitions (Table 1). This is important to note, given the federal government's current focus on "meaningful use" of HIT, which is likely to include the use of such systems to report quality data. We discuss this issue further in Chapter 5.

Table 1: **Requirements for the Presence of an EHR and Current Level of EHR Adoption**

	Comprehensive* EHR	Basic EHR † with Clinician Notes	Basic EHR † without Clinician Notes
Electronic Clinical Documentation			
Patient demographics	X	X	X
Physician notes	X	X	
Nursing assessments	X	X	
Problem lists	X	X	X
Medication lists	X	X	X
Discharge summaries	X	X	X
Advanced directives	X		
Results Viewing			
Lab reports	X	X	X
Radiology reports	X	X	X
Radiology images	X		
Diagnostic test results	X	X	X
Diagnostic test images	X		
Consultant reports	X		
Computerized Provider Order Entry			
Laboratory tests	X		
Radiology tests	X		
Medications	X	X	X
Consultation requests	X		
Nursing orders	X		
Decision Support			
Clinical guidelines	X		
Clinical reminders	X		
Drug allergy alerts	X		
Drug-drug interactions alerts	X		
Drug-lab interactions alerts	X		
Drug dosing support	X		
Adoption Level (95% Confidence Interval)	**1.5% (1.1%–2.0%)**	**7.6% (6.6%–8.3%)**	**10.9% (9.7%–12.0%)**

Source: Jha AK, DesRoches CM, Campbell E, et al. "Use of Electronic Health Records in U.S. Hospitals." *New England Journal of Medicine*, 360(16):1628–1638, 2009.
*Comprehensive EHR requires presence of each functionality in all clinical areas.
† Basic EHR requires presence of each functionality in at least one clinical unit in the hospital.

Characteristics of Responding Hospitals

We received responses from 3,049 hospitals, or 63.1 percent, of all acute-care general hospitals sampled. We excluded those hospitals located outside the 50 states and the District of Columbia (i.e., located in Guam, Puerto Rico, others) and federal hospitals, which left us with 2,952 institutions. In alternative analyses we included federal hospitals to determine their impact on our main study findings. We found modest differences between respondents and non-respondents and subsequently adjusted for potential non-response bias in all further analyses.

Adoption of Clinical Functionalities in Electronic Format

We examined the rate of adoption of specific electronic clinical functions among U.S. hospitals first with bivariate analysis followed by multivariable regressions. These analyses examined relationships between hospital characteristics (i.e., size and teaching status) and adoption of HIT. We considered several qualities as markers of a high technology institution, including having a Coronary Care Unit (CCU), burn unit, or a positron emission tomography scanner. Because the results were comparable, we only present data based on presence or absence of a CCU. Our bivariate results were similar to those found in the multivariable analysis. For brevity's sake, we present only the bivariate results in this report.

We found large variations in the implementation of key clinical functionalities across U.S. hospitals. Only a small minority of U.S. hospitals had implemented physician notes (12%) and CPOE for medications (16%) across all major clinical units (Table 2). In contrast, nearly 80% of U.S. hospitals reported adoption of electronic laboratory and radiology reporting systems (Table 3).

Adoption of an Electronic Health Record

We then analyzed the rate of adoption of both the comprehensive and basic EHR, again using both bivariate and multivariable analysis. Based on the definitions created by the ECP, we found that 1.5 percent (95% confidence interval [CI]: 1.1% to 2.0%) of U.S. hospitals had a comprehensive EHR implemented across all major clinical units and an additional 7.6 percent (95% CI: 6.6% to 8.3%) had a basic EHR that includes physician and nursing notes available in at least one clinical unit. If we included federal hospitals such as those run by the Department of Veterans Affairs, the level of adoption of comprehensive EHRs jumps to almost 3 percent (95% CI: 2.3% to 3.5%) while the basic EHR with clinician notes would be almost 8 percent (95% CI: 6.9% to 8.8%).

We found that several key characteristics were associated with adoption of EHRs. Larger hospitals, major teaching institutions, those located in urban areas and those that were part of hospital systems had higher rates of adoption of EHRs, as did hospitals with higher levels of other technologies available (as identified by the presence of a CCU). These findings are detailed in Table 4. Contrary to our prior hypothesis, public hospitals had levels of EHR adoption comparable to non-public institutions. Even comparing for-profit to nonprofit (public and private) institutions, there were no significant differences in adoption.

Table 2: **Characteristics of Responding and Non-Responding Acute-Care Non-Federal Hospitals**

		Respondents (N=2952)	Non-Respondents (N=1862)
		%	%
Size	Small (6 beds–99 beds)	48	50
	Medium (100 beds–399 beds)	43	43
	Large (400+ beds)	10	7
Region	Northeast	14	12
	Midwest	33	24
	South	37	41
	West	17	22
Ownership	For-profit hospitals	14	22
	Private nonprofit hospitals	62	55
	Public hospitals	24	23
Teaching Status	Major teaching	7	4
	Minor teaching	16	16
	Non-teaching	77	80
System	Member of a system	43	47
	Not a member of a system	57	53
Location	Urban hospitals	62	60
	Rural hospitals	38	40
Technological Capability	Hospitals with CCU	35	25
	Hospitals without CCU	65	75

Source: Jha AK, DesRoches CM, Campbell EG, et al. "Use of Electronic Health Records in U.S. Hospitals." *New England Journal of Medicine*, 360(16):1628–1638, 2009. CCU is Coronary Care Unit. P-value for each comparison <0.05.

Table 3: **Select Functionalities and Their Level of Implementation in U.S. Hospitals**

	Fully implemented across all units	Fully implemented in at least 1 unit	Began implementation or resources identified*	No implementation and no specific plans
Electronic Clinical Documentation	%	%	%	%
Medication Lists	45	17	18	20
Nursing Assessments	36	21	18	24
Physician Notes	12	15	29	44
Problem Lists	27	17	23	34
Results Viewing				
Diagnostic Test Images (e.g., EKG tracing)	37	11	19	32
Diagnostic Test Results (e.g., Echo report)	52	10	15	23
Lab Reports	77	7	7	9
Radiology Images	69	10	10	10
Radiology Reports	78	7	7	8
Computerized Provider Order Entry				
Laboratory Tests	20	12	25	42
Medications	17	11	27	45
Decision Support				
Clinical Guidelines (e.g., ß-blockers post-MI)	17	10	25	47
Clinical Reminders (e.g., Pneumovax)	23	11	24	42
Drug Allergy Alerts	46	15	16	22
Drug-Drug Interaction Alerts	45	16	17	22
Drug-Lab Interaction Alerts	34	14	21	31
Drug Dosing Support (e.g., renal dose guidance)	31	15	21	33

Source: Jha AK, DesRoches CM, Campbell EG, et al. "Use of Electronic Health Records in U.S. Hospitals." *New England Journal of Medicine*, 360(16):1628–1638, 2009.

* Those who reported that they were either "beginning to implement in at least one unit" or "have resources identified to implement in the next year."

Table 4. **Adoption of Comprehensive and Basic EHR Systems, by Hospital Characteristics**

		Have Comprehensive EHR System	Have Basic* EHR System	Have No EHR System	Overall P-value
Hospital Size		% (Standard Error)			
Size	Small (6 beds–99 beds)	1.2 (0.3)	4.9 (0.6)	93.9 (0.6)	<0.001
	Medium (100 beds–399 beds)	1.7 (0.4)	8.1 (0.8)	90.2 (0.8)	
	Large (400+ beds)	2.6 (0.9)	15.9 (2.2)	81.5 (2.3)	
Region	Northeast	1.1 (0.5)	8.9 (1.4)	90.0 (1.5)	0.77
	Midwest	1.7 (0.4)	6.6 (0.8)	91.7 (0.9)	
	South	1.4 (0.4)	7.3 (0.8)	91.3 (0.8)	
	West	1.9 (0.6)	7.0 (1.2)	91.1 (1.3)	
For-profit hospitals		1.3 (0.5)	5.2 (1.1)	93.5 (1.2)	0.08
Private non-profit hospitals		1.5 (0.3)	8.4 (0.6)	90.1 (0.7)	
Public hospitals		1.7 (0.5)	5.8 (0.9)	92.4 (1.0)	
Major teaching hospitals		2.6 (1.1)	18.5 (2.6)	78.9 (2.7)	<0.001
Minor teaching		2.4 (0.7)	10.6 (1.4)	87.0 (1.6)	
Non-teaching		1.3 (0.2)	5.6 (0.5)	93.1 (0.5)	
Member of a system		2.1 (0.4)	8.4 (0.9)	89.5 (0.9)	0.006
Not a member of a system		1.1 (0.2)	6.3 (0.6)	92.6 (0.6)	
Urban hospitals		1.9 (0.3)	8.4 (0.6)	89.7 (0.6)	<0.001
Rural hospitals		0.6 (0.3)	4.0 (0.7)	95.3 (0.8)	
Hospitals with CCU		1.9 (0.4)	9.7 (0.9)	88.4 (1.0)	0.002
Hospitals without CCU		1.3 (0.3)	6.3 (0.6)	92.4 (0.6)	

Source: Jha AK, DesRoches CM, Campbell EG, et al. "Use of Electronic Health Records in U.S. Hospitals." *New England Journal of Medicine*, 360(16):1628–1638, 2009.
* Basic EHR system with the presence of clinicians' notes.
　CCU is Coronary Care Unit.

Barriers and Facilitators of EHR Adoption

Finally, we asked respondents to assess the effect of several barriers to EHR adoption. Among the nearly 90 percent of U.S. hospitals that did not meet our definition of having an EHR system, financial concerns topped the list of major barriers. These institutions reported, as major barriers, inadequate capital for purchase (73%), concerns about maintenance costs (44%), physician resistance (36%), unclear return on investment (32%), and lack of availability of staff with adequate IT expertise (30%). (Please refer to Figure 1.)

Figure 1: **Major Barriers to Adoption of EHRs Among Hospitals That Have EHR Systems* Versus Those That Do Not**
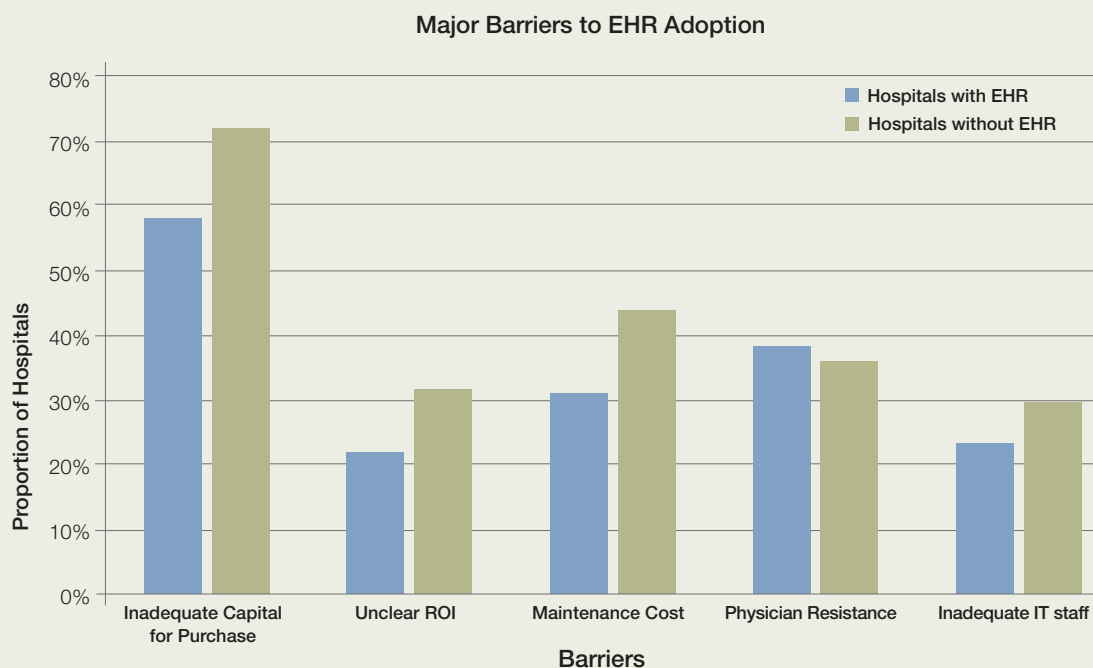
Source: Jha AK, DesRoches CM, Campbell EG, et al. "Use of Electronic Health Records in U.S. Hospitals." *New England Journal of Medicine*, 360(16):1628–1638, 2009.
P-value for difference is <0.01 for each comparison except physician resistance (p-value = 0.20).
* Hospitals that have either a comprehensive EHR or a basic EHR that includes clinicians' notes.

Not surprisingly, therefore, most hospitals without EHR systems identified financial factors as likely to have a major positive impact on EHR adoption: additional reimbursement for EHR use (82%) and financial incentives for adoption (75%). Other facilitators were cited far less frequently, including having greater availability of technical support for IT implementation (47%) and objective third-party evaluations of EHR products (35%). These results are shown in Figure 2.

Figure 2: **Facilitators Likely to Have a Major Positive Impact on EHR Adoption Among Hospitals That Have EHR Systems* Versus Those That Do Not**
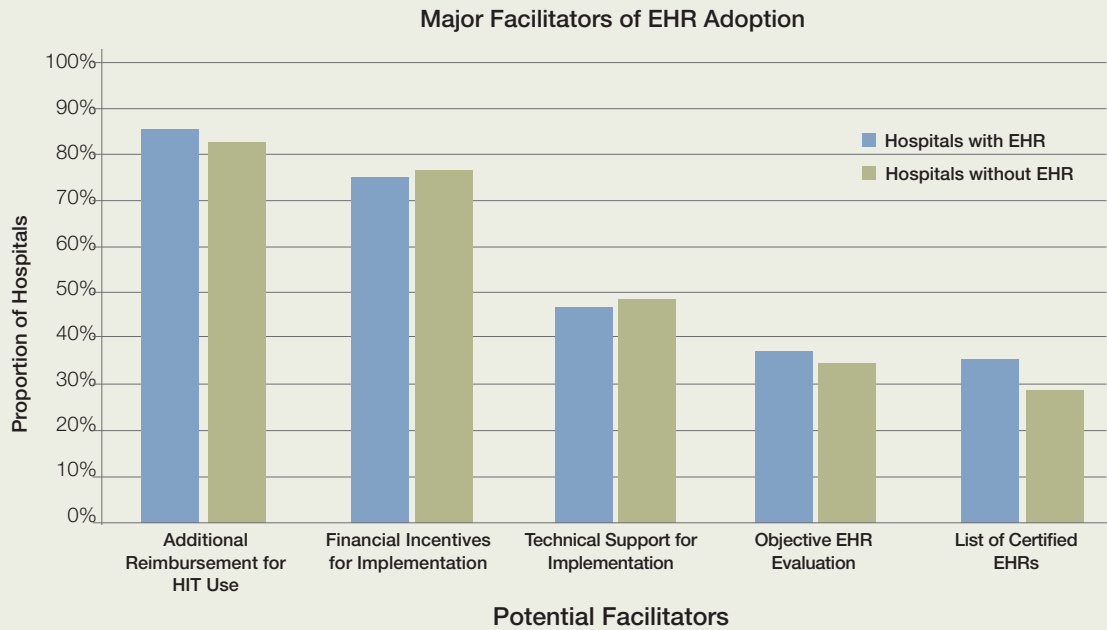
Major Facilitators of EHR Adoption

Source: Jha AK, DesRoches CM, Campbell EG, et al. "Use of Electronic Health Records in U.S. Hospitals." *New England Journal of Medicine*, 360(16):1628–1638, 2009.
P-value for each comparison >0.10.
*Hospitals that have either a comprehensive EHR or a basic EHR that includes clinicians' notes.

Discussion

Among U.S. acute-care non-federal hospitals, we found that less than 2 percent have a comprehensive EHR system and less than 8 percent have a basic EHR system that includes clinical notes. Information systems in greater than 90 percent of U.S. hospitals do not meet the requirement for a basic EHR.

Our findings should not be interpreted to suggest that 90 percent of U.S. hospitals lack any electronic systems. Although less than 10 percent of hospitals met the definition of having an EHR, a much larger proportion of hospitals in the U.S. have several key functionalities in place. A vast majority of institutions report the presence of laboratory and radiologic reports, radiologic images, medication lists, and some decision support functions available in electronic format. Others reported that they planned to upgrade their information systems to an EHR by adding functionalities, such as CPOE and physician notes, in the next several years. However, both CPOE and physician notes are among the most challenging functions to implement and whether hospitals will successfully do so is unclear.

Although we found somewhat higher levels of adoption among large teaching hospitals, even among this group, a vast majority of institutions do not have systems that meet the definition of a basic EHR. While these large academic centers have greater access to financial resources necessary to acquire EHR systems, a vast majority still have not made the investments necessary to implement these complex systems. Although we expected to find lower adoption among public hospitals, we did not find any such relationship in this analysis. However, as the next chapter in the report highlights, we have found that hospitals with a higher Disproportionate Share Hospital (DSH) Index have lower levels of adoption of nearly every functionality examined. Those findings are consistent with our initial hypothesis and suggest that tracking EHR adoption among providers that care for the poor should be a high priority.

In 2006, we reported in the first Robert Wood Johnson Foundation examination of the state of EHR adoption, that a relatively small minority of hospitals likely had an EHR.[15] However, our comprehensive review of the literature on hospital HIT adoption found mostly poor assessments of EHRs directly and the only reliable data were on levels of CPOE adoption, suggesting that between 5 percent and 10 percent of U.S. hospitals had adopted this specific functionality.[16, 17, 18] A prior AHA survey found higher prevalence of CPOE than we did,[19] but had a 19 percent response rate. A more recent analysis found that 13 percent of the hospitals had implemented CPOE, prevalence similar to our own.[20] However, this analysis used a proprietary database with both an unclear sampling frame and unclear response rates.

Our survey respondents suggested that financial issues are the dominant barrier to adoption, dwarfing other issues such as physician resistance, lack of an IT staff, or lack of good products in the marketplace. Others have found that physician resistance[21] can be detrimental to adoption efforts.[22] Despite these results, it is clear from other work that ensuring physician buy-in, often using clinical champions, can be helpful in ensuring successful adoption.[23]

A potentially important barrier to adoption is concern about interoperability: very few EHRs in the marketplace in 2009 allow for easy exchange of clinical data between hospitals, or from hospitals to physicians' offices, or for the construction and reporting of quality data. Further, very few communities have active efforts in health information exchange.[24, 25] The lack of interoperability of these systems dramatically reduces the value that clinicians might gain from using EHRs, which likely dampens their enthusiasm for adopting such systems.

We found that the inclusion of the Veterans Health Administration (VHA) hospitals had a dramatic effect on our adoption rate. This result is not surprising. VHA hospitals have used EHRs for more than a decade and have used these systems, among other initiatives, to improve the quality of care provided.[26, 27] A few other high income countries, such as the United Kingdom, Australia, New Zealand, and others have also successfully adopted EHR systems, although most have focused primarily on the ambulatory care sector. We are aware of very few countries that have made substantial progress in the hospital sector.[28]

Policy-makers have focused primarily on financially rewarding hospitals for using HIT through the American Reinvestment and Recovery Act (ARRA), which will provide financial incentives for hospitals to adopt "meaningful use" EHR systems. The primacy of financial barriers suggests that these incentives will be helpful for hospitals, however the definition of "meaningful use" will be critical to the success of this initiative. Other chapters in this report explain the details of ARRA and their likely implications for U.S. hospitals.

In summary, we examined levels of EHR adoption in U.S. hospitals in 2008 and found that less than 2 percent of U.S. hospitals have a comprehensive clinical information system and less than 10 percent have a basic system. While many institutions reported that they were planning on building out such systems over the upcoming two years, they faced significant financial barriers to doing so. The recent passage of ARRA should help alleviate some of the financial concerns, but other important issues, such as interoperability and training of HIT support staff will also need to be addressed to realize widespread use of EHRs across U.S. hospitals.

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Chapter 2: Adoption of Electronic Health Records Among Hospitals that Care for the Poor: Early Evidence of a New Healthcare Digital Divide?

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Eliminating health disparities remains a priority for policy-makers. Both the Institute of Medicine and *Healthy People 2010* cite the elimination of disparities as a critical national goal.[1, 2] At the same time, there is an intense focus on the potential for electronic health records (EHRs) to significantly improve care by enhancing both the safety and effectiveness of health care.[3] While there is only limited empirical evidence of the effect of EHRs in practice, their potential to improve quality of care is widely recognized.[4] This potential has resulted in a strong focus among policy-makers on monitoring: 1) the rate of adoption of EHRs among providers serving vulnerable populations; and 2) the potential effect of this technology on health disparities.[5] To the extent that EHRs prove to be a powerful means of improving care, slower adoption of EHR-enhanced health care among providers serving vulnerable populations could exacerbate existing health disparities. Concerns about slower diffusion among this population are underscored by studies documenting a lag in access to new developments in clinical care among vulnerable populations.[6, 7, 8]

The American Recovery and Reinvestment Act (ARRA) of 2009[9] provides approximately $30 billion to develop a national health information technology (HIT) infrastructure. ARRA authorizes the use of financial incentives through Medicare and Medicaid to promote the adoption of EHRs. Recognizing the importance of health information technology more broadly, and EHRs specifically, in eliminating health disparities, this act requires the Office of the National Coordinator for Health Information Technology (ONCHIT) to ensure that vulnerable populations (i.e., rural communities, the uninsured, and medically underserved populations) realize the benefit of this technology.[10] Although there is broad support for helping physicians and hospitals implement and use EHRs, some worry that without a concerted effort to ensure that providers serving vulnerable populations adopt this technology, this push to digitize health care will result in a new healthcare "digital divide" as patients from traditionally vulnerable populations lack access to the benefits of this technology. There is reason to suggest that this divide would result in lower quality and less efficient care for the uninsured, and medically underserved racial and ethnic minority populations.

