

We believe that U.S. healthcare cost and quality challenges cannot be addressed without the implementation of EMRs and other systems to coordinate care.

To receive a weekly e-mail about Brookings news, events, and publications, sign up for the **Brookings Alert** at www.brookings.edu.



1775 Massachusetts Ave. N.W.
Washington, DC 20036

Are Healthcare's Problems Incurable? One Integrated Delivery System's Program for Transforming Its Care

THOMAS H. LEE, MD, MSc AND JAMES J. MONGAN, MD

Rapid advances in medical knowledge have improved care for many conditions, but also produced unpleasant "side effects" including rising costs and disappointing quality. This brief argues that an important strategy for improving healthcare is the development of provider organizations that can implement electronic medical records (EMR) and other systems that can enhance coordination of clinicians, reduce inefficiency, and improve safety and quality.



EMRs and other such systems have been implemented in some organizations that employ salaried physicians (e.g., the Veterans Healthcare System and several staff model health maintenance organizations), but are not common among the more loosely-organized providers that dominate U.S. healthcare. We describe the example of an academic integrated delivery network with a heterogeneous mix of physicians and hospitals that began a program to use such systems to improve efficiency and quality in 2003. This program consists of initiatives with specific focuses including (1) implementation of the information systems infrastructure; (2) patient safety; (3) uniform high quality; (4) disease management; and (5) moderating the rate of rise of healthcare costs. Information on each initiative and its impact is provided.

We believe that U.S. healthcare cost and quality challenges cannot be addressed without the implementation of EMRs and other systems to coordinate care. We also believe that such systems are unlikely to be implemented unless providers are allowed—and even encouraged—to organize themselves into networks with incentives to improve their care. Policy decisions have the potential to slow or accelerate the development of provider organizations that can improve care. A companion brief examines policy issues related to this choice.



Advances in health care technology have vastly expanded the capacity of the medical system to diagnose, treat, and cure illnesses. Unfortunately, improvements in standard medical practice have not kept pace. The result is a large and growing gap between what medical care *could* offer and what it *does* offer.

Closing this gap is a complex task with multiple types of challenges. The rapid advance of knowledge has made it difficult if not impossible for individual physicians to know everything that might benefit their patients, or what treatment strategies might be most efficient. Multiple physicians are often involved in the care of sicker patients, and communication and coordination among them are often far from ideal. The result can sometimes be chaos leading to unnecessary costs and avoidable risks to patients.

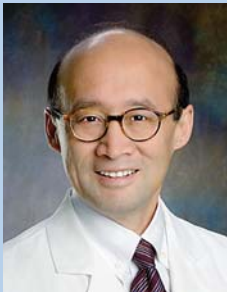
This brief describes the efforts that one organization—Partners Healthcare System [Box 1]—is now making to narrow the gap between current practice and the much greater capacity of modern medicine. Other organizations are engaged in a similar struggle, including Kaiser Permanente and the Mayo Clinic. We emphasize the experience at Partners because we are familiar with it and

because the obstacles we have encountered and continue to face illustrate the gains to be realized (and the obstacles that must be overcome) in moving the frontier of the capabilities of modern medicine.

The challenge is to reduce three types of medical error—under-provision, over-provision, and mis-use—through two concurrent revolutions. One is based on technology, in which physicians and other clinicians adopt such tools as electronic medical records to enhance quality and efficiency. The other revolution, which concerns the culture of medical practice, has at least three distinct elements. Where physicians once relied exclusively on their own memories and judgment alone, they now use decision support embedded in systems like electronic medical records. Rather than working mainly as individuals, physicians now collaborate on teams with other physicians and non-physicians, particularly in the care of patients with complex conditions. Rather than focus solely on the patient in front of them, physicians increasingly are taking responsibility for populations of patients across time and places.

Market forces are reinforcing changes in medical practice by fostering competition among providers on quality and efficiency. Although the traditional fee-for-service payment system does not encourage transformation in healthcare, insurers are beginning to negotiate “pay for performance” contracts with incentives to improve quality and efficiency with provider groups.

Data on physician and hospital efficiency and quality are increasingly available, and are being used to influence providers’ market share and reimbursement. This



Thomas H. Lee, MD, MSc, is Network President of Partners HealthCare System.



James J. Mongan, MD, is Chief Executive Officer for Partners HealthCare System.