A central policy question therefore becomes whether the HIT policy reforms set by ARRA will be implemented in ways that mitigate these risks and increase the rate of adoption among these providers. However, measuring progress in adoption among this group presents methodological challenges. One particular challenge is identifying the group of health care providers that serve poor and other vulnerable populations. The lack of a clear approach to identifying these providers has made the measurement of their rate of EHR adoption difficult. In our prior reports, we documented the lack of methodologically rigorous data on EHR adoption among providers serving vulnerable populations,[11, 12] showing that many previous studies documenting low EHR adoption among safety-net providers either lacked a comparison group, or focused on small geographic areas or community health centers.[13, 14, 15] In this 2009 report, we advance our knowledge in this area by using nationally representative data on the adoption of EHRs by hospitals serving vulnerable populations. We use data from the HIT Supplemental Survey (see Chapter 1 for details of survey methodology) to examine whether there is early evidence of a "digital divide".

A Note on Definitional Issues

Defining Safety-Net Hospitals

As discussed in our 2006 report, there are no national data on the proportion of patients served by a given hospital who are poor.[16] After considering several different methods for specifying safety-net hospitals, we used a hospital's Medicare Disproportionate Share Hospital (DSH) Index as a surrogate measure.[17] The DSH Index is assigned to hospitals by the Centers for Medicare and Medicaid Services (CMS) based on both their fraction of elderly Medicare patients who also are eligible for Supplemental Security Income (SSI) and the fraction of non-elderly patients with Medicaid coverage. The index provides an estimate of the proportion of a given hospital's patients who are: 1) both elderly and poor (those eligible for SSI); and 2) non-elderly poor (Medicaid insurance). It is particularly useful in classifying the proportion of hospitals' patients that are poor when a large proportion of patients are elderly. CMS then uses the index to identify hospitals eligible for additional Medicare payments for caring for the poor. We used the 2007 Impact File compiled by CMS to obtain each organization's DSH Index.

Hospital Information Technology Survey

Details on the survey development and administration can be found in Chapter 1. Briefly, in partnership with the American Hospital Association (AHA) and our Expert Consensus Panel (ECP), we developed a new survey of HIT adoption. The AHA administered the survey as a supplement to their annual survey. The AHA sent the survey to each hospital's chief executive officer and asked the CEO to assign the most knowledgeable person in the institution (generally the chief information officer or equivalent) to complete the survey. The survey achieved a response rate of 63.1 percent.

Defining EHR Adoption

Hospitals were asked to report on the presence of 32 electronic clinical functions. Specifically, they were asked whether the functions were "fully implemented in all major clinical units," "in one or more (but not all) major clinical units," or "not yet fully implemented in any unit of the hospital." Similar to our prior work on physician adoption of EHRs[18], our ECP used a modified Delphi process to define a comprehensive EHR as 24 clinical functions implemented across all major clinical units and a basic EHR as 10 clinical functions implemented in at least one major clinical unit. Chapter 1 provides additional details on the development of our definition of an inpatient EHR.

Defining Quality of Care

We used standard quality metrics to define quality of care in the hospital setting. Specifically, we use data from the September 1, 2008 public release of the Hospital Quality Alliance (HQA) program. This program reports performance scores for nearly all acute-care hospitals based on patients seen during calendar year 2007. We used the HQA process measures to calculate individual hospital summary performance scores for four conditions: acute myocardial infarction (AMI) (eight process measures), congestive heart failure (CHF) (four measures), pneumonia (seven measures), and surgical complication prevention (five measures). We used a widely-deployed approach to create condition-specific summary scores.[19]

Key Findings

Safety-Net Hospitals

We first examined characteristics of hospitals based on the quartile of DSH Index. We found, not surprisingly, that hospitals in the highest quartile of DSH Index ("High-DSH"), when compared to low-DSH hospitals, cared for a substantially higher proportion of Medicaid patients (27% versus 9%), elderly Black patients (18% versus 4%) and elderly Hispanic patients (4% versus 1%). High-DSH hospitals also cared for a substantially lower proportion of Medicare patients (40% versus 53%) than low-DHS hospitals. These high-DSH hospitals were more likely to be large (19% versus 5%), major teaching hospitals (15% versus 3%), located in the South (56% versus 26%) and for-profit. Hospital characteristics are displayed in Table 1.

Table 1: **Hospital Characteristics by DSH Index Among Responders to the HIT Survey**

		Highest DSH Quartile	2nd DSH Quartile	3rd DSH Quartile	Lowest DSH Quartile	P-value
Patient Population (Mean) (%)						
Proportion of Medicare patients		40	47	49	53	<0.001
Proportion of Medicaid patients		27	19	15	9	<0.001
Proportion Black		18	7	5	4	<0.001
Proportion Hispanic		4	1	1	1	<0.001
Structural Characteristics (Mean) (%)						
Hospital Size	Small (0–99)	29	30	36	39	<0.001
	Medium (100–399)	51	59	54	55	
	Large (400+)	20	11	9	5	
Teaching Hospital		15	7	5	3	<0.001
Geographic Region	Northeast	10	15	17	22	<0.001
	Midwest	9	9	37	38	
	South	56	50	32	26	
	West	25	18	14	14	
Profit status	For-profit	24	17	12	14	<0.001
	Private nonprofit	50	62	71	74	
	Public	26	21	18	12	
Urban Location		83	83	81	83	0.66

Source: Jha AK, DesRoches CM, Shields A, et al. "The Adoption of Electronic Health Records Among Hospitals that Care for the Poor: Early Evidence of a New Healthcare Digital Divide?" *Health Affairs*, http://content.healthaffairs.org/cgi/reprint/28/6/w1160.

Rates of EHR Adoption

We first examined rates of overall EHR adoption across quartiles of the DSH Index. Because the adoption rates of comprehensive EHRs were so low across all hospitals,[20] we combined basic and comprehensive EHRs. We assessed associations between EHRs and the DHS Index using bivariate and multivariate analyses. All multivariate analyses control for key hospital characteristics, including size, teaching status, region, profit status, and location (urban versus rural). Our adjusted (multivariable analysis) and unadjusted (bivariate analysis) adoption rates were not significantly different. For brevity, we present only the bivariate results in this chapter.

We found small, non-significant differences between high-DSH and low-DSH Index hospitals: high-DSH hospitals had slightly lower rates of adoption of either the basic or comprehensive EHR compared to low-DSH hospitals (9.7% versus 11.5%) (Table 2).

Table 2: **Selected Electronic Functionalities and Their Level of Implementation in DSH Index Responders**

Clinical Functionality	Highest DSH Quartile	2nd Highest DSH Quartile	3rd Highest DSH Quartile	Lowest DSH Quartile	P-value
Electronic Clinical Documentation	%	%	%	%	
Demographic characteristics	87	88	88	92	0.045
Medication lists	62	66	71	74	<0.001
Nursing assessments	57	64	67	67	0.003
Physician notes	26	27	31	33	0.03
Problem lists	41	50	52	51	0.001
Discharge summaries	60	64	72	69	0.001
Advanced directives	40	51	54	53	<0.001
Results Viewing					
Diagnostic test images (e.g., EKG tracing)	44	53	58	57	<0.001
Diagnostic test results (e.g., Echo report)	63	69	70	71	0.02
Lab reports	87	91	92	90	0.04
Radiology images	77	87	85	85	<0.001
Radiology reports	89	91	91	90	0.55
Consultant reports	59	64	69	68	0.009
Computerized Provider Order Entry					
Laboratory tests	32	29	32	35	0.20
Radiologic tests	33	30	32	35	0.37
Medications	29	26	29	32	0.27
Consultation requests	25	24	26	27	0.73
Nursing orders	32	30	33	33	0.71
Decision Support					
Clinical guidelines (e.g., ß-blockers post-MI)	27	29	32	30	0.47
Clinical reminders (e.g., Pneumovax)	35	40	37	40	0.17
Drug allergy alerts	63	67	71	69	0.11
Drug-drug interaction alerts	63	68	70	70	0.09
Drug-lab interaction alerts	49	57	57	54	0.05
Drug dosing support (e.g., renal dose guidance)	46	52	54	52	0.07
Bar Coding					
Medication administration	27	38	37	41	<0.001

Rates of Adoption of Key Clinical Functionalities

We next examined differences in the implementation of key clinical functions and found several small, consistent differences in implementation between high-DSH Index and low-DSH Index Hospitals (Figure 1). We conducted this analysis for two reasons. First, the low level of EHR adoption overall likely limited the power of our analysis to find differences in adoption between high- and low-DSH hospitals. Second, understanding differences in the adoption of specific functions is critical in the development of policies that will effectively increase the HIT capacity of the health care system in the future. Our analytic plan was similar to the one described above, with the adoption of each specific functionality modeled as the dependent variable and the DSH Index as the primary independent variable, controlling for hospital characteristics. Again, we present only the bivariate analyses.

We found significant difference between high- and low-DSH hospitals in the areas of electronic clinical documentation and results viewing. Overall, high-DSH hospitals had lower rates of adoption of all 24 functions compared to low-DSH hospitals, although many of these differences did not reach statistical significance. Statistically significant differences included lower rates of electronic medication lists (62% in high-DSH hospitals versus 74% among low-DSH hospitals) and electronic discharge summaries (40% versus 53% respectively).

Figure 1: **Rate of Adoption of EHRs by U.S. Hospitals, 2008**

Source: Jha AK, DesRoches CM, Shields A, et al. "The Adoption of Electronic Health Records among Hospitals that Care for the Poor: Early Evidence of a New Healthcare Digital Divide?." *Health Affairs*, *http://content.healthaffairs.org/cgi/reprint/28/6/w1160.*

Quality of Care and EHR Adoption

A key question in the debate around EHR adoption is whether EHR systems can help eliminate disparities by allowing providers of poor patients to provide higher quality care. The notion here is that while there are generally known disparities in the quality of care provided by those who serve the poor and those who do not, some have proffered that EHR systems can help eliminate the gap. The design of our hospital survey allowed us to link our survey data on EHR adoption with the standard hospital quality metrics described above to examine whether the adoption of EHR systems would impact the quality of care for providers with a high proportion of poor patients. We first assessed whether there was an association between a high DSH Index and lower quality scores (to test whether there were disparities in care), then stratified these results by adopters and non-adopters of EHRs (to test if EHRs can help eliminate these disparities). In this case, the effect modification analysis tested whether the relationship between the DSH Index and quality of care was affected by the presence of a comprehensive or basic EHR. Conducting the stratified analysis allowed us to examine whether the relationship between the proportion of poor patients in a hospital and the quality of care provided varied by EHR status.

We found a highly statistically significant relationship between proportion of poor patients in a given hospital and all four conditions examined: a 10 percent increase in DSH Index was associated with a 0.5 percent lower performance on AMI quality metrics, 1 percent lower performance on CHF metrics, 0.9 percent lower performance on pneumonia metrics, and 1.5 percent lower performance on surgical complication prevention metrics. These results confirmed that there are important disparities in hospital care in the national sample of hospitals (Table 3).

Table 3: **The Relationship Between DSH Index and Quality of Care, Stratified by EHR Adoption**

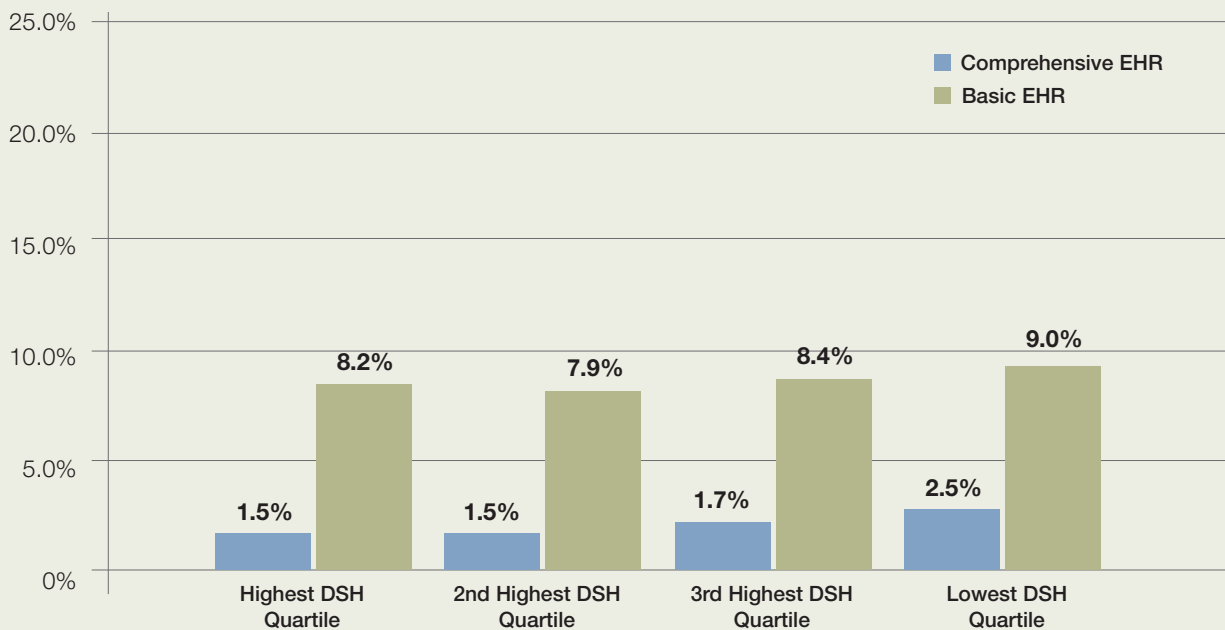|	Quality of Care		Adoption of EHRs		No Adoption of EHRs		Interaction Term (P-value)*
	Estimate (95% CI)	P-value	Estimate (95% CI)	P-value	Estimate (95% CI)	P-value	
Acute MI Summary Score	-0.5 (-0.6 to -0.4)	<0.001	0.7 (0.1 to 1.2)	0.01	-0.7 (-0.9 to -0.5)	<0.001	-0.5 (p-value 0.02)
CHF Summary Score	-1.0 (-1.2 to -0.7)	<0.001	0.5 (-0.7 to 1.7)	0.39	-0.5 (-1.0 to -0.03)	0.038	-0.4 (p-value 0.35)
Pneumonia Summary Score	-0.9 (-1.1 to -0.8)	<0.001	0.6 (-0.02 to 1.3)	0.06	-0.6 (-0.8 to -0.4)	<0.001	-0.5 (p-value 0.04)
Surgical Care Summary Score	-1.5 (-1.7 to -1.3)	<0.001	0.3 (-0.6 to 1.2)	0.48	-1.0 (-1.3 to -0.6)	<0.001	-0.7 (p-value 0.05)
Overall Summary Score	-0.7 (-0.8 to -0.6)	<0.001	0.9 (0.3 to 1.5)	0.004	-0.7 (-1.0 to -0.4)	<0.001	-0.4 (p-value 0.05)

Source: Jha AK, DesRoches CM, Shields A, et al. "The Adoption of Electronic Health Records Among Hospitals that Care for the Poor: Early Evidence of a New Healthcare Digital Divide?" *Health Affairs*, *http://content.healthaffairs.org/cgi/reprint/28/6/w1160.*

Estimate represents a 10% change in Disproportionate Share Hospital (DSH) Index.
*P-value ≥ 0.1 is traditionally considered statistically significant for interaction tests.

Figure 2: **Major Barriers to HIT Adoption Among DSH Hospitals with No EHR**
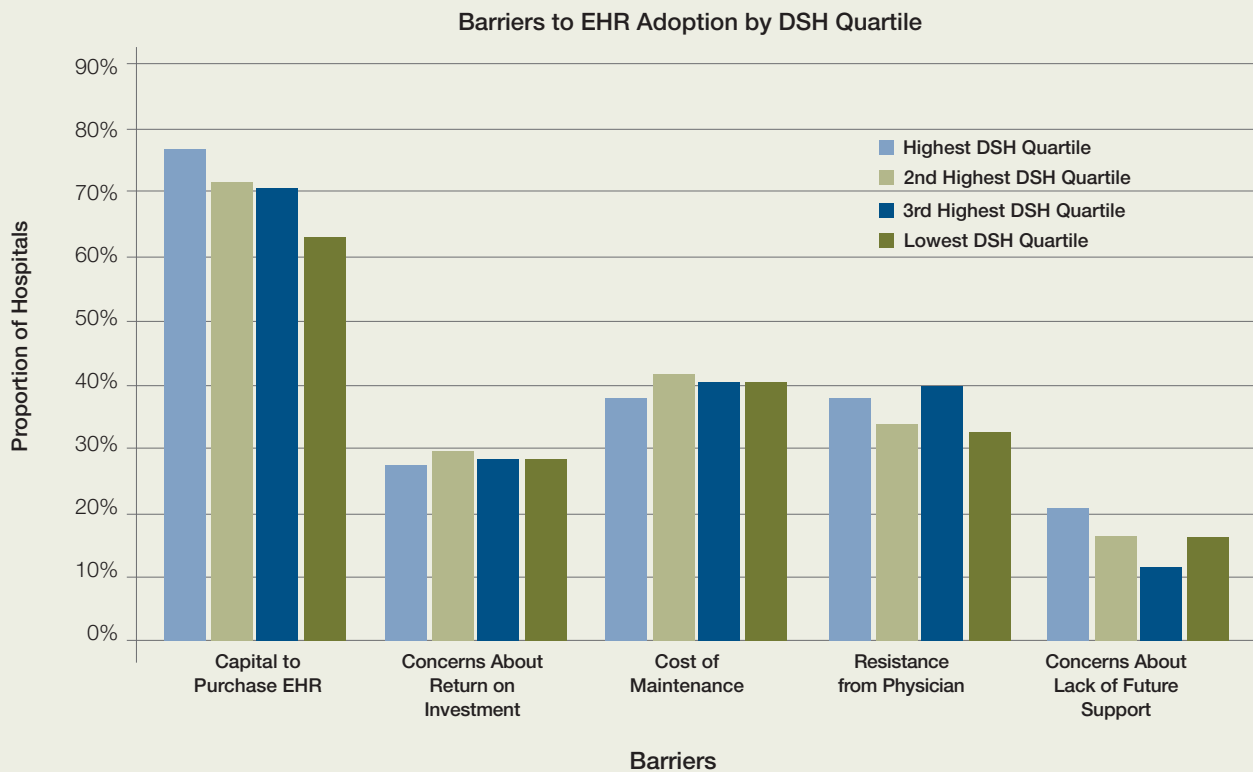
Barriers to EHR Adoption by DSH Quartile

Source: Jha AK, DesRoches CM, Shields A, et al. "The Adoption of Electronic Health Records Among Hospitals that Care for the Poor: Early Evidence of a New Healthcare Digital Divide?" *Health Affairs*, *http://content.healthaffairs.org/cgi/reprint/28/6/w1160*.

Our effect modification analysis demonstrated a very consistent pattern. In hospitals with an EHR (basic or comprehensive), DSH Index was not negatively associated with quality performance (i.e., among EHR adopters, there were no disparities based on proportion of poor patients cared for). However, among non-EHR adopters, a higher DSH Index was associated with lower quality performance for three of the four conditions examined: acute myocardial infarction, pneumonia, and surgical care (i.e., the disparities persisted among the non-EHR adopters). When we tested for interactions, examining whether the relationship between DSH Index and quality score varies by EHR status, we found a statistically significant interaction for these three conditions (Table 3).

Barriers to and Incentives for EHR Adoption

Understanding the specific barriers faced by safety-net hospitals will be critically important to any efforts to spur adoption among this group of providers. Toward this end, we examined associations between barriers to and facilitators of EHR adoption and the proportion of poor patients served by a given hospital. First we identified the five barriers and facilitators most frequently cited among all

respondents as major barriers. We then examined the rate with which they were cited by hospitals that disproportionately care for the poor. We then built logistic-regression models (adjusting for the hospital characteristics mentioned above) to assess whether the proportion of poor patients was associated with respondents' reports of specific barriers and facilitators.

Among those hospitals without a comprehensive or basic EHR system, high-DSH hospitals were more likely than low-DHS hospitals to cite inadequate capital (77% versus 63%) and future support (21% versus 16%) as major barriers to adoption. Across levels of DSH Index scores, hospitals reported concerns about the other four main barriers at comparable rates (Figure 2). Regardless of DSH Index score, the majority of hospitals identified financial incentives as likely to have a major positive impact on EHR adoption. There were no differences in facilitators identified by high- and low-DSH hospitals (data not shown).

Discussion

As policy-makers examine methods to improve the quality and effectiveness of the health care system, they have increasingly turned to HIT as a critical piece of the solution. There have been hundreds of studies demonstrating a relationship between the effective implementation and use of specific, individual IT functionalities and improved quality of care.[21, 22] Studies of EHR adoption have also found associations with adoption and increased efficiencies, and safer, less expensive health care.[23, 24, 25, 26]

Medicare and Medicaid under ARRA will afford financial incentive provisions for EHR and HIT adoption, and will have important implications for hospitals that care for a disproportionate share of poor patients. These hospitals, with fewer Medicare patients, will be primarily reliant on the adoption funds that state Medicaid programs are able to produce. As a result, the Medicaid HIT adoption incentives, which are available to both children's hospitals and hospitals whose inpatients are more than 10 percent Medicaid, become an especially relevant policy consideration. Furthermore, unlike Medicare, the Medicaid HIT incentive provisions[27] not only reward meaningful use but also are available to finance the front end costs associated with adoption and upgrades, thereby helping high-DSH hospitals overcome their more limited access to capital.[28]

Implementation of Medicaid HIT incentives is not mandatory for state participation in the Medicaid program. Therefore, it is unclear whether the Medicaid reforms will actually spur adoption at high-DSH hospitals. Rather, states can pursue HIT adoption at their option. Thus, strong implementation of Medicaid HIT incentives depends on the extent to which states aggressively move toward reform. Although Medicaid provider incentive payments will qualify for 100 percent federal financing, states will incur 10 percent of the costs related to administration. This, of course, raises the question of how rapidly cash-strapped Medicaid programs, particularly those not already actively pursuing HIT, will move toward adoption. Federal funding for incentives does not begin until 2011; thus much depends on the extent to which ONCHIT and CMS are able to foster state Medicaid adoption through technical assistance support and funding under the other HIT provisions of the act, as well as the extent to which they can set Medicaid implementation policies that encourage more rapid state action.