Box 1

The Partners Healthcare System is an integrated delivery system founded in 1994 by two of the nation’s foremost academic medical centers, Brigham and Women’s Hospital and Massachusetts General Hospital. This system now includes six community and teaching hospitals and more than 5000 physicians who deliver care to about 2 million people.

brief uses the specific actions and experiences of one academic integrated delivery system with programs for re-engineering its care to illustrate this transformation. Although comparatively new, these initiatives are yielding encouraging preliminary results that support the belief that marked improvements in efficiency, reliability, and safety are within grasp. However, experience to date has revealed internal and external barriers to change; we examine these obstacles in a companion brief.

MARKET CONTEXT AND IMPERATIVE FOR CHANGE

A 2001 IOM report, *Crossing the Quality Chasm*, described the problems that plague U.S. healthcare and laid out the strategies most likely to correct them. As the intensity of medical care has increased, the dangers to patients from medical errors have grown. The use of various medical procedures varies astoundingly among physicians practicing in the same community and among otherwise similar geographic regions. Recommended care is not reliably delivered, according to a landmark study by Elizabeth McGlynn and colleagues (*New England Journal of Medicine*, vol. 348:2635-2645, June 26, 2003). For example, six months after acute myocardial infarction, only about two-thirds of patients are taking medications called beta blockers, which have been shown to markedly reduce their risk of death and complications.

While everyone celebrates advances in healthcare that extend life and improve its quality, these improvements are also the most powerful force increasing healthcare costs. Besides their direct financial costs, these medical advances also generate indirect costs that result from the inability

of healthcare providers to deal with an explosion of information and an increase in the complexity of care. For example, presented with many possible testing strategies, physicians sometimes simultaneously pursue two or more.

Busy physicians often lack the time or training to understand recent research, and may be overwhelmed by a flood of data on their patients. A typical primary care physician spends an average of seventy-four minutes per day reviewing test results, and has to review an estimated 800 chemistry and hematology reports, forty radiology reports, and twelve pathology reports per week. Eighty-three percent of physicians reported that there had been at least one test result they wish they had known about sooner during the previous two months.

Additional challenges result from patients with severe and complex illnesses who may well receive care from several clinicians based at multiple institutions. In such cases, physicians may not communicate adequately with one another or work as a team. They may give conflicting advice or separately prescribe drugs that interact harmfully. One recent study found that primary care physicians were missing key clinical information in 13.6 percent of 1,614 patient visits. These missing data included laboratory results (6.1 percent of all visits), letters/dictation (5.4 percent), radiology results (3.8 percent), physical examinations (3.7 percent), and medications (3.2 percent). The missing data were judged to be “somewhat likely to adversely affect patients” in 44 percent of cases, and to potentially result in delayed care in 59.5 percent. (Smith PC, et al. *Journal of the American Medical Association*, 2005;293:565-571.)

The challenge is to reduce three types of medical error—under-provision, over-provision, and mis-use—through two concurrent revolutions: One industrial, the other cultural.



Simply exhorting physicians to learn more or work harder is unlikely to result in much behavioral change. The better option is to implement systems that improve efficiency, quality, and safety of care.

SYSTEMS ADOPTION AS THE MAJOR STRATEGY FOR CARE IMPROVEMENT

Simply exhorting physicians to learn more or work harder is unlikely to result in much behavioral change. The better option is to implement systems that improve efficiency, quality, and safety of care. Ideally, these systems should reduce one or more of the three types of errors that plague healthcare: under-use of beneficial care, such as mammography to detect early breast cancer; over-use, such as performing a costly radiology test that is unlikely to change the therapeutic outcome; or mis-use, such as prescribing a generally useful medication to a particular patient that has a potentially dangerous interaction with another of the patient's drugs. Error-reducing systems may take the form of software, such as computerized physician order entry or electronic medical records or "humanware," such as teams to follow patients with congestive heart failure. These systems reduce errors by reminding physicians of practices that experts consider beneficial for similar patients.

"SIGNATURE INITIATIVES"

In 2003, Partners began to implement the Signature Initiatives program to improve both hospital and physician office care. "Pay for performance" contracts now provide up to \$90 million a year in incentives for improvement in efficiency, safety, and reliability of care for approximately 500,000 patients. Additional encouragement for performance improvement comes from the increasing public availability of data on hospitals and physicians.