Another important factor will be how Medicare and state Medicaid programs define the concept of meaningful use, the measure used under the ARRA to determine if hospitals and health professionals qualify for reward payments once technology is adopted. ONCHIT and CMS are now grappling with this issue and in this regard, an important finding to emerge from this study is the modest differences between high- and low-DSH hospital adopters. This finding suggests that the problem is partly a meaningful use lag between high- and low-DSH adopters but partly also a question of how to position high-DSH hospitals so that adoption becomes financially viable.

Although relatively few hospitals have a comprehensive EHR, a large proportion of hospitals do have key functions that comprise EHR systems, including results viewing, medication and problem lists, and demographics. Given that hospitals that disproportionately care for the poor lag in adoption of many of these functions (for reasons we cannot determine other than perhaps cost), it will be critical to track the progress of these institutions and ensure that funding, especially via Medicaid or the DSH mechanism, is robust for the providers at these hospitals. Further, given that high-DSH Index hospitals seem to be a heterogeneous group (some are nonprofit academic medical centers while others appear to be smaller, for-profit institutions), they may need differing approaches to spur HIT adoption. Failure to do so may lead to greater financial strains for these institutions and may widen gaps in the quality of care delivered.

We found differences in quality between the high- and low-DSH Index hospitals in the national sample, as well as among non-EHR adopters. However, we found no such relationship among hospitals that had adopted EHR systems. While it is tempting to conclude that EHRs helped to erase the quality performance difference between high- and low-DSH index hospitals, we cannot be sure. Other studies indicate that EHR adoption is not associated with improvements in quality, suggesting that improved quality outcomes may be driven by how effectively health professionals actually use EHR systems for improvement.[29, 30] These studies have bolstered efforts to ensure that "meaningful use" leads to better care and not just having EHR systems implemented.

In summary, we examined associations between the adoption of EHR systems and/or key clinical components of these systems by hospitals that disproportionately care for the poor and those that do not. Hospitals serving a higher proportion of poor patients were less likely to have adopted many key electronic functionalities. Our results also indicate that comprehensive or basic EHRs may be helpful in reducing the disparities in quality of care between high- and low- DSH Index hospitals. While the Obama administration and Congress seek to craft policies to effectively spend resources to stimulate health information technology, it will be critical to ensure that those institutions that care for the most vulnerable Americans are not left behind.

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Chapter 3: State Roles in the Advancement of Health Information Technology

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Introduction

State governments play a unique role in the U.S. health care system. They regulate the insurance market within the state, license clinicians and facilities, ensure legal protections for consumers, and act as a purchaser and funder of health care services through Medicaid and other public insurance programs.[1] As a purchaser and funder of health care services, state governments are keenly aware of the increasing costs of health care. The issue of rising costs has come into sharp focus recently as states face the worst fiscal conditions in decades.[2]

State governments reported a collective budget shortfall of $230 billion between 2009 and 2011, forcing more than three-quarters of state governments to enact budget cuts.[3] These fiscal challenges are projected to persist for the next four to five years. Yet, shrinking budgets are also compelling states to consider methods to control health care expenditure growth. Health care costs commonly consume approximately 25 percent of state budgets; Medicaid alone is projected to account for an average of 21 percent of state expenditures in 2010.[4] Increased demand for health safety-net programs, such as state Childrens Health Insurance Programs (SCHIP) and Medicaid, compounded with lower actual revenues among community health centers, are likely to exacerbate expenditures issues.

As states have worked to contain the growth of health care costs, health information technology (HIT) has become a priority on many state policy agendas as a tool to improve quality of care, reduce inefficiencies, and control costs. Nearly all 50 states and the District of Columbia are involved in HIT initiatives.[5]

The American Recovery and Reinvestment Act (ARRA) offers unprecedented resources for the widespread adoption of HIT, many of which are directed toward state governments. As part of the ARRA, hospitals and clinicians who care for a disproportionate share of low-income, non-elderly patients (i.e., pediatric hospitals, critical access hospitals, clinicians practicing in Federally Qualified Health Centers) will be eligible for financial incentives for HIT adoption through their state's Medicaid program. States will be eligible for planning and implementation grants that will, among other things, promote the use of EHRs for quality improvement, identify and promote strategies for HIT adoption in medically underserved communities, and encourage electronic exchange of health information.[6] States may apply for competitive grants to develop loan programs to purchase EHRs, train clinicians, and enhance electronic health information exchanges. Finally, the Office of the National Coordinator for Health Information Technology (ONCHIT) has announced the establishment of the State Health Information Exchange Cooperative Agreement Program to "advance appropriate and secure health information exchange (HIE) across the health care system".[7]

As noted above, prior to the ARRA, many states were actively engaged in efforts to foster widespread adoption of HIT, although the stage of development, scope of work, overseeing agency, and primary funding mechanism vary widely. In this chapter, we review these state level initiatives focused on HIT adoption more broadly. In addition, given the emphasis that ONCHIT has placed on state level health information exchange, we provide an overview of state efforts to encourage HIE at the state and local level.

Overview of State-Level Activity on HIT

Legislative efforts by states have grown rapidly since 2004, when President George W. Bush called for comprehensive adoption of interoperable electronic health records (EHRs) by 2014.[8] Between 2005 and 2008 a total of 168 pieces of HIT-related legislation were passed by state governments.[9] The Health Information Technology Economic and Clinical Health Act (HITECH) of the ARRA, which provides nearly $30 billion to build a national HIT infrastructure, will provide unprecedented opportunities for states to effectively expand HIT efforts through grant, loan, and financial assistance programs (please refer to Chapter 4: *Recent Federal Initiatives in Health Information Technology* for detailed information about ARRA).[10] This infusion of new dollars makes it critical for states to integrate and coordinate their efforts with those of federal and local governments and other public and private organizations to realize the potential of HIT and achieve comprehensive, interoperable expansion. Table 1 reviews current areas of focus for health technology adoption.

Table 1: **HIT Activities at the State Level**

E-Health Category	States Indicating Category as Significant
Electronic HIE development	Alaska, Ark., Ariz., Calif., Colo., Conn., Del., Washington, D.C., Ga., Iowa, Ill., Ky., La., Md., Mich., Nev., Neb., N.H., Ohio, Okla., Ore., Pa., R.I., S.D., Tenn., Texas, Vt., Wash., Wis., W.Va.
Grants, loans and other technical assistance for HIT and local HIEs	Fla., Ga., Ky., Mich., Minn., Wash.
Telehealth	Hawaii, Neb., N.M., Ore., W. Va.
E-prescribing	Ark., Ill., Mass., N.H., Pa., R.I., Ky.,
Replacement information system	N.D.
Electronic medical records (EMRs)	Fla., Hawaii, N.M., Ore., R.I.
Electronic health records (EHRs)	Ark., Washington, D.C., Kan., Minn., Mo.
Patient health records (PHRs)	Ore.
Decision-support tools, chronic disease management and case management	Maine, Mo., Ind., Vt.
Web-based tools for eligibility, program benefits, provider billing, etc.	Ala., Mass., Utah
Quality and transparency activities	Ala., Ark, Calif., Ga., Va.
Registries	Maine , Ohio , Utah
Privacy and security issues	Calif., Conn., La., Md., Okla., Wis.

Source: Commonwealth and National Governor's Association E-Health Survey, 2007.

Although general state HIT approaches range from a regulatory to a market-oriented approach, state HIT legislation typically falls into one of five major categories:

1. Planning and Oversight

2. Advancing Adoption and Implementation

3. Funding

4. Privacy Protection and Security

5. Health Information Exchange (HIE)

In this chapter of our report, we examine these five areas of state focus, providing an overview of the steps that states have taken to advance the use of HIT.

Planning and Oversight

Successful implementation of effective HIT begins with careful planning and oversight. In the following section, we review the roles that many states have taken in promoting HIT adoption and implementation.

Several states have established planning committees. These groups develop a single plan for HIT adoption and implementation, along with the promotion of agreed upon software standards and e-health terminology. These committees or task forces also serve as neutral settings for public, private, and consumer representatives to share insights about different perspectives and experiences. Although planning requires sufficient funding and thoughtful organization, savings may be realized downstream as a result of stronger, more efficient strategic outcomes.[11]

State HIT initiatives are often overseen by one or more of the following state departments or offices:[12]

- State department of health
- Other state department/agency
- Governor's office
- State Medicaid program
- Commissioned state-wide panel, appointed by governor or state legislature
- State department focused on information technology

Specific committee tasks and deliverables are normally defined by legislation and may include the following:[13]

- Establishing an inventory of existing projects
- Detailing future needs and resources
- Devising recommendations for state policy changes to promote HIT
- Developing a statewide roadmap
- Creating sustainable business model recommendations
- Addressing privacy and security concerns

It is important to note that states will face a number of challenges unique to HIT during the planning phase. For example, state infrastructure to support HIT must consider existing users of these technologies and build on existing state laws. Further, older systems often lack the capability to either extend their current use of functionalities or are incompatible with emerging technologies. In addition planning bodies must anticipate issues at varying levels of implementation and forecast technical assistance and educational needs for sustainability. Overcoming these obstacles through careful planning is essential. Finally, state planning committees must be cognizant of the need to maintain open communication with federal representatives to ensure state input is well represented and appropriately considered during the federal policymaking process. Under HITECH, existing adoption plans should be evaluated in the broader context of new federal initiatives.[14]

Advancing Adoption and Implementation

Our previous research demonstrates the overall low levels of HIT adoption nationally among ambulatory physicians and acute-care hospitals.[15, 16] States are ambitiously exploring various strategies and collaborating within and across state lines to encourage best practices for HIT adoption. The National Governors Association Center for Best Practices (NGA) underscores such efforts. In 2007, the center established the State Alliance for eHealth (State Alliance) as a collaborative state-level initiative comprised of elected and appointed representatives to aid the transformation of health care connectivity and address interstate and intrastate implementation challenges. The initiative is organized into several task forces that are focused on examining select issues such as health information protection, health care practice, health information and data exchange, and public programs implementation.[17]

State experiences provide key insights for emerging technologies and national policies, making them a common target for federally funded demonstrations and pilots aimed at testing strategies for HIT implementation. Medicaid, employee health benefit plans, state hospital and psychiatric facilities, prisons, and public health initiatives are all venues for direct participation in state HIT initiatives.

The following state policy levers and incentives can drive adoption by directly influencing standards and establishing legal parameters for future implementation efforts.

Mandates, Executive Orders and Legislation: Legislation serves as a tool for state policy-makers to directly affect action and promote collaboration. State commissions and task forces commonly focus their efforts on developing strategic roadmaps for HIT implementation. Other state initiatives nest HIT and HIE implementation within the broader context for health care reform and quality improvements. Some, such as Massachusetts and Minnesota, mandate state agencies to use Certification Commission for Healthcare Information Technology (CCHIT) certified products in attempts to increase standards-driven integrative systems within their borders. Table 2 highlights enacted legislation from the last two years.[18]

Table 2: **2007 and 2008 Enacted Legislation**

Main Topic	Number of Laws Enacted	States*
Comprehensive	7	6
E-prescribing	14	12
Electronic records	10	8
Financing	46	25
Health information exchange	11	10
Miscellaneous	9	7
Planning/study commissions	18	14
Privacy and security	5	5
Resolutions	12	9
Total	**132**	**45**

Source: National Conference of State Legislatures, August 2008.
*Includes District of Columbia.

Health Organization and Physician Licensure Standards: States may soon begin to tie EHR adoption and specific EHR functionalities to standards for licensure renewals for both hospital and community health centers. In an effort to promote computerized physician order entry, the Massachusetts Department of Public Health will require CCHIT certified CPOE by 2012 and EHRs by 2015. Furthermore, Massachusetts is preparing to include a predetermined physician board licensure requirement for HIT competency.[19]

Training: To realize the full benefits of HIT implementation, states should prioritize efforts to implement robust training programs for clinicians and other technology users. States can ensure the dissemination of technical guidance and education to all participants. The eHealth Initiative suggests several methods for states to engage clinicians and advance HIE involvement such as: hospital outreach, physician practice visits, and outreach through medical societies.[20]

Infrastructure Development: The development of necessary technical infrastructures will directly affect the rate of adoption. Support exists for conducting statewide assessments to determine levels of adoption as a measure to move forward and to gauge progress over time, and some states have supported the development of uniform assessment tools.[21]

State-Level Consensus Projects and Collaborations: There are several state-level projects initiated by stakeholders other than state governments. For example, the State Level HIE Consensus Project began as a contract under ONCHIT to explore venues for dissemination of HIT technologies.[22] The Rural Health Resource Center for Health Information Technology strives to improve rural health care by providing a national knowledge base for HIT implementation focused on rural areas.[23] In 2006, the state of Connecticut launched eHealthConnecticut, a health records network allowing providers to share information electronically. This entity offers HIT and interoperability support for the entire state. Efforts are transparent to secure the trust of all participants.[24]

Incentive Programs: To advance HIT, some states offer medical school loan repayments linked to IT competency for specialties with workforce shortages and provide tax credits and further financial incentives discussed later in the chapter. As part of a workforce loan repayment program, Massachusetts assists medical school loan repayment for practitioners who are willing to work in underserved areas and includes HIT competency as a prerequisite (Massachusetts SB 2863). State Medicaid programs will provide incentive payments for adopters who demonstrate meaningful use of systems starting in 2011 and will invoke penalties for non-adopters in the beginning in 2015 (please refer to Chapter 4 for detailed information). As discussed in Chapter 2, states will have an important role in this incentive structure as hospitals with a low proportion of Medicare patients (i.e., safety-net hospitals, pediatric hospitals) will rely on incentives made available through state Medicaid programs.

Consumer Engagement: In prior reports, we discussed the importance of consumers in efforts to increase HIT adoption.[25] In their role of increasing communication across a varied selection of stakeholders, states may extend discussions to include consumer perspectives. Focus groups have commonly been used as a way to understand consumer perspectives on HIT adoption. State programs have also sought to increase consumer engagement through outreach coordination and partnerships with privacy advocates.[26] In addition, states are being encouraged to directly engage consumers through the promotion of HIT systems such as personal health records (PHRs). Minnesota created a pilot program to provide consumer-owned portable PHRs to members of the state employee plan (Minnesota HB 548) and Oregon identified PHRs as one of their most significant e-health activities.[27]

State Purchasing Power: As promoters of HIT, states can leverage their pooled purchasing power and roles as health care providers to increase adoption. As such, they are able to negotiate price discounts for items which include HIT systems, training resources, and software.[28]

Funding

The development of effective, interoperable HIT infrastructures will require significant investment. Funding is the barrier to HIT adoption and implementation most commonly cited not only by providers and hospitals, but also by state governments hoping to actively promote its use.[29-31] The limited ability of cash-strapped states to provide substantial upfront and ongoing funding emphasizes the need for legislators to explore alternate methods of providing resources outside of state budgets.

To date, the majority of states have not provided direct funds to HIT efforts. For states that did fund HIT initiatives, the amounts greatly varied: from less than $100,000 per year to more than $100 million per year.[32] These funds are typically allocated to providers who are less likely to adopt EHR systems, such as small practices, rural health providers, community health centers, and providers who serve a disproportionate share of poor and minority patients. In the following section we discuss the possible policy funding options that states might use to increase adoption.

Dedicated Funding Streams: Dedicated funding streams may be created by placing a fee on a health care service, such as a claims processing fee, or through dues and bonds. The state may charge a fee to all users of HIT systems or require vendors to pay a tax on sold products.

Appropriations: Stretching state health dollars to fund more long-term HIT efforts may prove difficult. It generally has been noted that state legislators pass one-time appropriations for specific HIT initiatives or projects. Project examples include technical support to community health centers during adoption, the purchase of EHR systems or software updates, or funding planning committee administrative expenses over a specified time frame.[33]

Grants or Loans: Commonly, states will administer grants or loans to promote adoption among targeted providers who encounter additional financial barriers to the purchase and implementation of HIT systems.[34] These providers typically practice in small practices or care for a large proportion of poor or underserved patients, such as community health centers. States may require organizations that receive funds to meet specific requirements or match state funding appropriations. States most frequently provide grants for upfront costs, such as equipment and training.[35]

Provider Reimbursement Incentives: States may choose to provide supplemental reimbursements to providers for HIT related activities, such as participation in health information exchange or meaningful use of EHR systems. In New York, payments have been made to providers with certain electronic records capabilities and defined percentages of Medicaid or uninsured patients.[36]

Tax Credits: States may award tax credits to providers who adopt HIT. Since 2007, Wisconsin has allowed tax credits up to 50 percent of the cost of an electronic medical record (EMR) up to $10 million. (SB 40)

Pay for Performance Initiatives: Policy-makers are increasingly interested in tying financial incentives to performance measures (see Chapter 5 for a discussion of the effect of EHRs on the public reporting of quality data). States may include quality measures specific to HIT tools, such as the use of CPOE to decrease adverse drug events and medication errors, as part of pay-for-performance programs. States may include such provisions in pay-for-performance programs through Medicaid, state health benefit plans, or in state mental hospital or prison systems. Although current incentives do exist through Medicaid, the relatively weak incentives have been unable to promote adoption.[37]

Health IT Funds: Health IT funds are typically appropriated by legislatures. These dedicated funds are intended for the sole purpose of increasing technology adoption. The public funds are often pooled with payments from the private sector (which may be voluntary contributions or required payments, such as claims fees). To ensure effective use of the funds, policy-makers often tie requirements to funding, such as the use of a certified EHR system. Based on their calculations, states can expect to set certain monetary goals which aid adoption, such as among independent small practitioners. For example, Vermont has allocated 100 percent of a health IT fund (established in their department of treasury) for the advancement of HIT and utilization within the state.[38]

Maryland

In August 2009, the state of Maryland approved $10 million in start-up funding for a statewide health information exchange. The funds will be used over two to five years, and come from hospital reimbursement adjustments. The nonprofit Chesapeake Regional Information Systems for our Patients (CRISP) was selected by the Maryland Health Care Commission, which is the state agency responsible for the development and implementation of a statewide HIT, to build the exchange.[39]

Privacy Protection and Security

State legislatures increasingly have played a role in addressing privacy and security concerns both as means to protect consumer and provider information, and to develop trust among participating HIT entities. In addition to protecting sensitive health information and ensuring the secure exchange of data, effective privacy and security laws should reduce variations in standards and protocols among participating entities. Although functions such as audit logs and access controls can arguably create safer electronic health information than paper-based data, there are substantial fears of misuse.[40] All states need to evaluate their legal environment and determine the most appropriate set of actions to address inconsistencies among federal, state, and local privacy laws, and how various stakeholders interpret and apply the laws. Below we review the range of approaches currently being used by state governments to allay these concerns.

Considerations in Structuring Policy for Patient Consent: Fundamental patient security questions are exposed when states consider whether patient consent is required to enter health data into a HIT system. Some states, such as Rhode Island, require patients to opt-in for their data to be included in HIT systems. Others automatically include data for all patients in HIT systems or restrict data entry to specific providers, except under emergency situations.[41]

Consent to Access Data: Patients may be allowed to choose which providers are able to access their data. Most states also include special conditions in which patient data may be accessed by nonselected providers, such as emergency care personnel or public health authorities.

Data Breach Notifications: To manage patient concerns of inappropriate or unauthorized access to personal health information (PHI), states may expand existing data breach notification laws to include medical information. These laws require organizations to promptly notify patients in the event that PHI is compromised.

Redefining Health Care Providers: Innovative new technologies like PHRs are spurring the entrance of novel vendors, such as Google and Microsoft, into the health care industry. States may need to consider expanding the definition of health care providers regulated under HIPAA to include unconventional organizations involved with patient data.

Limitations on Commercial Use of Data: Many states are actively pursuing mechanisms to limit the commercial use of PHI. A general consensus exists regarding the importance of aggregated patient-level data for quality measurement and population health management. As such, emerging concerns of potential abuse by commercial entities and the purchasing of unidentified patient data have been identified.[42]

HIPAA: The electronic transmission of data facilitated by HIE infrastructures may compel states to consider granting HIPAA preemptive authority over more stringent state laws.[43]

Audit: States may require HIT systems to maintain an audit log that tracks the identity of all providers who access the patient's data and/or the date on which the information was accessed. States can grant patients the right to obtain a copy of the audit log at any time.

Penalties: The violation of state privacy and security statutes may evoke civil or criminal penalties. Further, those who inappropriately access or disclose patient health information may be liable for compensatory damages, attorney fees, or disciplinary action by state licensure boards.[44]

Optimal consumer engagement in HIT will require transparent strategies that ensure the protection and security of sensitive PHI while instilling a high degree of confidence. States play a pivotal role in designing an environment that promotes data security, accountability, and confidence while harmonizing inconsistent federal, state, and local laws. Although laws that govern privacy and security may exist for a paper-based system, these laws may need to be retooled for an electronic-based system. States may also need to consider updating and modifying existing statutes to appropriately reflect the changing technological environment in the health care industry, maximize compliance, and accommodate shifting public concerns.

Health Information Security and Privacy Collaboration (HISPC)

In June 2006, ONCHIT awarded RTI International a contract to address security and privacy concerns related to differences in state laws and business policies. The multi-state collaboration, which has grown from 34 to 42 states and territories, aims to promote the exchange of health information by reviewing variations in laws and policies and developing solutions and implementation plans to overcome these barriers.[45]

Massachusetts Security Breach Law

The Massachusetts security breach law is the most stringent legislation in the nation on how personal information is handled across states. Under the law, the attorney general and the Office of Consumer Affairs and Business Regulation must be notified of a security breach or unauthorized use of personal information of Massachusetts residents. The notification must include: "(1) a detailed description of the nature and circumstances of the breach of security or unauthorized acquisition or use of personal information; (2) the number of Massachusetts residents affected as of the time of notification; (3) the steps already taken relative to the incident; (4) any steps intended to be taken relative to the incident subsequent to notification; and (5) information regarding whether law enforcement is investigating the incident."[46]

Health Information Exchange

Prior to 2005, state government involvement in HIE was limited and efforts to create electronic data exchange were primarily focused on stakeholder-led regional health information organizations (RHIOs). As discussed in our 2008 report, many of these organizations were unable to find financially sustainable models and suffered from other issues related to infrastructure capacity and regulatory limitations.[47] However, with EHRs and HIE increasingly identified as critical to health system reform, state governments' interest and involvement in developing sustainable HIE has grown. HIE is recognized as a critical strategy to achieve higher performance, reduce inefficiencies, and improve health outcomes. Health care savings associated with HIE implementation are projected to be substantial: approximately $77.8 billion annually (2003 dollars) after a 10-year implementation period on the national level.[48] Savings are predominately accrued by decreasing redundant tests and reducing the administrative burden of paper-based exchanges that promote substantial wasteful spending.[49]

Several key provisions in the ARRA are focused on catalyzing action among states to plan and build these infrastructures.[50] The majority of funding allocated by the ARRA for the planning, implementation, and oversight of HIE will lie with states, providing states with an unprecedented opportunity to lead HIE efforts.[51]

Current State of HIE

The sixth annual eHealth Initiative's survey to assess the state of HIE found rapidly increasing interest in and progress toward HIE activities at the state level. The report identified 193 HIE initiatives in 2009, of which 57 are operational and exchanging data, in all 50 states and the District of Columbia (Figure 1). Of the 150 HIEs that responded to the survey, 83 initiatives in 43 states reported involvement by one or more state agencies, most commonly the state's department of health.[52]

Champions for HIE advancement within states may consist of the state government itself, the private sector, a state designated independent entity, or a combination of private and public resources. Small states tend to establish one HIE, whereas larger states typically create multiple HIEs to serve their populations. Select states have also collaborated with other states due to geographic proximity or because their citizens are frequent users of health care services in another state.[53]

To date, the majority of efforts at the state-level are focused on: 1) governance to convene and coordinate efforts; and 2) technical operations to develop the necessary infrastructure and support services.

Figure 1: **HIE Initiatives Across the U.S.**

States with Operational HIE Initiatives

Number of Operational Initiatives:
None   One   Two or more

Source: eHealth Initiative 2009 HIE Survey

Governance

Convene Stakeholders: The experiences of the most successful states suggest that a full range of stakeholders must be actively engaged during planning, implementation, and maintenance processes for HIE to have an optimal impact. State governments can serve as a neutral environment for competing organizations to foster shared responsibility, trust, and investment by public and private entities.

Coordinate Efforts With National, Regional and Local Initiatives: In order to avoid duplicative efforts states must allineate current and developing agendas at the national, regional, and local levels to reduce administrative redundancies, optimize coordination between participating entities, and ensure HIE aims are aligned with broader state and federal health goals. States may best do this by designating one entity, whether new or existing, to coordinate HIT initiatives among various stakeholders.

Identify Barriers: Each participating entity will face obstacles to HIE involvement. Leading endeavors to identify and understand barriers, as well as to develop plans to overcome these barriers, is crucial to implementation and long-term sustainability.

Advance Standardization and Interoperability: Several mechanisms exist through which states can promote standardization and interoperability. For example, they may require the purchase of certified systems that meet specific standards criteria.

They may also mandate that EHR systems sold within their borders or used by state agencies include specific functionalities. In future years, states will have the opportunity to adopt federal standards that are currently being developed by the Health Information Technology Standards Committee. (See Chaper 4.)

Manage Privacy and Security Concerns: States have addressed privacy and security legal barriers by creating state privacy and security boards, developing approaches to consent, and managing differing state and federal privacy laws. This is discussed previously in the chapter.

Promote Transparency Through Advocacy and Education: States may advocate for transparent HIE adoption in private and public settings. They may also provide education programs, fund studies or reports that assess the implications of HIE efforts, communicate information to the public, and facilitate consumer involvement.

Technical Operations

Fund HIE Infrastructure: States may fund demonstration or pilot projects, provide grants or loans to providers for the purchase of EHR systems and other software to transmit and receive data, support ongoing training and maintenance expenses, and provide broadband access to participant entities. Since the majority of states have not developed robust exchange infrastructures, these funds will provide the foundation for the sharing and exchange of clinical data.

The states are an ideal resource for advancing HIE as they may play a number of pivotal roles, such as purchaser, regulator, coordinator, and planner. Yet, the wide variety of strategies underscores a lack of information about the best and most appropriate means to advance HIE at the state level. States are seeking increased guidance from the federal government for technical standards for interoperable systems, training and educational resources, implementation and support funding, and recommended models for infrastructure and investment.[54]

Colorado Regional Health Information Organization (CORHIO)

The Colorado Regional Health Information Organization (CORHIO) is a nonprofit organization created in 2007 to lower costs and improve the quality and efficiency of care in the region. The CORHIO provides real-time patient data to providers at participating organizations when a patient presents in the emergency room, including prescription drugs, lab tests, diagnosis, and registration information. It was launched through a contract with the Agency for Healthcare Research and Quality (AHRQ). Additional funds have been provided by: the State of Colorado; the Colorado Health Foundation; the Children's Hospital; Denver Health and Hospital Authority; Kaiser Permanente Colorado; the University of Colorado Hospital; United Healthcare; Rocky Mountain Health Plans; and COPIC Insurance. The diverse partnership of public and private stakeholders, including governments, health plans, providers, consumers, hospitals, nursing homes, pharmacies, and quality experts, and use of national standards and local knowledge has created a robust infrastructure supported by the community.[55]

Challenges

States face a number of substantial challenges to achieving comprehensive adoption of interoperable HIT.

State Finances: States must balance constrained budgets with the potential for HIT to accumulate substantial long-term cost savings. HIT implementation and maintenance expenses are large, savings are not immediately realized, and benefits are difficult to quantify. State governments are experiencing deep fiscal troubles, and growth trends indicate that current rates of state health care spending are unsustainable. Further, states' limited budgets are rarely able to fund long-term operations that provide HIT with a critical financial backbone.

Misaligned Financial Incentives: It is difficult to make the business case and obtain organizational buy-in from an array of stakeholders due to misaligned financial incentives. Providers typically endure the majority of financial burden for HIT systems while payors tend to reap the financial benefits of HIT adoption and use. The most appropriate strategy to balance the costs and benefits among participating stakeholders is currently unclear.

Interoperability: Different vendors and software are frequently incompatible. The dearth of uniform technical standards impedes the flow of clinical and administrative data among various organizations. Further, standards are not consistently applied across all participating entities, or within a given organization.

Stakeholder Engagement: States must employ strategies to obtain trust, buy-in, and participation among a full range of stakeholders with competing interests and market pressures.

Privacy and Security Concerns: Privacy and security concerns are present among both consumers and providers. Consumers fear that their data will be breached and misused. Providers are concerned that they may be liable for the misuse of data, such as treating a patient based on incomplete data. In addition, differing federal and state laws and organizational rules can create confusion and varying interpretations of the law that lead to practice and legal discordance among organizations.

Conclusion

State governors and legislators across the country are increasingly interested in employing HIT as a tool to manage rising state health care expenditures and improve their population's health. As regulators, purchasers, providers, payers, and public health advocates, states are uniquely positioned to promote the adoption and implementation of interoperable HIT. As a result, legislation activity around HIT at the state level has experienced rapid growth. However, states are faced with substantial budgetary challenges in the midst of the economic downturn. The ability for states to balance budget constraints and effectively engage in HIT efforts is unclear. Thus, it will be pivotal for states to maximize the funding opportunities presented by the ARRA and facilitate involvement of both public and private stakeholders. The adoption of HIT systems alone will not ensure the quality and efficiency gains predicted by health care experts and policy-makers. Governors and legislators must carefully consider activities to create robust infrastructures that balance finances, protect and engage consumers, and promote the meaningful use of interoperable systems.

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Chapter 4: Recent Federal Initiatives in Health Information Technology

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Introduction

Over the past five years, federal policy-makers have supported the increased use of health information technology (HIT) through executive orders,[1] regulatory reforms,[2] and legislation in recognition of its potential to decrease costs, improve health outcomes, coordinate care, and improve public health.[3] In April 2004, President Bush called for the widespread adoption of interoperable electronic health records (EHRs) by 2014, and issued an executive order setting in motion the development of technology standards and adoption incentives and requiring federal agencies to develop and execute a strategic plan to guide the nationwide adoption of interoperable HIT in both the public and private sectors.[4] The strategic plan, issued by the administration in 2008, established a four-year implementation timeframe and is structured around two goals: patient-focused health care and population health, each containing four specific objectives: privacy and security, interoperability, adoption, and collaborative governance.[5]

Hundreds of pieces of legislation addressing one or more aspects of health information have been introduced in Congress since President Bush's 2004 announcement, culminating in the February 2009 passage of the American Recovery and Reinvestment Act of 2009 (ARRA).[6] ARRA supports the development, adoption, and upgrade of HIT both structurally and economically by authorizing new federal investments in HIT capability and use in accordance with the development of comprehensive federal standards. The act both incentivizes EHR adoption among physicians and hospitals and establishes a formal policymaking framework to support the development of a nationwide technology infrastructure that will enable the electronic use and accurate exchange of health information.[7]

The American Recovery and Reinvestment Act of 2009

One of the most comprehensive pieces of economic legislation ever enacted, ARRA provides hundreds of billions of dollars in heath care spending, including more than $49 billion in discretionary appropriations and mandatory spending to support and promote the adoption of HIT generally and EHRs in particular.[8] In addition, the legislation makes comprehensive reforms in health law and policy, particularly in the areas of health information privacy law and laws governing provider payment under Medicare and Medicaid.[9] To create a national policy basis for HIT, ARRA authorizes the Health Information Technology for Economic and Clinical Health (HITECH) Act,[10] which creates the Office of the National Coordinator for Health Information Technology (ONCHIT) and provides for its support through the ongoing appropriations process. Prior to HITECH, ONCHIT existed as a result of a 2004 executive order; under ARRA, the national coordinator is empowered to engage in administration-wide direction of federal investments in HIT.[11]

HITECH contains four key elements: HIT infrastructure and new program development; a federal policy and standards framework; Medicare and Medicaid payment incentives; and privacy reforms.

Health IT Infrastructure and New Program Development

ARRA appropriates $2 billion to support a series of grants, loans, and technical assistance programs designed to aid providers with the adoption of EHRs and to encourage health information exchange (HIE) at the state, regional, and local levels.[12] One particular provision creates a national HIT Research Center and Regional Extension Centers to assist providers in adopting, implementing, and using EHRs. The goal of the extension centers is to provide assistance and education to all providers in a region, but assistance will be prioritized first to public, nonprofit and critical access hospitals; federally qualified health centers (FQHCs); rural or other providers that serve uninsured, underinsured or medically underserved patients; and individual or small group practices. They are thereby likely to be extremely important to small and rural health care providers, who often require more assistance than providers in large practices to implement and use EHR systems successfully.[13]

The U.S. Department of Health and Human Services (HHS) has significant discretion in allocating the funding among various programs. As required by the law, ONCHIT submitted an initial operating plan outlining immediate actions for meeting the act's statutory requirements to Congress in May 2009 (Figure 1).[14]

Figure 1: **ONCHIT Operating Plan Highlights**

Outlines immediate plans to meet statutory requirements under HITECH aimed at improving the health of Americans and the performance of the nation's health system, through investment in HIT.	
Funding	**$2 billion**
Privacy and security	$24.3 million*
NIST	$20.0 million
Regional HIT exchange	$300.0 million
Unspecified	$1655.7 million
Goals	
Inform health care professionals	
Improve population health	

* Included an estimated $9.5 million for audits by the Office of Civil Rights, CMS, and is subject to change.

Continued

Figure 1: **ONCHIT Operating Plan Highlights, Cont.**

Major Activities of the Plan Include:	
Privacy and Security Spend Plan. The Department of Health and Human Services (HHS) is to fulfill HITECH regulatory and enforcement requirements, which enhance enforcement of the Health Insurance Portability and Accountability Act (HIPAA) Privacy and Security Rules and add new requirements of covered entities and business associates. The HHS' duties include providing contract assistance, issuing regulations and guidance, conducting studies, submitting Congressional reports, and issuing guidance on safe harbor provided by the statute's notification of breach provision. Milestones include issuing regulations that:	
• HIPAA Enforcement Rule	Revise penalty structure (February 18, 2010)
	Implement provisions for sharing civil monetary penalties or settlements with harmed individuals (February 18, 2012)
	Implement willful neglect provisions (August 18, 2010)
• HIPAA Security Rule	Extend certain provisions to business associates (February 18, 2010)
• HIPAA Privacy Rule	Extend certain provisions to business associates (February 18, 2010)
	Modify provisions concerning the right to request restrictions on disclosure; interpretation of "minimum necessary" requirement; and access to electronic health records (EHRs) (February 18, 2010)
	Modify provisions concerning marketing and fundraising (February 18, 2010)
	Modify accounting of disclosures provisions (June 18, 2010)
	Modify to generally prohibit payment for personal health information (PHI) without individual authorization (August 18, 2010)
• Other HHS Duties Include:	Issuing interim requirements for breach notification for covered entities and business associates
	Issuing regulations to clarify that certain entities are business associates
	Issuing guidance on the HIPAA Privacy Rule's requirements for de-identification
	Reporting to Congress on "breaches for which notice was provided to the Secretary" and HIPAA Privacy and Security Compliance.
National Institute of Standards and Technology (NIST):	
Providing funding for continued work on advancing health care information integration through activities such as technical standards analysis and establishment of conformance testing infrastructure.	
Standards Rulemaking:	
HHS to adopt and publish an initial set of standards, implementation specifications, and certification criteria. (Published in Federal Register by December 31, 2009.)	
Update Federal HIT Strategic Plan (Publish by December 31, 2009)	
Define "Meaningful Use" of an EHR	
Recovery Act Public Communications:	
Establish mechanisms for communications with the public, which would include creating a Web site like *healthreform.gov*.	
ONCHIT is charged with revising and developing additional performance measures that support the programs funded with ARRA dollars. Measures are to be tied to goals and objectives of the Federal Health IT Strategic Plan.	

Federal Policy and Standards Framework

ARRA creates a new federal HIT policy and standards framework, with ONCHIT at its center. The law empowers the national coordinator to lead strategic planning, oversee the development of technology standards and policy (although it is the HHS Office for Civil Rights that will have immediate responsibility for privacy reforms, in keeping with its current privacy law oversight powers), and establish the governance system and standards that will undergird national infrastructure oversight. ONCHIT and the secretary of HHS have broad authority under the law to tie federal dollars to specific policies and standards developed to promote the broad policy objective of designing, building, operating and governing a nationwide health information structure.

As discussed in Chapter 5 of this report, many issues are left open, however, including which standards and technologies will be specified, and the specific governance structure, administrative requirements, and contractual rules that will be developed to oversee the nationwide health information infrastructure.[15]

Advisory Committees

ARRA establishes two federal advisory committees to advise the national coordinator. As shown in Figure 2, the HIT Policy Committee is charged with making recommendations regarding the implementation of a nationwide HIT infrastructure, including implementation of the federal strategic plan. In addition, the Policy Committee's duties include making recommendations in areas such as technologies that protect the privacy and security of health information; the steps necessary to ensure utilization of electronic health information to improve the quality of health care; and technologies and design features that address the needs of children and other vulnerable populations. The Policy Committee will also recommend an order of priority for the development, harmonization and recognition of standards, implementation specifications and certification criteria for the electronic exchange and use of health information.[16]

Figure 2: **HIT Policy and Standards Committees**

HIT Standards Committee is charged with making recommendations to the National Coordinator on standards, implementation specifications, and certification criteria for the electronic exchange and use of health information.

- Develop, harmonize or recognize standards, implementation specifications and certification criteria, consistent with the latest recommendations made by the HIT Policy Committee.

- Provide for the pilot testing of standards and implementation specifications by NIST.

- Assure consistency with existing standards.

- Serve as a forum to bring broad groups of stakeholders together.

- Establish a schedule for assessment of recommendations of HIT Policy Committee, not later than 90 days after enactment and update schedule annually.

- Conduct public hearings and solicit public input.

- Consider recommendations and comments from the National Committee on Vital and Health Statistics (NCVHS) in the development of standards.

Source: ARRA § 13101 (adding new Title XXX section 3003 to the Public Health Service Act [42 U.S.C. § 201 et seq.]), 42 U.S.C.A. § 300jj-13 (West, Westlaw through August 2009).

Continued

Figure 2: **HIT Policy and Standards Committees, Cont.**

HIT Policy Committee is charged with making policy recommendations to the National Coordinator on a policy framework for the development and implementation of a nationwide health information technology infrastructure, including implementation of the strategic plan. The committee will recommend areas in which standards, implementation specifications, and certification criteria are needed for the electronic exchange and use of health information and will also recommend an order of priority for the development, harmonization, and recognition of such standards. The standards and implementation specifications shall include named standards, architectures, and software schemes for the authentication and security of individually identifiable health information and other information as needed to ensure the reproducible development of common solutions across disparate entities.

Required Recommendations:

- Privacy and security technology including technology for the segmentation and protection from disclosure of specific and sensitive individually identifiable health information.

- A nationwide technology infrastructure that allows for electronic use and accurate exchange of health information.

- Technologies that allow individually identifiable health information to be rendered unusable, unreadable, or indecipherable to unauthorized individuals.

- Use of EHRs by all Americans by 2014.

- Technologies that can account for disclosures by covered entities under HIPAA for purposes of treatment, payment and health care operations.

- The use of certified EHRs to improve the quality of care through coordination, continuity, reduction of medical errors, improving population health, reducing population disparities, reducing chronic disease, and advancing research and education.

- Use of electronic systems to ensure the comprehensive collection of patient demographic data, including, at a minimum, race, ethnicity, primary language and gender information.

- Technologies that address the needs of children and other vulnerable populations.

Other Areas for Recommendations:

- The appropriate uses of a nationwide health information infrastructure, for the purposes of collection of quality data and public reporting, public health and biosurveillance, medical and clinical research, and drug safety. Various specialized technologies, including telemedicine, self service, home health care, medical error reduction, care continuity, meeting the needs of diverse populations, and any other technology that the HIT Policy Committee finds to be among the technologies with the greatest potential to improve the quality and efficiency of health care.

- Methods to facilitate secure access by an individual to the individual's PHI.

- Methods, guidelines, and safeguards to facilitate secure access to patient information by a family member, caregiver or guardian acting on behalf of the patient.

Source: ARRA § 13101 (adding new Title XXX § 3002 to the Public Health Service Act [42 U.S.C. § 201 et seq.]), 42 U.S.C.A. § 300jj-12 (West, Westlaw through August 2009).

Whereas the HIT Policy Committee will set priorities for standards development, the HIT Standards Committee will recommend which standards are to be adopted, consistent with the strategic plan and the Policy Committee's recommendations.[17] An initial set of standards must be adopted by the secretary by December 31, 2009.[18] While adoption of the standards by private entities is entirely voluntary, federal agencies that contract with health care providers, health plans, and health insurance issuers must require contractors to use compliant HIT systems and products where available as they implement, acquire, or upgrade HIT systems and products.[19]

Medicare and Medicaid Payment Incentives

ARRA employs both "carrots and sticks" to encourage the adoption and use of HIT. It authorizes the Centers for Medicare and Medicaid Services (CMS) to provide monetary incentives to qualified health care providers under Medicare and Medicaid to encourage the purchase and use of EHRs, and threatens financial penalties in the form of reduced Medicare payments for nonadopters. Incentive payments are conditioned on the ability of adopters to demonstrate "meaningful use" of EHRs, defined by the statute (subject to further regulation) in regard to Medicare payments as: (1) use of certified EHR technology in a demonstrably meaningful manner, including e-prescribing; (2) use of certified EHR technology that allows for the electronic exchange of health information to improve the quality of health care, such as promoting care coordination; and (3) reporting on clinical quality and other measures selected by the secretary using certified EHR technology.[20] The act specifically requires the secretary to seek to improve the use of EHRs and to improve health care quality over time by requiring more stringent measures of meaningful use.[21] ARRA gives state Medicaid agencies flexibility to develop a definition of meaningful use that may differ from that used by Medicare. All state definitions must be approved by the secretary of HHS, must address populations in the state with unique needs, such as children, and must be compatible with state or federal administration management systems.[22]

The ability of providers to benefit from either proposed incentive program depends heavily on the creation of viable HIE networks at the state, regional, and local levels, as meaningful use of an EHR depends in part on the exchange of information across different health care providers. The incentive systems therefore rely not only on the government's development of the definition of meaningful use, but also on state action to facilitate health information exchange. HHS has stated that it will publish a proposed rule on the definition of meaningful use in late 2009. Both the HIT Policy Committee and the HIT Standards Committee have provided recommendations to help CMS develop the initial criteria for meaningful use and assist in planning for any expansion of the criteria for the incentives programs in the future.[23] Please see Chapter 5 of this report for further discussion of this issue.

Medicare

ARRA's Medicare incentive payments are targeted at physicians practicing in fee-for-service settings, hospitals, and, in certain cases, Medicare Advantage (MA) organizations. Physicians are eligible for the incentive payments without regard to their Medicare patient load, except in the case of those practicing in MA organizations. As shown in Table 3, beginning in 2011, physicians who can demonstrate meaningful use of a certified EHR can receive bonus Medicare payments for up to five years. The payment is equal to an additional 75 percent of the physician's allowable Medicare charges for the given year, subject to caps.[24] Physicians who predominately serve beneficiaries in health professional shortage areas (HPSAs) are eligible for 10 percent higher payment caps.[25] Beginning in 2015, physicians who are not meaningful users of EHRs will be penalized in the form of reduced Medicare fees at the rate of 1 percent per year. The secretary retains authority to reduce Medicare payments by a total of 5 percent if fewer than 75 percent of providers are meaningful EHR users by 2018.[26]

A similar incentive system is established for eligible acute care and critical access hospitals, with payments beginning in 2011 and phasing down by 25 percent a year over four years. Reduced incentive payments are available for hospitals that become meaningful users in 2013 or 2014, but unavailable for new adopters after 2015. Beginning in 2015, hospitals face penalties for non-adoption in the form of reduced reimbursements.[27]

Table 3: **Medicare Incentive Payments for Adoption and Meaningful Use of Certified EHR**

Adoption Year	First Payment Year Amount, and Subsequent Payment Amounts in Following Years (in thousands of dollars)	Reduction in Fee Schedule for Non-Adoption/Use
2011	$18, $12, $8, $4, $2	$0
2012	$18, $12, $8, $4, $2	$0
2013	$15, $12, $8, $4	$0
2014	$12, $8, $4	$0
2015	$0	-1% of Medicare fee schedule
2016	$0	-2% of Medicare fee schedule
2017 and following	$0	-3% of Medicare fee schedule

Incentive: Eligible providers may receive up to 75% of allowable Medicare Part B charges, to a maximum of $18,000 over a five-year period, ending in 2016.
- Physicians practicing in rural health professional shortage areas are eligible to receive a 10% increase on the incentive payment amounts described above.

- For 2018 and each subsequent year, if the proportion of eligible professionals who are meaningful EHR users is less than 75%, the reduction in fee schedule will be lowered by 1% from the applicable percent in the preceding year, up to 5%.

- Eligible acute care and critical access hospitals have a similar incentive plan beginning in 2011 and phasing down over four years, available to new adopters only through 2015. Penalties for non-adoption begin in 2016. The incentive payment is calculated based on the product of: (1) an initial amount of $2 million plus an amount based on the number of discharges for each eligible hospital; (2) an adjustment variable reflecting the proportion of the hospital's inpatient-bed days attributable to Medicare beneficiaries and an adjustment for charity and uncompensated care; and (3) a transition factor which phases down the incentive payments by 25% per year over the four-year period (i.e., one for the first payment year, ¾ for the second payment year, ½ for the third payment year, ¼ for the fourth payment year, and zero thereafter).

- Qualifying critical access hospitals can apply for cost-based reimbursement for EHR technology capped at 101% of reasonable costs. In addition, 20 percentage points are added to the Medicare share portion of the incentive formula, provided that the Medicare share calculation does not exceed 100%. Instead of the annual or periodic payments in place for other hospitals, critical access hospitals may expense the costs in a single payment year. These hospitals can continue to receive cost-plus reimbursement for remaining costs, such as ongoing maintenance of the EHR systems.

Eligible Physicians: Non-hospital based physicians. Medicare Advantage-affiliated professionals are eligible if affiliated with organizations that furnish at least 80% of their services to MA enrollees; and furnish, on average, at least 20 hours per week of patient care services.
- Physicians cannot take advantage of the incentive payment programs under both the Medicare and Medicaid programs.

Source: American Medical Association at *www.ama-assn.org/ama1/pub/upload/mm/399/arra-hit-provisions.pdf*; CMS; ARRA Title IV Subtitle B § 4102 (a) (adding new section 1886 (n)(2) to the Social Security Act).

Medicaid

ARRA gives a dramatic and explicit boost to state funding efforts for HIT under Medicaid. The law provides for a 100 percent federal contribution to enable EHR adoption by several classes of Medicaid providers[28] who serve a high volume of Medicaid patients, and, in the case of Federally Qualified Health Centers (FQHC) and rural health clinics, "needy" patients. Eligible providers must agree to waive any right to Medicare HIT incentive payments.[29]

The Medicaid incentive program makes financing available for implementation or technology upgrades to providers who might not have funds of their own to invest.[30] Following an initial start-up payment, subsequent payments are conditioned on meaningful use of the EHR technology as defined by each individual state. While the secretary of HHS is obligated to implement the Medicare HIT incentives set by ARRA, Medicaid implementation is an optional state undertaking.

As shown in Table 4, in order to qualify for the Medicaid incentive payments, a provider's patient load must be at least 30 percent Medicaid; providers practicing "predominately" in rural health clinic or FQHC settings are accorded broader eligibility criteria that allow payment if at least 30 percent of their patient volume

Table 4: **Medicaid Incentive Payments for Adoption and Meaningful Use of Certified EHR**
(in thousands of dollars)

Adoption Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
2011	$21.5	$8.5	$8.5	$8.5	$8.5	$8.5	$0	$0	$0	$0	$0	$63,750
2012		$21.5	$8.5	$8.5	$8.5	$8.5	$8.5	$0	$0	$0	$0	$63,750
2013			$21.5	$8.5	$8.5	$8.5	$8.5	$8.5	$0	$0	$0	$63,750
2014				$21.5	$8.5	$8.5	$8.5	$8.5	$8.5	$0	$0	$63,750
2015					$21.5	$8.5	$8.5	$8.5	$8.5	$8.5	$0	$63,750
2016						$21.5	$8.5	$8.5	$8.5	$8.5	$8.5	$63,750

Incentive: Eligible professionals may receive up to 85% of the net average allowable costs for certified EHR technology, including support and training (determined on the basis of studies that the secretary will undertake), up to a maximum level of $25,000 for the first year and $10,000 for each subsequent year, over a six-year period.
- After the initial start-up payment, subsequent payments are conditioned on "meaningful use" of EHR.

- Non-hospital based pediatricians with at least 20% patient volume attributable to Medicaid can receive a reduced incentive payment per year, totalling up to $42,500 over a six-year period.

- Other non-hospital based physicians with at least 30% patient volume attributable to Medicaid, and eligible professionals who practice predominantly in a FQHC or RHC and have at least 30% patient volume attributable to needy individuals (including Medicaid, SCHIP, those paying on sliding scale basis, uncompensated care), could receive up to $63,750 over a six-year period.

- Acute care and hospitals with at least 10% patient volume attributable to Medicaid would also be eligible for payments, as would children's hospitals of any Medicaid patient volume.

Eligible Providers: Physicians, dentists, certified nurse-midwives, nurse practitioners and physician assistants who are practicing in Federally Qualified Health Centers (FQHCs) or Rural Health Clinics (RHCs) led by a physician assistant.
- Physicians cannot take advantage of the incentive payment programs under both the Medicare and Medicaid programs.

Source: CMS; ARRA Title IV Subtitle B § 4201(a) (amending Section 1903 of the Social Security Act, 42 U.S.C.A. § 1396b.)

are "needy individuals," (which includes Medicaid, State Children's Health Insurance Program [SCHIP]) beneficiaries, and those receiving uncompensated care or paying on a sliding scale basis).[31] Pediatricians can qualify for a reduced incentive payment if 20 percent of their patients are Medicaid beneficiaries.[32]

As with the Medicare incentive program, Medicaid incentives begin in 2011 and are provided on a phased-down basis. Eligible providers may receive up to 85 percent of net average allowable costs, up to a maximum level of $25,000 for the first year and $10,000 for each subsequent year. An initial payment to cover the cost of purchasing or upgrading certified technology including training and other support services can therefore equal up to $21,250. Eligible providers may then receive up to $8,500 per year for five years for operation and maintenance, as long as they continue to demonstrate meaningful use.[33] Providers receiving payments must cover any additional costs incurred in setting up and maintaining their HIT systems. Acute care hospitals with more than 10 percent of their patients on Medicaid and children's hospitals of any Medicaid patient volume can receive incentive payments for the purchase of EHR technology up to the amount allowed under the Medicare incentive program for hospitals.[34] Providers who adopt EHRs after 2016 will not be eligible for incentive payments.

Non-hospital physicians (including pediatricians) are therefore eligible to receive up to $63,750 if they have at least 30 percent Medicaid patient volume under the program. An alternative payment schedule and patient-mix criteria is provided for office-based pediatricians who have at least 20 percent Medicaid patient volume, who may receive up to $42,500. The choice for physicians between the two incentive programs is significant: for early adopters, potential Medicaid incentive payments could be significantly higher than under the Medicare program.[35]

As estimated by researchers at the George Washington University, about 15 percent of all office-based physicians in the nation would qualify for the Medicaid incentive payments, including nearly 99 percent of FQHC physicians. If all qualifying physicians apply for the Medicaid incentives and receive the maximum level of payments, the federal government could invest more than $2.8 billion in HIT through Medicaid, making significant strides toward reaching the HHS strategic plan's goal of 40 percent physician adoption by 2012.[36]

Privacy Reforms

Although national opinion surveys have shown that overwhelming numbers of consumers want their doctors to be able to access all of their health information in order to provide the best care, concern about health information privacy is widespread. This unease is particularly evident with regard to information in electronic form, due to the volume of information available about specific patients, perceived ease of access to electronic data, and its potential for harm.[37] In response to these concerns, and in recognition of the fact that protecting individuals' health information is necessary in order to build public trust in electronic health information systems,[38] Congress crafted ARRA to significantly revise health information privacy and security law, particularly the Health Insurance Portability and Accountability Act (HIPAA). As shown in Table 5, the statute broadens the reach under HIPAA and strengthens its privacy and security standards, in addition to adding new provisions related to enforcement and entities not covered by HIPAA.

Expanded Patient Rights

The effort to encourage individuals to participate more actively in managing their own health care, including through the use of consumer-facing technologies such as personal health records (PHRs), will only be successful if individuals can easily and promptly obtain electronic access to their health records.[39] ARRA supports this need by specifying that when a HIPAA covered entity[40] uses an EHR containing an individual's personal health information (PHI),[41] he or she has a right to a copy of the record in an electronic format and to have the record sent directly to another person.[42] In addition, ARRA gives individuals the right to request that providers restrict the disclosure of their PHI to health plans for the purpose of carrying out payment or health care operations. Under HIPAA, choosing to honor such a request was voluntary; compliance is now mandatory if the PHI pertains to a health care item or treatment for which the patient paid out-of-pocket in full and if disclosure is not otherwise required by law.[43] The provision does not apply to disclosures for treatment purposes or to de-identified information.

Table 5: **Privacy Reform**

ARRA maintains and strengthens the privacy and security provisions of HIPAA. Provisions are effective February 17, 2010. Highlights include:
• Individuals have the right to a copy of their electronic health record (EHR) in electronic format and to have the record sent directly to another person when a HIPAA covered entity[1] uses an EHR containing protected health information (PHI).
• Individuals may request providers to restrict disclosure of their PHI for payment or for health care operations if the PHI pertains to a health care item or treatment which the individual has paid for, in full, out-of-pocket. Compliance is mandatory unless the disclosure is otherwise required by law.
• Individuals have the right to receive an accounting of disclosures of health information through an EHR for disclosures made for treatment, payment, and health care operations for a period of three years prior to the request.[2]
• Covered entities must notify individuals whose unsecured PHI has been disclosed as a result of a privacy or security breach. The provision is not limited to breaches of the security of online information.
• Covered entities will be deemed in compliance with HIPAA when they limit the PHI used, disclosed, or requested to a "limited data set." If needed by the covered entity, the "minimum necessary" amount of PHI may be used. The secretary of HHS is required to issue guidance on the minimum necessary standard, as well as HIPAA's requirements for the de-identification of PHI.
• The sale of patient information by a covered entity or business associate without the patient's consent is generally prohibited.
• The use of PHI for marketing purposes without the individual's authorization is generally prohibited. Prohibition includes communications paid for directly or indirectly by an outside entity, unless the communication refers to drugs or biologics currently prescribed for the patient.
• Applies HIPAA's privacy and security requirements directly to business associates.[1]
• Expands the definition of business associate to include certain entities not currently covered by HIPAA, including health information exchanges, regional health information organizations, and other organizations that transmit PHI to a covered entity or its business associate and require routine access to PHI.
• Subjects business associates to the same civil and criminal penalties as covered entities.
• Increases civil monetary penalties for HIPAA violations and adds new enforcement approaches. Requires HHS, in consultation with the Federal Trade Commission, to conduct and submit a report to Congress on recommended privacy and security.
• Requires HHS, in consultation with the Federal Trade Commission, to conduct and submit a report to Congress on recommended privacy and security requirements for entities not currently covered under HIPAA.

Source: AMA, CMS

Finally, under current HIPAA regulations, covered entities are required to provide an accounting of certain disclosures of PHI at an individual's request, but they do not need to account for disclosures related to treatment, payment or health care operations.[44] ARRA expands individuals' rights in this regard to include all disclosures made for treatment, payment and health care operations made through an EHR during the three-year period prior to the request.[45]

Increased Duties for Business Associates and Other Entities

Until the passage of ARRA, business associates of covered entities were not directly subject to the detailed requirements of the privacy and security rules established under HIPAA. Instead, business associates could only be held accountable to the covered entities with which they contracted for complying with the contract terms and any applicable HIPAA rules.[46] In the event of a breach, the business associate would face only a contract claim by the covered entity, and unless the covered entity sustained economic damages from the breach there would be little incentive to bring such a claim. Business associate contracts therefore have been viewed by critics as an ineffective way of protecting health information, particularly in the hands of large aggregators such as health information exchanges, which typically are the business associates of covered entities that participate in the exchange. The act addresses this issue and also imposes new requirements on vendors of PHRs and other non-HIPAA entities.

Under ARRA, business associates will now be required to comply directly with most provisions of the HIPAA Security Rule.[47] The act does not apply the full range of HIPAA privacy standards to business associates, but does prohibit business associates from disclosing PHI outside of the terms of a HIPAA business associate contract.[48] The privacy and security requirements created by ARRA itself will apply to business associates, and business associates will now be subject to the same civil and criminal penalties applicable to covered entities under HIPAA.[49]

In addition, gaps in HIPAA coverage of a number of innovative electronic health information tools have been perceived as possible obstacles to promoting the widespread use of HIE because the public may not trust that their information will be protected in the absence of applicable minimum privacy standards.[50] ARRA therefore clarifies that health information exchanges and other organizations that transmit PHI to a covered entity (or its business associate) and require routine access to PHI are business associates and must enter into business associate contracts with the covered entity.[51] The same applies to vendors that contract with a covered entity to allow the covered entity to offer a PHR to patients as part of an EHR.[52] Finally, ARRA requires the secretary of HHS to conduct a study and submit a report to Congress on recommended privacy and security requirements for entities that are not currently covered under the law, which could be interpreted to include consumer-facing health IT tools now being created by internet companies such as Microsoft, Google and WebMD.[53]

Privacy and Security Breach Notices

Although a number of states have enacted laws requiring businesses to notify consumers of breaches of the security of their personal information in electronic databases, HIPAA has no strict notification requirement. ARRA establishes the first national data security breach notification law by requiring covered entities to

notify individuals whose unsecured PHI has been disclosed as a result of a privacy or security breach.[54] In certain cases, the covered entity must also notify the secretary of HHS and the general public. If a breach is discovered by a business associate, it is required to notify the covered entity, including the identification of each individual who is reasonably believed to have been affected. Unlike many state notification laws, the new federal law is not limited to breaches of the security of online information or restricted to financially sensitive information, such as social security numbers. ARRA does not preempt state requirements that are more restrictive and does not apply to certain unintentional disclosures of protected health information.[55]

The statute also applies similar breach notification requirements to vendors of PHRs, as well as businesses that offer products or services through the website of a PHR vendor or a covered entity that offers PHRs, and entities that access information in or send information to a PHR.[56] As required by the statute, the government issued rules implementing the breach notification requirements for both covered and noncovered entities, as well as guidance describing a safe harbor from the requirements, in August 2009.[57]

Restrictions on Marketing, Fundraising and the Sale of PHI

Although HIPAA addresses the use of PHI for marketing purposes, consumers have continued to express serious privacy concerns regarding the topic.[58] ARRA addresses these concerns by clarifying that patient consent is required for marketing communications (i.e., communications by a covered entity or business associate that encourage patients to purchase or use a product or service) subject to certain exceptions. In addition, the statute revises HIPAA to address a perceived "loophole" that allowed third parties to pay covered entities to send targeted marketing communications that the entities could not send themselves without individual authorization. ARRA now requires prior authorization for an individual's PHI to be used to make communications that are paid for (directly or indirectly) by an outside entity. Such communications are acceptable in the absence of patient consent only when they describe a drug or biologic that is currently prescribed for the patient and as long any payment received by the covered entity in exchange for making the communication is reasonable. In addition, ARRA allows providers to engage in fundraising activities using a patient's PHI as long as they provide an opportunity for the patient to opt out of future solicitations.[59]

Finally, except in the area of marketing, HIPAA does not prohibit a covered entity from being paid for PHI as long as the disclosure is otherwise permitted.[60] ARRA changes this standard by generally prohibiting a covered entity or business associate from selling patients' PHI without specific authorization with certain exceptions that include payment for treatment, public health activities, research, or other activities as specified by the secretary.[61]

Limited Datasets and De-Identified Data

In order to offer stronger protection to PHI in health information exchange, advocates have called for the increased use of data stripped of patient identifiers instead of fully identifiable information where it is possible to do so and still accomplish the purpose for which the data was legitimately accessed.[62] ARRA

addresses this idea by specifying that covered entities will be deemed in compliance with HIPAA when they limit the PHI used, disclosed, or requested to a "limited data set"[63] (a dataset defined by the HIPAA Privacy Rule that is stripped of a number of categories of patient identifying information and can be used pursuant to a data use agreement for research, public health and health care operations purposes).[64] Limited datasets provide a clear outline of what information can be used or disclosed by a covered entity in situations not involving direct treatment or payment. If needed by the covered entity, the "minimum necessary" amount of PHI needed to accomplish the intended purpose may be used. Covered entities and business associates will have discretion to decide what constitutes "minimum necessary," and de-identified information is exempt from the disclosure limits.[65]

In addition, the act addresses the confusion expressed by some covered entities regarding how to apply the minimum necessary standard. The act requires the secretary to issue guidance about the standard. The secretary must take into consideration that "minimum necessary" should encompass the information necessary to improve patient outcomes and to detect, prevent, and manage chronic disease.[66] The secretary is also required to develop guidance on how best to implement requirements under HIPAA for the de-identification of PHI.[67]

Improved Enforcement

Finally, in response to criticism that the HIPAA rules have not been adequately enforced, ARRA strengthens HIPAA privacy enforcement by including new enforcement approaches; tiered penalties based upon the nature and extent of a violation and the harm caused; and the empowerment of state attorneys general to bring civil suits in federal court to recover damages on behalf of states' citizens. Increased penalties for violations of HIPAA are effective immediately, while penalties for violations of provisions cited under ARRA will be effective in 2011.[68]

Challenges

ARRA has fundamentally changed the landscape of federal HIT law and policy. Many of the law's provisions will take effect in February 2010, although the HIPAA penalty provisions were effective immediately upon the bill's passage. Provisions that require implementing regulations could take two years or longer to take effect.[69]

While HHS has begun the process of issuing rules and guidance for ARRA HIT provisions, major implementation challenges remain. If physicians and hospitals will benefit from the most generous Medicare and Medicaid incentive payments, the programs' infrastructure should be in place well before 2011. As National Coordinator David Blumenthal has noted, however, "[it] takes time to develop and implement innovative federal programs, and it will take even more time to create the local institutions needed to support HIT implementation."[70]

The federal government also must define two critical terms in order to support the incentive programs: "certified EHR" and "meaningful use." As discussed above, the HIT Policy and Standards Committees have made recommendations for the initial criteria for meaningful use and HHS is scheduled to publish the rule at the end of 2009.[71] (Please see Chapter 5 of this report for further discussion.) The balance that the government must strike in defining the term

is precarious: "meaningful use" could be an important tool for motivating practitioners to take full advantage of EHRs, but if the requirements are too high, the definition itself could become a barrier to HIT adoption.[72] In addition, any program of certification of EHR systems must take the meaningful use standards into consideration to ensure that certified systems will enable providers to meet the standards and qualify for federal subsidies.

Since 2005, ONCHIT has contracted with a private organization, the Certification Commission for Health Information Technology (CCHIT), to certify EHRs as having the basic capabilities the federal government needs.[73] Many of the EHRs certified thus far are difficult to use, however, and are not designed to meet goals defined by ARRA for improving quality and efficiency in the health care system. Not only must the standards developed by ONCHIT for a "certified EHR" be designed to meet those goals, but physicians and hospitals also will have to use them effectively in order to do so.[74] The HIT Standards Committee made recommendations regarding certification standards in August 2009;[75] ONCHIT is expected to issue a final rule by the end of the year.[76]

Although the development and certification of individual EHR systems is essential to HIT adoption, meeting the broad policy objective of designing, building, operating and governing a nationwide health information structure under ARRA depends on a variety of other system-wide innovations that promote interoperability and communication among providers in diverse settings. Physician adoption incentives are only part of the health care system investments needed to achieve quality and efficiency improvements.[77] As discussed above, the ability of providers to benefit from Medicare and Medicaid incentive programs set forth by ARRA depends on states ensuring that the necessary infrastructure is in place to allow providers to participate in HIE. Moreover, the statute's explicit focus on providers with heavy Medicaid case loads and requirement that EHRs link to health information exchange networks gives state governments an important role in determining how HIE will serve the needs of safety-net providers and the patients they serve.

Conclusion

HIT provisions under the auspices of ARRA reflect a shared conviction among the administration, Congress and many health care experts that electronic information exchange is essential to improving health and health care. HIT, however, is not an end in itself, but a means of improving the quality of health care, the health of populations, and the efficiency of health care systems. As noted by David Blumenthal, it will be tempting for us to measure HITECH's success in terms of the numbers of computers or EHRs installed in physicians' offices and hospitals.[78] Instead, our goal is to use the tools provided by ARRA to help facilitate a major transformation in American health care made possible through the creation of a secure, interoperable nationwide health information network.[79]

Endnotes

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8. United States Department of Health and Human Services. American Recovery and Reinvestment Act of 2009¸ Implementation Plans, May 2009. Available at *www.hhs.gov/recovery/reports/plans/hhs_implementation_plans.pdf*. Accessed on September 5, 2009.

9. Rosenbaum S et al.

10. The HIT provisions of the act are located primarily in Title XIII, Division A, Health Information Technology, and in Title IV of Division B, Medicare and Medicaid Health Information Technology. These titles together are cited as the Health Information Technology for Economic and Clinical Health (HITECH) Act.

11. ARRA § 13101, adding new Title XXX, Section 3001 to the Public Health Service Act (42 U.S.C. § 201 et seq.), 42 U.S.C.A. § 300jj–11 (West, Westlaw through August 2009).

12. Included among the programs authorized are: an HIE grant program for states or "state-designated" entities, ARRA § 13301, adding new Subtitle B section 3013 to Title XXX of the Public Health Service Act (42 U.S.C. § 201 et seq.), 42 U.S.C.A. § 300jj–33 (West, Westlaw through August 2009); a state-based EHR adoption loan program, ARRA § 13301, (adding new Subtitle B section 3014 to Title XXX of the Public Health Service Act (42 U.S.C. § 201 et seq.), 42 U.S.C.A. § 300jj–34 (West, Westlaw through August 2009); grants to state-based and other institutions of higher education for workforce training, ARRA § 13301 (adding new Subtitle B sections 3015 and 3016 to Title XXX of the Public Health Service Act (42 U.S.C. § 201 et seq.), 42 U.S.C.A. §§ 300jj-35 and 36 (West, Westlaw through August 2009); and grants to state-based and other institutions of higher education, nonprofits and federal government labs for new technology research & development**,** ARRA § 13202, 42 U.S.C.A. § 17912, 2009.

13. ARRA § 13301,adding new Subtitle B section 3012 to Title XXX of the Public Health Service Act (42 U.S.C. § 201 et seq.), 42 U.S.C.A. § 300jj–32 (West, Westlaw through August 2009).

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15. ARRA § 13101, adding new Title XXX sections 3001(a)–(b) to the Public Health Service Act (42 U.S.C. § 201 et seq.), 42 U.S.C.A. § 300jj–11 (West, Westlaw through August 2009). On August 7, 2009, the secretary delegated further authority to the national coordinator to administer the Incentives for the Use of Health Information Technology provisions under ARRA § 13301 adding new Subtitle B sections 3011–3017 to Title XXX of the Public Health Service Act (42 U.S.C. § 201 et seq.), 42 U.S.C.A. §§ 300jj–31, 32, and 33 (West, Westlaw through August 2009), with the exception of § 3012(c)(5), the section governing financial support of the Regional Extension Centers. Available at *http://edocket.access.gpo.gov/2009/pdf/E9-19709.pdf*. Accessed on September 5, 2009.

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17. ARRA § 13101, adding new Title XXX section 3003 to the Public Health Service Act (42 U.S.C. § 201 et seq.), 42 U.S.C.A. § 300jj–13 (West, Westlaw through August 2009).

18. ARRA § 13101, adding new Title XXX section 3004(b) to the Public Health Service Act (42 U.S.C. § 201 et seq.), 42 U.S.C.A. § 300jj–14 (West, Westlaw through August 2009).

19. ARRA §§ 13101, adding new Title XXX section 3007 to the Public Health Service Act (42 U.S.C. § 201 et seq.), 42 U.S.C.A. § 300jj–17 (West, Westlaw through August 2009), 13112 (42 U.S.C.A. § 17902).

20. ARRA Title IV Subtitle A § 4101(a) (adding new section 1848(o)(2)(A) to the Social Security Act), 42 U.S.C.A. § 1395w–4 (West, Westlaw through August 2009).

21. ARRA Title IV Subtitle A § 4101(a) (adding new section 1848(o)(2)(A) to the Social Security Act), 42 U.S.C.A. § 1395w–4 (West, Westlaw through August 2009).

22. ARRA Title IV Subtitle B § 4201(a)(2) (adding new section 1903(t)(6)(C) to the Social Security Act), 42 U.S.C.A. § 1396b (West, Westlaw through August 2009).

23. U.S. Department of Health and Human Services, Office of the National Coordinator of Health IT, "Meaningful Use." Available at *http://healthit.hhs. gov/portal/server.pt?open=512&objID=1325&parentname=CommunityPage&par entid=4&mode=2&in_hi_userid=10741&cached=true*. Accessed on September 5, 2009.

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25. ARRA Title IV Subtitle B § 4101 (a) adding new section 1848 (o)(1)(A)(i) and (o)(1)(B) to the Social Security Act, 42 U.S.C.A. § 1395w-4 (West, Westlaw through August 2009).

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27. ARRA Title IV Subtitle B § 4102 (a)adding new sections 1886 (n)(1) and 1814 (1)(3) to the Social Security Act, 42 U.S.C.A. § 1395w-4 (West, Westlaw through August 2009) and ARRA Title IV Subtitle B § 4102 (b) (adding new sections 1886 (b)(3)(B)(x) and 1814(1)(4) to the Social Security Act), 42 U.S.C.A. § 1395w-4 (West, Westlaw through August 2009).

28. Eligible providers are physicians, nurse-midwives, nurse practitioners, dentists, certain physician assistants, children's hospitals, and general acute care hospitals. ARRA Title IV Subtitle B § 4201 (a) adding new section 1903 (t)(2) (A), (t)(3)(B) and (t)(3)(D) to the Social Security Act.

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32. ARRA Title IV Subtitle B § 4201(a) (adding new section 1903 (t)(2)(A)(ii) to the Social Security Act), 42 U.S.C.A. § 1396b (West, Westlaw through August 2009).

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34. ARRA Title IV Subtitle B § 4201(a) (adding new section 1903(t)(2)(B) to the Social Security Act), 42 U.S.C.A. § 1396b (West, Westlaw through August 2009).

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37. Goldstein.

38. DesRoches C, Blumenthal D. (eds)., *Health Information Technology in the United States: Where We Stand, 2008*. Robert Wood Johnson Foundation, 2008. Available at *www.rwjf.org/pr/product.jsp?id=31831*. Accessed on September 5, 2008; McGraw D. "Privacy and Health Information Technology," *Legal Solutions in Health Reform*. Washington: O'Neil Institute for National and Global Health Law, 2009.

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40. HIPAA "covered entities" are defined as health plans, health care clearinghouses and health care providers who transmit health information. 45 CFR § 160.103 (2007).

41. "PHI" is defined by HIPAA as "individually identifiable health information" that is held or transmitted by a covered entity (or its business associate) in any form or media, whether electronic, paper or oral. 45 CFR § 160.103 (2007).

42. ARRA § 13405, 42 U.S.C.A. § 17935 (West, Westlaw through August 2009).

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47. ARRA § 13401, 42 U.S.C.A. § 17931 (West, Westlaw through August 2009), applying 45 CFR Sections 164.308 (administrative safeguards), 164.310 (physical safeguards), 164.312 (technical safeguards), and 164.316 (policies and procedures and documentation requirements) to business associates.

48. ARRA § 13404, 42 U.S.C.A. § 17934 (West, Westlaw through August 2009).

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63. See 45 C.F.R. § 164.514(e) (2007).

64. ARRA § 13405(b), 42 U.S.C.A. § 17935 (West, Westlaw through August 2009).

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68. *See generally* ARRA §§ 13409, 13410 (amending sections 1177(a) and 1176 of the Social Security Act), 42 U.S.C.A §§ 1320d-6(a), 1320d-5 (West, Westlaw through August 2009).

69. *See* United States Department of Health and Human Services, American Recovery and Reinvestment Act of 2009, Implementation Plans (May 2009). Available at *www.hhs.gov/recovery/reports/plans/hhs_implementation_plans.pdf*.

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Chapter 5: Potential Implications of Widely Adopted Meaningfully Used HIT: Is Quality Measurement and Reporting About to Take Flight?

Michael W. Painter, J.D., M.D.

Introduction

In 1896, Major Baden-Powell, then secretary of the Aeronautical Society (not yet Royal) wrote to the great physicist, Lord Kelvin, inviting him to become a member. In reply, he received a letter stating "I am afraid I am not in the flight for 'aerial navigation'… I have not the smallest molecule of faith in aerial navigation other than ballooning, or of expectation of good results from any of the trials we hear of…" Kelvin was not alone in his opinion… Simon Newcomb, another physicist of lesser but still very considerable eminence, wrote at about the same time: "The demonstration that no possible combination of known substances, known forms of machinery and known forms of force, can be united in a practicable machine by which men shall fly long distances through the air, seems to the writer as complete as it is possible for the demonstration of any physical fact to be."

This, it should be noted, was less than a decade before the Wrights flew…[1]

The evidence that measuring the quality of care and reporting those measures publicly promotes improved patient outcomes remains ambiguous. For example the most comprehensive review of the literature to date concludes that public reporting provides mixed signals and that its usefulness remains unknown.[2] Others warn that public reporting of quality measures may have unintended results such as worsening certain disparities because physicians might avoid difficult-to-treat patients in an effort to improve measurement scores.[3, 4]

Critics of the current claims-based attempts to construct performance measures for reporting suggest that these efforts are fraught with statistical problems that could decrease the utility of the measures for public reporting.[5] Many also argue that measures derived from claims data do not fully or accurately reflect the clinical care experience.[6]

Construction of measures from clinical data is currently problematic as well. Manually extracting clinical data from patient charts is extremely time-consuming and costly. The hope is that health information technologies (HIT), such as electronic health records (EHRs), can make clinical data extraction both efficient and inexpensive, which would facilitate large-scale clinical performance measurement efforts.[7] However, with the current state of information technology, it is often very difficult to construct measures in part or in full based on clinical data extracted from the medical record. A large-scale measurement and reporting strategy, however, must be able to incorporate clinical data quickly, easily and cheaply.

Therefore, two main barriers stand in the way of large scale electronic record use for collecting and reporting clinical quality measures. First, as prior editions of this report have shown, the current level of EHR adoption in general is dismally low in

virtually all clinical settings.[8, 9] Second, adoption of electronic records and systems with the ability to enhance and accelerate measurement and public reporting is likely even lower still, if present at all.

Many point to this evidence or, rather, the lack of evidence, and voice skepticism and, in some instances, outright opposition to measurement and public reporting efforts.[10] Many argue, as Dr. Newcomb did in the 1890s about flight, that the known facts do not necessarily indicate that efforts to advance measurement and reporting will help improve health care quality.

In spite of the skepticism and limited, ambiguous literature, there is mounting evidence that the field is not, in fact, waiting for proof to guide the effort. Instead, the pressing nature and urgency of the nation's health care quality problems, in the context of high and rising health care costs, are prompting escalating coordinated efforts and investments to build sophisticated measurement capacity that will produce measures of process, structure and outcome to be reported to the public. The intent of such an effort is to drive quality improvement both through transparency to the consumer and to health professionals.

This chapter explores the background and current efforts to build a measurement and reporting infrastructure. It will describe the status of the current so-called "measurement enterprise." It will also describe the potentially critical role of the adoption and meaningful use of electronic health records (EHRs) and funding from the Health Information Technology for Economic and Clinical Health Act (HITECH) in advancing measurement and reporting. The chapter will examine how the development of the meaningful use definition, the role of consumers in this process, and the efforts to transition from claims-based to electronically generated clinically-based performance measures will surely change the landscape of the efforts to capture and report the quality of care Americans receive.

Measurement and Reporting Efforts are Building and Accelerating

Virtually every major credible national consensus body that has commented on the nation's health care quality problems has emphatically urged the development and use of measures for public reporting.

In 1998, the President's Advisory Commission on Consumer Protection and Quality in the Health Care Industry found that "[a] key element of improving health care quality is the nation's ability to measure the quality and provide easily understood, comparable information on the performance of the industry."[11] The commission further noted that "[s]teps should be taken to ensure that comparative information on health care quality is valid, reliable, comprehensive, and available in the public domain for use by consumers, purchasers, practitioners, quality oversight organizations and others."[12] This commission also recommended that the field establish two new entities to address these recommendations. The first would be a new public entity that would identify national aims for improvement. The second would be a private entity with key health care representatives from both the private and public sector to implement a plan for measuring and reporting those measures. This second entity became the National Quality Forum (NQF). Congress, to date, has not authorized the first.

Then in 2001 the Institute of Medicine (IOM) in *Crossing the Quality Chasm* urged that the field quickly make information about performance widely, publicly available to help the public make informed health and health care decisions.[13] Again, in 2006 the IOM in *Performance Measurement: Accelerating Improvement* noted that "[t]here are many obstacles to rapid progress in improving the quality of health care, but none exceeds the fact that the nation still lacks a coherent, goal-oriented, consistent and efficient system for assessing and reporting on the performance of the health care system."[14] The IOM Committee went on to add that "[f]ailure to establish a well-functioning national performance measurement and reporting system would severely compromise our ability to achieve the essential quality improvements called for in the *Quality Chasm* report."[15]

NQF, among other things, is now the national consensus body that develops national priorities and goals for performance improvement and is charged with endorsing national consensus standards for measures. In order for a measure to receive NQF endorsement, the measure must be appropriate both for quality improvement and public reporting.[16] According to NQF "[a] standardized performance measurement and reporting system is a core building block for creating a higher quality, more affordable health system, and is necessary to successfully implement virtually all reform strategies."[17]

In addition NQF has more recently convened a collaborative effort of 32 major national organizations that represent all sectors of American health care to set the most important priorities and goals for nation-wide improvement in health care performance.[18] This collaborative effort, called the National Priorities Partnership (NPP), emphasizes the critical importance of developing standardized measures in the effort to improve quality. NPP literature further notes that "[a]ggressively moving toward more electronic data sources will allow measures to be more easily collected as part of the care process."[19]

The Medicare Payment Advisory Commission (MedPAC), an independent congressional agency established by the Balanced Budget Act of 1997, advises Congress on issues that impact Medicare. MedPAC has commented often on the importance of measurement and reporting to help drive improvements in quality and to support payment incentives that would sustain those improvements. In its March 2005 report it noted:

Quality measurement is an important building block for improving quality. It gives providers information on their own performance to identify areas for quality improvement efforts, evaluate the results of those efforts, and compare their performance to others. It also allows payers and consumers to make judgments about the quality of care they pay for and receive. However, collecting and reporting quality information can pose a burden on providers, particularly when it involves abstracting information from medical records or other special data collection efforts. Information technology, if sufficiently advanced, could automate and streamline this process. Paying for quality is one way to build the business case for IT adoption.[20]

The efforts to develop quality measures for reporting include the recent large federal investment in national adoption of health information technology authorized in the American Recovery and Reinvestment Act (ARRA).[21] (See Chapter 4.) HITECH provides for significant federal funding to advance the adoption of EHRs. Further, HITECH provisions promote not just adoption of EHRs, but rather adoption of the technology explicitly for meaningful use of that technology. Meaningful use specifically includes using the technology to construct measures for reporting purposes.

HITECH requires that for an EHR to promote meaningful use it must be certified, exchange electronic health information to improve the quality of health care, and be used to report measures of the clinical quality of care. Beyond that the secretary of HHS, the Office of the National Coordinator for Health Information Technology (ONCHIT) and the Centers for Medicare and Medicaid Services (CMS) are in the process of developing the precise regulatory definition of meaningful use.[22] That regulatory definition will not be finalized until 2010. Nevertheless, it seems clear that Congress has also spoken on the importance of dramatically increasing the national adoption of EHRs for use in measuring the quality of care and reporting those measures in efforts to improve health care quality.

The "Measurement Enterprise"

In June 1999, Vice President Al Gore convened a planning committee to implement the recommendation of the President's Advisory Commission on Consumer Protection and Quality in the Health Care Industry for a private entity to produce a measurement and reporting strategy.[23] NQF emerged from this planning committee work with initial funding from the Robert Wood Johnson Foundation (RWJF) and others. NQF began operations in late 1999. NQF now has about 350 members representing essentially all aspects of health care. It is a private, nonprofit entity, but it has special recognition under the National Technology Transfer and Advancement Act. That act encourages federal agencies to adopt private sector standards endorsed by entities recognized under the act, like NQF, rather than create new sets of standards. NQF is a neutral, voluntary consensus body that evaluates and endorses quality measures developed by others. NQF does not develop measures. It has, however, endorsed more than 500 measures, practices and public reporting guidelines.

A host of other entities develop measures for a variety of situations and clinical settings. These entities include the National Committee for Quality Assurance (NCQA), the Joint Commission (formerly the Joint Commission for Accreditation of Health Organizations), the Centers for Medicare and Medicaid Services (CMS), the Agency for Healthcare Research and Quality (AHRQ) and the Physician Consortium for Performance Improvement (PCPI) convened by the American Medical Association. In addition, medical and nursing associations, specialty societies, and proprietary entities develop performance measures. Until recently, all these entities developed measures as they respectively found the need to develop a given measure or set of measures. There was no overarching priority setting structure for measure development—a role perhaps the original President's Advisory Commission had envisioned for the public Advisory Council that Congress never authorized. The NPP will likely assume this priority setting function for measure development.

As this measurement development and endorsement process progressed, parallel collaborative efforts developed in a variety of clinical settings. For instance, the Hospital Quality Alliance (HQA) began in 2002 and the AQA (previously known as the Ambulatory Quality Care Alliance) formed in 2004 to help prioritize the growing set of measures and promote practical ways to begin implementing those measures into the respective clinical settings. The HQA collaboration includes CMS, American Hospital Association, the Federation of American Hospitals, the Association of American Medical Colleges, the Joint Commission, the American Medical Association, the American Nurses Association, the National Association of Children's Hospitals and Related Organizations, American Association of Retired People, American Federation of Labor and Council of Industrial Organizations, the Consumer-Purchaser Disclosure Project, the Agency for Healthcare Research and Quality, NQF, the Blue Cross and Blue Shield Association, the National Business Coalition on Health, America's Health Insurance Plans, the U.S. Chamber of Commerce and others. The AQA includes a similarly large group of specialty societies, business and consumer leaders as well as CMS, AHRQ and NQF.

Progress on Public Reporting

Hospital Measures: In November 2000, a group of employers interested in promoting high quality health care launched the Leapfrog Group with initial support from the Business Round Table, the Robert Wood Johnson Foundation, Leapfrog members and others.[24] These employer leaders believed they needed more information about the health care they were purchasing for their employees. They based Leapfrog on the notion that purchasers have an important role to play in promoting high quality and could work together collaboratively to help develop more performance information to inform their decision making. Leapfrog began collecting hospital data in 2001 from hospitals in six regions and has now increased that number to about 38 regions including about 1,300 hospitals.[25] Leapfrog's Web site reports that the 38 regions they cover touch about half of the U.S. population and 62 percent of all hospital beds.[26] Leapfrog measures are all endorsed by NQF and are designed for consumer as well as health plan, employer or purchaser audiences.[27] Leapfrog arguably provided a very important initial catalytic example that inspired additional collaborative measurement and reporting efforts. Leapfrog demonstrated the power of collaborative activity to produce demonstrable progress in measurement and reporting. It did not, however, on its own, of course, drive sustainable high-quality care.

From the Leapfrog example, additional collaborative activity to promote measurement and reporting developed. In 2005 HQA helped launch Hospital Compare, which is an internet based web tool that displays a variety of process, outcome and patient experience measures for the public.[28] Approximately 4,200 hospitals across the nation participate in Hospital Compare. Hospital participation is voluntary; however, the reporting program operates along with the Reporting Hospital Quality Data for Annual Payment Update (RHQDAPU) program. The Medicare Prescription Drug, Improvement, and Modernization Act (MMA) of 2003 authorized the RHQDAPU program. That program provides payment incentives and penalties to promote hospital quality measure reporting. Almost all hospitals, about 95 percent, participate successfully in this reporting program.[29]

The program also provides CMS with the information that it uses for Hospital Compare reporting.[30] To produce these measures, nearly all hospitals use clinical abstractors (usually nurses) to manually extract the data. Although there are not reliable estimates of the amount of money hospitals spend in this effort, there is little doubt that this process is both cumbersome and expensive.

Ambulatory Measures: In spite of the progress in advancing public reporting of hospital measures with Leapfrog and Hospital Compare, reporting of outpatient physician or physician group measures was somewhat slower to develop. To promote ambulatory performance measure reporting, the Tax Relief and Health Care Act of 2006 (TRHCA) provided for a new outpatient physician reporting system now called the Physician Quality Reporting Initiative (PQRI).[31] TRHCA provided financial bonuses for physicians who participated in PQRI. In the first year of reporting, in order to receive a bonus, eligible physicians had to report on one to three measures out of 74 measures selected by the PQRI program. PQRI initially used the Medicare claims system for physicians to report. CMS deemed PQRI's first year a success, but that year was not without problems.[32]

A CMS report on PQRI's first year indicated that just over half of those submitting reports actually received bonuses.[33] Just over half the measures submitted were submitted in a valid manner. There was also, apparently, significant physician dissatisfaction because of some of these problems.[34] Further, many physicians had difficulty accessing the feedback reports provided by the PQRI program.[35]

The Medicare Improvements for Patients and Providers Act of 2008 (MIPPA) made PQRI permanent.[36] MIPPA also provided for incentive payments for reporting measures to continue through 2010 and then, presumably, end. The next phases of PQRI also added additional potential measures and allowed for submission of measures from registries and other sources, not just claims-based measures.[37]

In addition to the federal PQRI ambulatory reporting initiative, a series of regional collaborative efforts emerged starting in about 2006 that also sought to advance ambulatory performance reporting. With these efforts, discussed below, regional health care stakeholders began taking newly endorsed NQF measures for ambulatory care and implementing measurement for public reporting locally. At the same time, the national measurement enterprise leadership also began to organize itself. As the number of national entities working on measurement and reporting activities increased, there was increasing pressure for entities to sort out their respective roles and determine a vision, priorities and overall direction of the expanding national public-private measurement effort.

The Measurement Enterprise Begins to Organize Itself

In 2006, the HQA and AQA formed a joint steering committee called the Quality Alliance Steering Committee (QASC) to help promote measurement implementation across the inpatient and outpatient care settings.[38] With funding from the Robert Wood Johnson Foundation, QASC developed a series of activities under an umbrella effort called the High Value Health Care Project (HVHC) to help accelerate the measurement implementation work.[39, 40] That HVHC effort created common data aggregation methodologies that would enable the construction of all payer sets of claims-based measures; designed new cost and efficiency measures for 12 common conditions across both inpatient and outpatient care settings; promoted a series of planning activities to help guide the implementation activities for national measurement and public reporting and supported a variety of efforts to examine and help address racial and ethnic disparities.

Figure 1: **Measurement Enterprise Organizational Wheel**
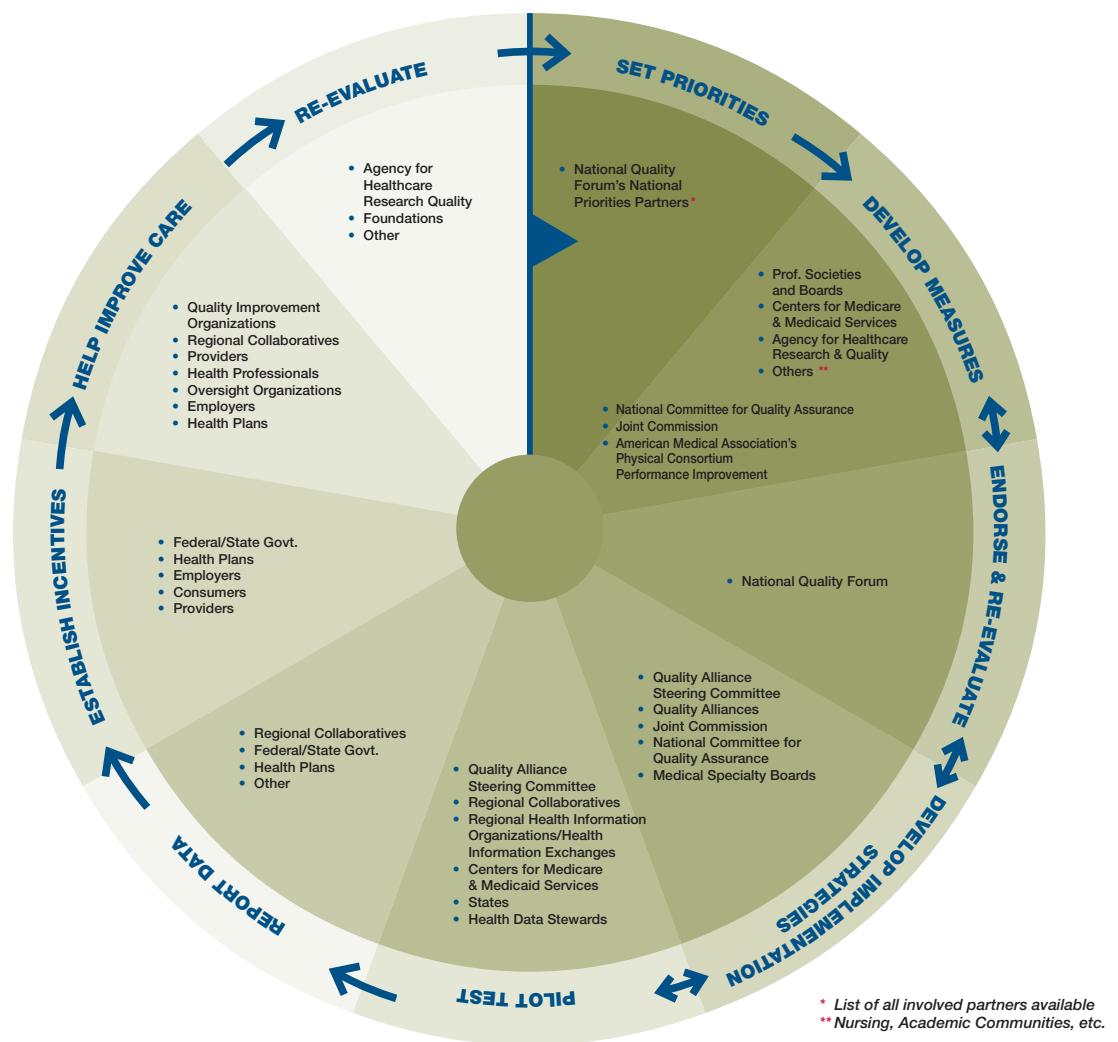
Source: Quality Alliance Steering Committee, 2008.
Available at *www.healthqualityalliance.org/resource-library*. Accessed on September 5, 2009.

Around the same time, QASC also developed a so-called measurement enterprise "vision wheel" in an attempt to capture the prevailing consensus view of the emerging national measurement enterprise[41] (see Figure 1). This wheel depicts an ongoing, concerted, loosely coordinated effort in which NQF, through NPP, establishes national measurement and reporting priorities, various entities develop measures in response to those priorities, and NQF evaluates and endorses those measures. A variety of national and regional entities then implement the measures and begin public reporting of them, payment incentives key off those reported measures and promote improved care, and then the cycle continues.

As noted above, in November 2008, NQF convened the NPP to establish and set national improvement priorities.[42] The 32 NPP partners have all agreed to work together and with other leaders across the nation to promote improvement in performance measurement, public reporting, payment systems, research and knowledge dissemination, professional development and system capacity to achieve the established priorities.[43] Those priorities are: engage patients and families in health care decision-making; improve the health of the population; improve health care safety; ensure patients receive coordinated care; guarantee appropriate end-of-life care; and eliminate overuse while ensuring appropriate care. This priority setting function is depicted in Figure 1 at the top, right part of the circle.[44]

Finally, in early 2009 in anticipation of a national health reform debate, a group of health care stakeholders from across the nation developed a set of recommendations and core principles that they, as a group, believed necessary for "high quality, affordable health care."[45] They developed a set of recommendations from the measurement enterprise to inform the national health reform discussion. This large group of approximately 200 major national health care stakeholders, called "Stand for Quality", noted that measures are the core building block to provide high quality care and emphasized the accomplishments of the existing measurement enterprise. In letters to key Congressional committees dated June 17, 2009, this large group of national health care leaders noted prominently that their recommendations are all based on linking measurement and public reporting to any reform efforts.[46]

Regional Measurement and Reporting Efforts

As noted above, at around the same time that the national leaders were making progress with national aspects of the measurement enterprise, parallel efforts began to develop at the regional level in many sites across the country. The measurement enterprise vision diagram (see Figure 1), in fact, specifically incorporates the important perceived role of regional collaboratives in the implementation of measures for public reporting.

There are currently, by some estimates, more than 70 regional, multistakeholder efforts of varying types across the country devoted to improving health care quality and working in some capacity on measurement and reporting activities.[47] Several efforts predominate: the Better Quality Information Project, the RWJF *Aligning Forces for Quality* initiative, and the HHS Chartered Value Exchange program.

Better Quality Information Pilots

In 2006, the AQA and AHRQ selected a set of six communities to participate in a two-year pilot program called the Better Quality Information to Improve Care for Medicare Beneficiaries Pilot Project (BQI pilots) sponsored by CMS.[48] The six BQI communities were each organized around a multistakeholder leadership group. The geographic area covered by the sites varied. Some were entire states, some counties, some multiple counties and some groupings of clinics across a state.[49] The intent of the effort was for the participating pilots to make progress on developing ambulatory measures and reporting those measures to the public. The effort combined both Medicare data and private data to construct pilot site measures. All but one of the BQI pilots made progress with public reporting of ambulatory measures during the approximately two-year effort.

Aligning Forces for Quality Initiative

At about the same time in 2006, RWJF launched the pilot phase of a long-term $300 million initiative called *Aligning Forces for Quality* (Aligning Forces). Aligning Forces helps communities work on three overlapping areas of activity in each community.[50] The Aligning Forces initiative attempted to take learning from prior efforts that may have focused on only a single potential driver of quality, such as just attempting technical quality improvement, or promoting measurement and reporting, or using a single stakeholder perspective, like purchasers. Instead, this initiative attempted to prompt all relevant stakeholders in a given health care market to work together collaboratively on three important likely drivers of regional health care improvement.[51] The three areas are: 1) advancing measurement and public reporting; 2) developing quality improvement resources; and 3) engaging health care consumers.

The initiative started with four pilots and has grown to include 15 participating communities. Like the BQI pilots, Aligning Forces work is also based upon a multistakeholder alliance of leaders in the given region.[52, 53] Three Aligning Forces communities are entire states, while most are comprised of multiple counties. One community is a very rural county, and one other spans a state border into two state jurisdictions. Two of the former BQI sites are now Aligning Forces sites. The initiative provides grant support and technical assistance to participating alliances to perform the Aligning Forces work.

The Aligning Forces communities have committed to making substantial improvement in producing performance measures and publicly reporting those measures, developing local resources to help health professionals improve the quality of care and coordinating efforts to engage the public in the respective communities to use health information in making care decisions. All of the Aligning Forces communities have committed, for instance, to release a set of NQF endorsed ambulatory care measures for at least 50 percent of the primary care physicians in their community by February 2010. As of September 2009, eight of the 15 communities have already met that target. The program reports that the remaining seven are all on target for meeting that goal as well.

The Aligning Forces communities have all committed to incorporating, at a minimum, the Hospital Compare inpatient measures into their public reports by December 2009. All of the communities are reportedly on target for meeting that goal. In addition, the Aligning Forces communities are making iterative efforts to make their reports helpful to the consumer public. The initiative has developed a common agreement as to the key elements that a so-called consumer friendly report would include, and the communities are working to make those reports meet those guidelines.[54] They are also in varying stages of planning and developing a local quality improvement resource to help physicians and nurses improve care. The effort is also helping the communities develop ways to enhance the collection of race, ethnicity and primary language data and incorporate that demographic data into the measurement and reporting effort.

Chartered Value Exchanges

In 2008, HHS launched a similar regional improvement program called the Chartered Value Exchange (CVE) program to help participating communities improve the quality and cost-effectiveness of the health care in their community.[55] There are now 25 CVEs across the nation. CVEs also are organized around a multi-stakeholder leadership alliance and are working on roughly the same set of activities as the Aligning Forces communities. Thirteen of the 15 current Aligning Forces communities are involved in some manner with a CVE. CVEs receive a range of technical assistance funded and coordinated by AHRQ.[56]

Regional alliances like the Aligning Forces and CVE communities who are attempting to advance measurement and reporting at the local level face a number of challenges. To create regional ambulatory care measures, each regional alliance had to develop a locally unique way to do that. Most of the original regional alliances created measures from administrative claims-based data. Some had limited access to clinical data and also began to incorporate that clinical information into the measurement process. Most, though, relied on claims data. That meant that most relied on regional or national health plans to agree to participate in the regional effort and provide the claims data to construct the regional set of measures. There was no standard set of measures across the regions or a standard method of aggregating the data or constructing the measures. That meant that each community had to develop a unique set of agreements with the relevant health plans, engage a unique data aggregator and create measures for their community. They also had to develop a local dissemination method for the measures.

As the number of regional alliances proliferated, national health plans faced increasing numbers of requests for claims data. That increasing pressure for claims data in turn prompted the national plans to work together to begin to develop some sort of common approach to meet this increasing demand for claims data. The HVHC Project working with the America's Health Insurance Plans Foundation developed a methodology for aggregating claims data across multiple plans using a so-called distributed data model.[57] That method essentially makes it possible for health plans to construct measures internally using an agreed upon statistical format and then aggregating the measures externally arithmetically. That method is currently undergoing pilot testing in Colorado and Florida.

The potential promise of that common data aggregation methodology, however, did not solve the data aggregation problem for the regional alliances. Instead, it highlighted a new question: Where is the ideal locus for claims data aggregation? Is it with a regional alliance? Or is it with some sort of national hub? Most of the regional alliances are still developing sustainable business models to support their improvement work. Some, though, have leveraged the value of their regional data aggregation, measurement construction and reporting ability to support an income stream. A national data aggregation model would, in that case, be a potential threat to such a business model. Here, solving one measurement problem raised new questions and potential problems for other aspects of the measurement enterprise.

Any tensions, though, between regional and national efforts, like the locus of aggregation of claims data question, are in all likelihood largely temporal. Most acknowledge that claims-based measures are only a transitional stage of the measurement enterprise evolution. As noted previously, measures based predominantly on clinical data extracted electronically from a variety of sources would be significantly more desirable.

Notwithstanding any perceived regional-national tensions, the measurement enterprise leadership recognized the importance of both regional and national efforts. (See Figure 2.) Both NQF and QASC have made efforts to bring regional alliance leaders into the national decision-making process. The perspective is that health care is delivered locally and many of the measurement, reporting and improvement challenges must unfold at the local or regional level. The national level, alternatively, is viewed as the best place for standard setting and helping with activities that do not require unique regional solutions.

Figure 2: **Regional-National Feedback is Essential**

Source: Quality Alliance Steering Committee, 2008.
Available at *www.healthqualityalliance.org/resource-library*. Accessed on September 5, 2009.

Measurement and Reporting Functionality in Adopted EHRs—How Was it Going Pre-HITECH?

Even without widespread adoption and use of health information technology, the measurement enterprise has made significant progress at both the national and regional levels. In approximately 10 years since the launch of NQF, the field now has more than 500 nationally endorsed, standardized measures for a variety of aspects of health care. In the course of three or four years, there has been a significant increase in the number of measures constructed and reported for both inpatient and outpatient care. In approximately three years a large number of regional reporting initiatives have launched and are making headway. Prior to 2006 there were only a few reports on hospital care. Leapfrog was essentially a seminal effort. Now, there are public reports on process, outcomes and patient experience for virtually every hospital in America. Similarly, there are an increasing number of communities with public reports that include ambulatory care. Most of this measurement and reporting progress, however, has occurred using claims-based, not clinical, data.

Claims-based measures provide important information. They also, however, have a number of important limitations. As noted in a recent Health System Change commentary, "[c]laims and administrative data have inherent weaknesses in documenting all services provided to a patient by a physician and in capturing legitimate reasons why certain services were or were not provided—information that is critical for an accurate assessment of physician performance."[58] Claims-based measures often have reliability problems as well as inadequate sample size problems.[59] There are also problems with physician attribution.[60] Most experts believe that measures based entirely on administrative claims data will ultimately have limited usefulness and will not provide the kind of information necessary to drive fundamental payment reforms. Extracting clinical data manually, of course, is not a viable large-scale solution. It is too labor intensive and expensive. The critical next step, then, is to integrate clinical data extracted electronically from a variety of sources. In particular, there is intense interest in the ability of widely adopted EHRs to provide this information to advance the measurement and reporting enterprise.[61, 62]

Unfortunately, the rate of EHR adoption has remained stubbornly low. Both the 2008 edition of this report and the current edition highlight that relatively small numbers of physicians and even a smaller percentage of hospitals, at the time of those surveys, had actually implemented an electronic health record. Adoption in ambulatory settings is about 4 percent for a so-called "fully functional" EHR. The ambulatory rate of adoption increases somewhat to 13 percent for a "basic" EHR. Similarly, in the inpatient setting the rate of adoption is less than 2 percent having a fully functional EHR and a little less than 8 percent have a basic version. Both of those surveys used the same definitions developed in the 2006 edition of this report for an EHR as well as for a basic and fully functional system. Importantly, though, neither the definition of a basic nor a fully functional EHR include the ability to facilitate extraction of clinical data for measures, construct measures or report measures. In fact, presumably if researchers calibrated the rate of adoption to include this measurement and reporting function the already very low rate of adoption would likely fall even lower.[63, 64]

A number of studies have shown, though, that EHRs are a viable source of information for measurement and reporting.[65, 66, 67] Some researchers have noted that performance measures become "strikingly" more clinically relevant when EHR-based.[68] Experts predict that if and when more physicians and hospitals adopt EHRs, policy-makers will "design measurement systems, and incentive programs based on them, to take advantage of computer-based information systems that will become the new standard of care… Likewise, a transition plan should be developed to migrate the nation's use of administratively based quality measures to clinically based quality measures."[69]

Will HITECH Driven Meaningful Use Accelerate Measurement and Reporting Efforts?

HITECH authorized significant federal expenditure for a number of activities intended to improve the quality of health care by the use of health information technology. Specifically, HITECH authorized, among other things, CMS to provide at least $17 billion in financial incentives for eligible health professionals who implement and use EHRs.[70] (See Chapter 4.)

The HITECH incentives all hinge on the so-called "meaningful use" of the EHR. HITECH provides some general statutory guidance on the definition of meaningful use. The statute provides that meaningful use of an EHR requires that an eligible professional is using a certified EHR in a "meaningful manner." The professional must demonstrate that the EHR is connected with other related technologies so that pursuant to appropriate laws and standards it can facilitate the electronic exchange of health information in ways that improve health care quality. Finally, the professional must use this EHR to report clinical quality measures to improve the quality of health care. The secretary of HHS must select the measures that will be reported under this meaningful use definition and must work to avoid redundant reporting.

HITECH formally authorizes the National Coordinator for Health Information Technology (National Coordinator) and the Office of the National Coordinator within HHS. President Bush initially created the office in 2004 by executive order. HITECH also provides for the creation of two new advisory committees under the Federal Advisory Committee Act that will give important advice and input to ONCHIT: the HIT Policy Committee and the HIT Standards Committee. Previously, the prior secretary of HHS convened another advisory group called the AHIC or "American Health Information Community." AHIC provided advice and recommendations on accelerating adoption of health information technology to then-Secretary Leavitt from 2005 to 2008. In late 2008, the work of AHIC ended and a new public-private entity, the National eHealth Collaborative (NeHC) took over many of the AHIC functions. As a new entity, NeHC is still establishing its new advisory role. In addition, the National Committee on Vital and Health Statistics (NCVHS) has provided advice to the secretary, or that office's predecessor, for more than 50 years on health statistics and health information related matters. It is a forum in which private sector experts can provide important technical and policy advice to the secretary.

The National Coordinator has charged its various advisory committees, particularly the HIT Policy and Standards Committees, to develop detailed proposed framework, criteria and recommendations for the definition of "meaningful use." CMS and ONCHIT are reportedly working extensively on the

proposed elements of this definition. CMS will take those recommendations and then develop and publish a definition of meaningful use in 2010 along with the criteria for the EHR payment incentives.[71]

Status of the Meaningful Use Definition

In April 2009, NCVHS convened a public meeting to gather input to help define meaningful use. That committee submitted its initial report of that hearing to ONCHIT in a May 2009 letter and its summarized observations in June 2009.[72, 73] Among other things, the committee observed that the vision of meaningful use should be framed by a predictable phased path toward use of electronically generated information that promoted quality outcomes and health care value. The primary focus should be on the use of the technology, not the tool. Importantly, the committee noted, among other things, that the technology must facilitate development of measures that can be used by health professionals and individuals to improve patient care and that the use must be designed to promote payment reforms that will reward high value care.

In June 2009, the HIT Policy Committee held its first public meeting and has met routinely since that time. At the opening meeting in June, the HIT Policy Committee's Meaningful Use Working Group presented an early draft of recommendations on the important criteria for the meaningful use definition.[74] The Meaningful Use Working Group explicitly based its meaningful use framework and proposed criteria on the NQF NPP priorities. The Working Group also presented a matrix that outlines priorities, care goals and objectives over time starting in 2011 and extending through 2015.[75]

The draft meaningful use criteria, so far, reflect most of the themes in the NCVHS recommendations. The draft framework and criteria highlight that meaningfully used EHRs will focus on promoting high quality outcomes. The technology should be a tool to help patients and health professionals get information and use the information to promote high quality.

ONCHIT asked for public comment on those initial recommendations and received more than 800. According to ONCHIT staff, the comments provided general strong endorsement of the health care outcomes focus of the meaningful use draft recommendations. For instance, MedPAC noted in its comment letter that, "the criteria should incorporate specific measures of clinical processes and outcomes supported by or enabled with the use of health IT, and not based simply on the presence of IT in a hospital or provider's office or its use for administrative functions such as billing and patient record-keeping. Eventually, the criteria defining meaningful use should support payment policy reforms that will drive health care delivery systems improvements, for example reducing payments to hospitals with significantly high readmission rates and financially rewarding providers that efficiently deliver demonstrably high-quality care."[76]

Working in parallel with the HIT Policy Committee, the HIT Standards Committee is making recommendations on standards that will be important for meaningful use of the EHR.[77] Based on the meaningful use priorities and care goals outlined by the HIT Policy Committee, the HIT Standards Committee is developing a recommended set of measures and related standards for those measures that will be reported as part of meaningful use of EHRs. This work of the Standards Committee, in turn, builds on prior work of NQF, AHRQ and AHIC.

In 2007, NQF under an AHRQ contract and at the request of the AHIC convened an expert panel on HIT, the Health Information Technology Expert Panel (HITEP).[78] While most experts recognized the potential of HIT and EHRs to provide the clinical information necessary to advance measurement and reporting, the current standards were not supporting that measurement and reporting function. NQF convened HITEP to develop recommendations that would help make EHRs support measurement construction and reporting. Specifically, the panel would make recommendations on standardizing the basic building blocks, or data elements, necessary for constructing quality measures. In 2008, HITEP issued a report that identified 11 key data categories and 39 data types that will be important for constructing measures from electronic clinical sources.

HITECH provisions promoting rapid implementation of EHRs for meaningful use have only further highlighted the need for additional standardization work that will facilitate the electronic extraction of clinical information for constructing and reporting of measures. In early 2009, NQF with funding from AHRQ reconvened HITEP to further advance this standardization work. HITEP is now working to help accelerate the development of standards to support the use of HIT and EHRs to create and report performance measures.[79]

How Will Meaningfully Using EHRs Impact the Measurement of Clinical Quality and the Reporting of Those Measures?

Much of the work on the definition of meaningful use has focused most prominently on creating the overall framework, criteria and either the re-tooling or the development of the measures themselves. There is another important step, though. To be helpful, that is to be meaningful, the measures and the information from those measures must be reported somewhere. HITECH requires that the measures be reported, for instance, to the secretary, at least as a first step. The measurement enterprise and huge body of quality improvement work invested in measurement emphasize the need for measures to be reported publicly for all stakeholders to use to improve health care quality. Just as the current technology and standards do not easily facilitate either the extraction of clinical information or the creation of the measures, they also do not facilitate electronic reporting of those measures. This electronic reporting capability and the standards to support the reporting function are themselves critically important gaps.
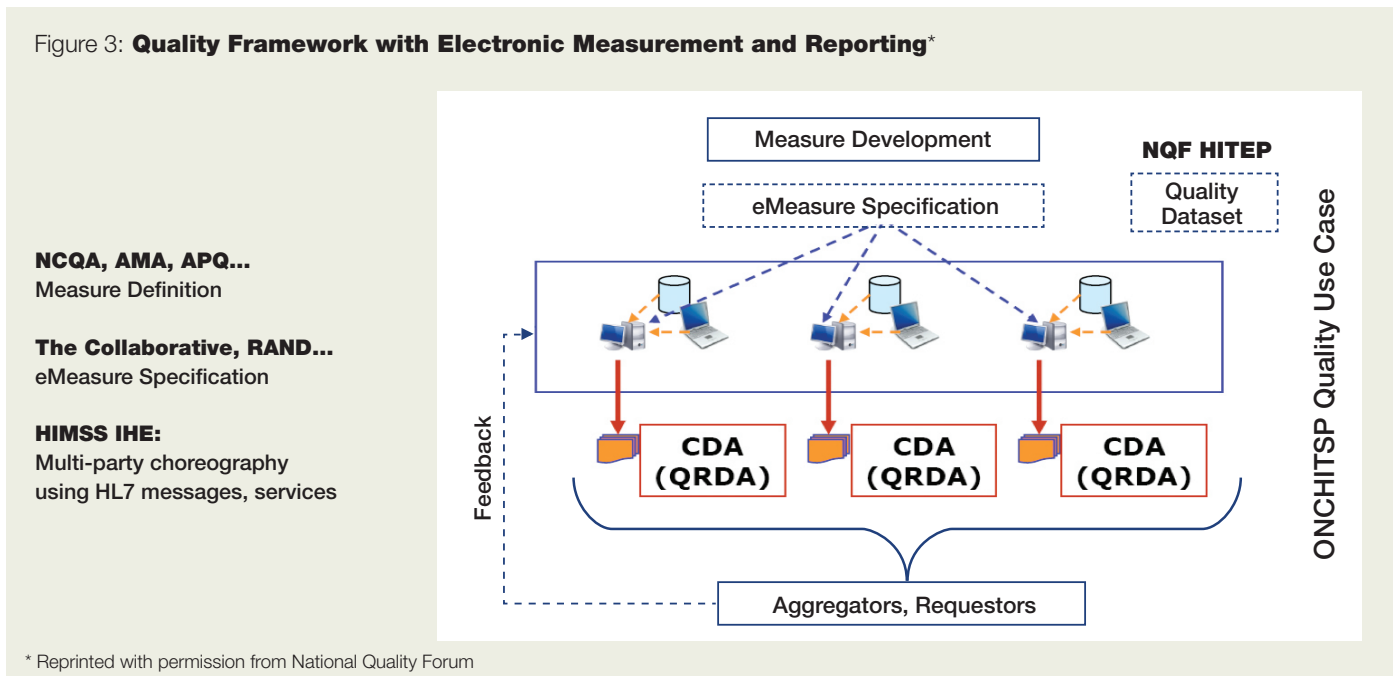
Another group with an important role in developing the measurement and reporting standards is the Healthcare Information Technology Standards Panel (HITSP).[80] HITSP formed in 2005 as a public-private collaborative effort to make recommendations on HIT standards and harmonize various standards to advance health care quality. HITEP and groups such as HITSP are developing recommendations, identifying gaps and working to piece together the various standards to create an overall model for constructing measures from electronically generated clinical information and then reporting those measures. These groups are now submitting their recommendations back to the HIT Standards Committee in order to build a model for creating electronically generated and reported measures and fill in the various standard gaps for that model.

For instance, previously there was no standard for sending or reporting quality measures, once constructed, to an aggregator or other requestor. In 2007 an independent private effort called the Quality Reporting Document Architecture (QRDA) initiative sponsored by the Alliance for Pediatric Quality developed a potential standard for the electronic exchange of quality measures.[81] Prior to the development of QRDA there was essentially no standard for reporting quality measures to a requesting entity or system—such as a data aggregator. Without the reporting standard, electronic reporting of these electronically generated, clinically based measures cannot really occur. Therefore, for electronic measurement and reporting of all kinds this sort of technical standard gap is critical. HITSP has now completed public comment on QRDA. The HIT Standards Committee is reviewing QRDA to determine if it should be the required standard for reporting meaningful use measures in 2013.

Separately, in September 2009, NQF working with a standard development group, HL7, announced a new data standard for so-called "e-measures."[82] E-measures will make it possible to extract data from records for the creation and reporting of measures. This new standard is designed to represent a quality measure as an electronic document. Through standardization of a measure's structure and other important aspects of it, the e-measure provides for consistency and unambiguous interpretation. NQF supported the development of the e-measure standard in a contract with HHS.

These efforts to develop standards that facilitate the use of HIT to create and report measures electronically are ultimately likely to change the way many currently approach measurement construction, aggregation of data and reporting. It seems likely that such a new HIT-enabled measurement infrastructure would have a significant impact on the current vision of the measurement enterprise that stakeholders developed in an almost exclusively claims-based measurement environment. (See Figure 1.) So how is the electronically generated measurement model evolving? What might the model look like right now? (See Figure 3.)[83]

Figure 3: **Quality Framework with Electronic Measurement and Reporting***

NCQA, AMA, APQ...
Measure Definition

The Collaborative, RAND...
eMeasure Specification

HIMSS IHE:
Multi-party choreography
using HL7 messages, services

Feedback

Measure Development

eMeasure Specification

NQF HITEP

Quality Dataset

CDA (QRDA)   CDA (QRDA)   CDA (QRDA)

Aggregators, Requestors

ONCHITSP Quality Use Case

* Reprinted with permission from National Quality Forum

The current measurement enterprise model depicted in Figure 1 envisions priority setting and identification of measurement gaps by the appropriate national entity. In a HIT enabled measurement enterprise that step would not seem to change given current meaningful use definition recommendations that start with the current priority setting mechanisms. But from that point, things do start to change potentially—particularly in the construction, implementation and reporting of electronic measures. As indicated in Figure 3, measure developers would define and develop measures that have a specific set of standard quality datasets attached. Those measures would then be constructed as so-called e-measures. From there the various EHRs could then report individual level measures to requestors for a variety of uses, including aggregating for reports. This final step would rely importantly on the QRDA standard or some similar reporting standard to allow the EHR systems to communicate with the requestor or aggregator electronic systems, for instance.

Much of this new measurement and reporting model depicted in Figure 3 likely remains in flux as the actual definition of meaningful use is not final. But this example highlights the potential tremendous implications and importance of that meaningful use definition. A model like this one relying on electronically generated clinical information could prompt many to reconsider current thinking about the so-called measurement enterprise depicted in Figure 1. In such a model who aggregates and creates reports, for instance? Do regional efforts still have a significant role? Does such a model simplify the measurement enterprise vision or make it more intricate and complicated? How does the vision account for collecting clinical information from a wide spectrum of sources (i.e., lab, pharmacy, EHRs, hospitals, PHRs) not just one stakeholder like health plans in a claims-based measurement environment?

In any event, it appears that the various ONCHIT Committees, working groups and related organizations are attempting to address many of the primary technical issues related to developing electronic clinical measures for reporting. But there are also likely many important outstanding gaps. For example, what about the host of concerns that many have raised about claims-based measures for reporting? Do the current standards and plans for developing electronically generated, clinically based measures address those problems? Do the standards address the physician attribution problem? In order for a physician or other health professional to be comfortable that a given measure pertains to the care she provided, the physician must be assured that the patient was, in fact, her patient. It's not clear at all that the current electronic measure work has addressed this problem adequately.[84] Further, how do the electronic systems recognize a given patient across a variety of clinical settings?[85] It's not clear if the work so far has adequately addressed that problem.

And there are other concerns about statistical validity and reliability of electronically generated clinical measures.[86] For instance, how many patients are necessary to make a given measure a reliable picture of the care a given physician or group of physicians is providing? It's not clear that the work, so far, has adequately addressed this point either. It is entirely possible that the work to advance claims-based measures and reporting will inform the solutions for many of these problems, but it's not clear that anyone is addressing them yet.

Other problems that the claims-based measure and reporting effort has encountered are more relational or political. For instance, previously as health plans began moving more assertively to report on a variety of metrics and

then group physicians into tiers or categories according to their performance, physicians strongly resisted many of those efforts.[87] In New York, state regulators became involved because of that potential clash. From that New York experience, business, consumer, health plan and physician leaders developed what they called a "Patient Charter for Physician Performance Measurement, Reporting and Tiering Programs"[88] to address many of these tensions and potential problems.

That Patient Charter required among other things that measures must be meaningful to consumers; that those being measured must be involved in the measurement process; that those measured have the ability to review a measure and potentially challenge and revise measure results; and that the measure methodology be transparent and valid. The Patient Charter, arguably, helped to address many of the fundamental physician concerns about measurement and reporting. It is not clear, though, how current efforts to develop electronically generated clinically based measures might, in turn, address the kinds of concerns highlighted in the Patient Charter experience. The field may ultimately need to develop an "E-Patient Charter" for example.

The Role of Consumers in Determining Measures for Meaningful Use

As noted, the Patient Charter specifically highlighted the consensus view that measures must be meaningful to consumers, that they should convey both quality and cost information and that they should provide input on the methods to select and develop the measures. Further, others have emphasized the importance of including all stakeholders in the meaningful use process. NCVHS in its observations on meaningful use to ONCHIT noted that "[a]chievement of the vision of health and health care transformed requires the dedication of people and organizations—all stakeholders—to focus on ensuring patient-centered, coordinated, quality care."[89]

The HIT Policy and Standards Committees all have consumer advocacy members. And NQF has made significant efforts to include consumer advocates in its endorsement process and the priority setting process. Nonetheless, the current draft recommendations for meaningful use do not necessarily explicitly reflect that these draft measure sets are intended for public, consumer use or that the relevant decision makers selected them based on what consumers might actually find important or helpful in making health care decisions. So far, the role of the consumer in the meaningful use definition discussion has been tenuous and ambiguous, at best.

Impact of Meaningful Use Measures on Disparities

Will HIT enabled measurement and reporting help reduce disparities or make them worse? Racial and ethnic health care disparities are an important part of the nation's health care quality challenge. The IOM in the *Crossing the Quality Chasm* report specifically included equity as one of the six key aims of health care quality.[90] Each year since 2005 AHRQ has released an annual congressionally mandated National Healthcare Disparities Report (NHDR) to monitor the status of health care disparities. The 2008 report again indicates that we continue to have significant racial and ethnic health care disparities.[91] That means that while we overall have a national health care quality problem, that quality is also different for different people. The report highlights that the disparities for blacks, Asians,

American Indians/Alaska Natives and Hispanics remain a major challenge. It notes that for these groups "at least 60 percent of measures of quality of care are not improving (either stayed the same or worsened)."[92]

Many have voiced concern that some efforts to improve quality, especially the accelerating efforts we describe in this report to measure and publicly report performance and also efforts to use those measures to support payment incentives that reward improvement, could in some hypothetical instances worsen the disparities problems.[93, 94] An extensive systematic review of this literature by Chien et al. funded by the Robert Wood Johnson Foundation noted many of these potential concerns.[95] These researchers noted that some reporting efforts could potentially encourage "one-size-fits-all approaches" which would likely not help address disparities. They note that reporting might encourage "cherry picking" behavior such that health professionals might drop difficult-to-manage patients or patients with multiple difficult-to-manage conditions and limited resources to enhance performance metrics thus potentially worsening disparities.

The Chien review examined more than 41,000 articles related to either public reporting or payment incentive programs. Of those, 536 articles pertained to or mentioned race and ethnicity. The review ultimately, though, found no evidence about the effects of performance incentives on disparities and only one pertaining to public reporting impacts on disparities. That one study attempted to assess the impact of a New York state program to report coronary artery bypass (CABG) mortality rates by comparing the New York CABG rates for various races with rates in states without reporting. In all states the CABG rate was higher for whites than for the racial minorities examined. The study found that the disparities gap widened after the public reporting effort began and that it remained the same in the states that did not report.[96]

Given the dearth of evidence, these researchers also conducted structured interviews with a set of key health care leaders to gather expert opinion about the potential impact of reporting and payment changes that reward improvement on disparities. From these interviews the researchers summarized four recommendations for using reporting and payment changes to reduce disparities. The leaders, in commenting about reporting and payment changes, were in general "enthusiastic about their potential for improving the overall quality of health care…"[97] They recommended that in conjunction with those efforts, though, reporting and payment initiatives also: improve the collection of race and ethnicity data for stratification of the measures; emphasize conditions that impact minorities; reward improvement rather than just achieving a given score; and encourage relevant national measurement enterprise entities to address disparities explicitly.[98]

While the one New York study indicating potential negative impact of public reporting on disparities is cause for concern, the leaders in the measurement enterprise are working to make it more likely that measurement and reporting efforts will help rather than hinder disparities reduction efforts. As NQF concluded in a 2007 issue brief on disparities, "it will be important to monitor the results of multiple studies over time to identify and develop strategies to mitigate any unintended consequences of public reporting…"[100]

There are currently a number of activities at both the national and regional levels to address many of the expert recommendations highlighted in the Chien

review. It remains true that most hospitals and physicians still do not routinely collect racial and ethnic demographic data. Most agree improving the primary collection of race and ethnicity demographic data is an important and difficult challenge, one that a recently released IOM report suggests we must address.[99] The report makes clear that federal entities, such as CMS, Veterans Affairs and the Department of Defense, should systematically collect race, ethnicity and language data and provide financial incentives for private health professionals to do so. The IOM also suggests that policy-makers consider the variety of indirect methods of estimating race and ethnicity in a given population, although these indirect estimation methods do not provide the granular information necessary to inform measures and guide improvement.

NQF has endorsed a set of performance measures specifically to address racial and ethnic disparities.[101] In the AHRQ National Health Plan Collaborative, 10 major national health plans worked collaboratively to find ways to improve primary collection of racial and ethnic demographic data.[102] The HVHC project is working in a variety of pilots across the nation to identify ways to improve collection of primary racial and ethnic demographic data.[103] The Aligning Forces regional initiative also includes an explicit focus on racial and ethnic disparities.[104] The Aligning Forces communities, for example, have all committed to improving the collection of racial and ethnic demographic data and incorporating that information into their measurement and reporting efforts. The current draft recommendations pertaining to meaningful use of EHRs also explicitly highlight using the electronically generated information from that use to address racial and ethnic disparities.[105]

Transition From Claims-Based Measures to Clinically-Based Measures— Who's Minding the Glide Path?

An important detail about the recommendations and plans for meaningful use of the EHRs is that it will be phased in over a period of years. The first phase of this meaningful use is not intended to begin until 2011. ONCHIT and others will be revising the definition, criteria and expectations iteratively through, at least, 2015. Further, as noted above, the current rate of EHR adoption is very low. There is also the current largely claims-based measurement effort in place now. Notwithstanding the extensive plans and promise of the meaningful use of EHRs, measurement and reporting efforts probably cannot simply stop and wait for meaningful use to begin. The field will, then, need to develop a host of strategies to move from the current claims-based measurement environment toward one that is predominantly built around electronically generated sources of clinical information.[106]

In August 2009, QASC through its HVHC Project released a draft plan that proposes ways, over a period of three years, to knit together an increasing variety of efforts in a coordinated strategy to bring more and more electronic clinical data into the measurement process.[107] This plan would attempt to leverage things like electronic registry, lab and pharmacy clinical data to enhance electronically captured administrative claims data. Beyond this preliminary plan, however, there does not appear to be any other systematic effort to guide the transition from the current measurement environment to one with ubiquitous meaningful users of EHRs.

This chapter began by noting that the evidence that performance measurement and public reporting of those measures actually helps improve quality of care is limited. There is also limited evidence or even experience to highlight the potential unintended consequences of measurement and reporting. Nevertheless, virtually all the major stakeholders in health care based on unequivocal and specific expert recommendations are working to develop an increasingly sophisticated measurement and reporting infrastructure. Why would that be? The answer seems to pertain to payment. Many believe that our ability to reform health care hinges largely on our ability not only to increase coverage for and access to health care but also to address the underlying fundamental dysfunction of health care–poor quality, exploding cost, and payment systems that hinder efforts to improve. The current national health reform debate reinforces the important potential role of measurement and reporting in solving many of these fundamental problems.

MedPAC, for example, has consistently strongly recommended measurement and reporting as an important piece of payment reforms. In its March 2005 report, it noted that:

Medicare already uses a variety of strategies to improve quality for beneficiaries… MedPAC supports those efforts… Most of those efforts, however, are grafted onto a payment system with few incentives for delivering high-quality care. Medicare, the largest single payer in the system, pays all of its health care providers without differentiation based on quality. Providers who improve quality are not rewarded for their efforts. In fact, Medicare often pays more when a serious illness or injury occurs or recurs… The incentives of this system are neutral or negative toward improving the quality of care… [Q]uality measures can be used to distinguish among hospitals, home health agencies, and physicians… Expanded use of IT would also increase the ability to measure and reward good performance.[108]

Many also look at state experiences with health reform for guidance. In 2006 Massachusetts passed a law providing for near universal insurance coverage for its citizens. A report on the first year experience of the Massachusetts reform noted, though, that the reforms and the universal coverage from the reforms "will become unaffordable–for individuals, employers, and government–unless health care spending can be brought under control."[109] In searching for solutions, Massachusetts contracted with RAND Corporation to prepare a report suggesting a range of cost containment options including estimates of potential savings.[110] That August 2009 report identified a host of potential interventions, but the one with the greatest cost savings potential was payment reform. Specifically, the group modeled a type of payment that would reward improvement in quality and cost to replace the current fee-for-service scheme. They examined so-called bundled payment proposals that provide a single payment for all the care necessary over a given episode. These payments would be designed to reward efforts to eliminate services that are wasteful, unnecessary and of low value and to reward high quality, high value outcomes. They estimated that this kind of payment could save Massachusetts up to $30.3 billion over a 10-year period.[111]

Another recently published analysis of a kind of bundled payment reform noted similar large potential savings for the nation:

Our analyses of several national and regional data sets, in addition to our pilot work, show that PACs [potentially avoidable complications] account for 22 percent of all private-sector health care expenditures in the United States. The data show that PACs can account for as much as 80 percent of all dollars spent for conditions such as congestive heart failure that require intensive management and that there are significant regional variations in PACs. On the basis of our current findings, we project that even a modest reduction in PACs from one year to the next would have a considerable effect on the private sector's portion of health care spending over the next 10 years. If such results were replicated in a Medicare population, the potential savings would double, reducing the country's health care bill by more than $700 billion over 10 years.[112]

These kinds of value focused payment changes depend on, among other things, robust, accurate reported measures of performance and cost. To realize the potential of these and other kinds of payment reforms, accurate measurement and reporting is necessary.

Finally, in September 2009, to help inform the national health reform discussion, a group of 10 prominent health care economists released a set of 10 key recommendations designed to address long-term health care spending challenges.[113] They noted that in order to address the cost challenges health professionals, employers, consumers, insurers and government would need to work together to help move health care from a system that promotes high volume, fragmentation and dysfunction, to one that encourages collaboration, accountability, improvement and value. Their recommendations include a wide array of reforms touching on health information technology, comparative effectiveness, workforce, payment, the delivery system, insurance markets and prevention. A prominent theme throughout was, again, better information—better measurement, improved tools to highlight quality and high value, enhanced public reporting of outcomes and more publicly available quality and cost information to support individual decision making.

Information about the quality and value of health care, then, is viewed as critical in most proposed solutions to the fundamental challenges of the health care problem—high cost, poor quality, fragmentation and dysfunction. From that perspective, the clear consensus advice, intense interest and increasing investment in building the measurement and reporting enterprise seems more than justified.

Conclusion

The stakes could not be higher. Health care costs are increasing persistently. Projections for the federal government's obligations for Medicare and Medicaid, before any attempt to cover the millions of uninsured, escalate astronomically into the future. The nation spends far more than any other on health care, yet assessments of the quality of that care show that it is too often mediocre or poor quality and low value. Rather than receiving accolades for being a "high performing" industry well worth the enormous national investment, health care is encumbered instead with labels like "fragmented," "dysfunctional" or "unsafe".

At this moment, as we search urgently for ways to move health care from that fragmentation and dysfunction, most agree that information about the quality and cost of health care is central to almost every viable potential solution. Unfortunately, the field does not yet have that information—it does not have entirely satisfactory or ideal measurements or ways of reporting those measures to professionals and individuals. We also do not yet have a host of experience or past evidence to inform every step or even prove that these tools will really work. Instead, we have defined the basic contours of the problem. Now that we've defined the problem, health care leaders from all sectors are attempting to create and build the viable solutions.

At this critical juncture, as this still new measurement enterprise unfolds with its foundational work in developing measurement and gaining experience with reporting, we also find a reinvigorated health information technology sector flush with new federal investment and direction. That quality measurement and reporting experience combined with the potential enhancement and acceleration of wide spread meaningfully applied health information technology could prove to be the necessary accelerator. Naysayers and skeptics, notwithstanding, we will know soon enough if this combination of hope, urgent need, innovation and technology will allow the measurement enterprise to, in fact, fly. That is, we will know if ubiquitous, publicly available information will help move health care from fragmentation and dysfunction onto a path of sustainable high value.

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