Signature Initiatives are built around five teams. Each team has explicit goals; Box 2 shows how each team reduces the three

main types of medical errors. The System Chief Executive Officer, as well as the Boards of Trustees of the overall System and its individual entities, tracks their progress. Pay-for-performance contracts reinforce managerial exhortation with tangible financial incentives.

TEAM 1: INFORMATION TECHNOLOGY INFRASTRUCTURE

Team 1 focuses on implementing electronic medical records and other information systems with decision support designed to promote compliance with guidelines for patient care. Many studies confirm that hospital and outpatient information systems can improve the reliability, safety, and efficiency of patient care. Unfortunately, these systems are costly, especially for small physician practices. And they often require doctors to change ingrained practice habits. As a result, implementation has been slow. Computerized physician order entry was in use in about 8 percent of U.S. hospitals with fewer than 300 beds, and 17 percent of hospitals with 300 or more beds. These rates are expected to rise but with distressing sluggishness to only 37 percent and 53 percent, respectively, by 2011. (R. Kaushal et al., *Health Affairs*. 2005;24:1281-1289). Partners exceeded these end-of-decade national projections in 2005, with computerized physician order entry completely implemented in two of its academic medical centers and in two of four acute care facilities. Implementation is expected to be completed at the last two community facilities by the end of 2007.

Similar progress has been made in dissemination of electronic medical records, which are currently used by about 90 percent of center-based physicians. As

recently as 2003, only 9 percent of community-based primary care physicians in the Partners' Network were using electronic records, but as of mid-2006, more than 60 percent were using electronic medical records or in the course of implementation. Progress has been most marked among larger physician practices in the Partners network.

TEAM 2: PATIENT SAFETY

The goal of the second initiative is to improve the safety of inpatient medication. By 2010, all member hospitals will have in place integrated systems to minimize medication errors. These systems begin with computerized order entry systems to minimize errors in physician decision-making. Next come measures to ensure

Box 2			
How Partners Signature Initiatives Teams Address the Three Major Types of Errors in Healthcare: Examples			
Team	Type of Error (see text)		
	Over-use (Inefficiency)	Under-use (Suboptimal reliability)	Mis-use (Suboptimal safety)
1. Information infrastructure	Electronic decision support to guide physicians to cost-effective choices in medications and tests	Systems to identify patients with diabetes who have not received tests and treatments known to improve outcomes	Computerized alerts to prevent patients from receiving medications that might endanger them (e.g., due to interactions with other medications)
2. Patient safety	Systems that prevent medical injuries reduce costs	Not applicable	Integrated systems to prevent errors during the ordering and administration of medications
3. Uniform high quality	Highly reliable delivery of optimal care for some subsets of patients (e.g., diabetics) is known to reduce overall costs	Systems to reliably identify key populations of patients, and ensure that they receive all interventions known to be beneficial	Not applicable
4. Disease management	Coordination of care can help prevent admission for the highest risk 3percent of patients who account for 50percent of costs	Team-based programs in which non-physicians help follow patients ensure that they are receiving all key treatments	Systems for coordination of care help identify miscommunication among care-givers that can lead to errors
5. Trend management	Data analyses identify variation in use of resources; decision support and feedback of data reduce rate of rise of radiology and pharmacy costs	Development and dissemination of guidelines for appropriate use of medications and tests increases use for patients who might benefit from them	Not applicable

All large systems can and, we believe, should adopt them because doing so will improve quality. Unfortunately, some current public policies do not encourage and, in some cases, obstruct some of the steps we believe are beneficial.



that the right patient gets the right drug at the right dose at the right time. These measures include “smart pumps” and an electronic medication administration record that uses bar codes on the medications and patient identification bracelets.

Research has shown that such systems dramatically reduce the risk of medication errors. Implementation of computerized physician order entry alone reduced medication-related errors 55 percent in one trial. Improvements to the “decision support”—that is, the sophistication of software evaluating the risk of a drug based on the patient’s age, kidney function, other drugs and medical conditions led to an 83 percent reduction in the overall rate of medication errors. These systems can also decrease costs by preventing complications. Although the value of such systems is well documented, few U.S. hospitals, other than those of the Veterans Administration, have implemented them completely. Partners has made a contractual commitment to have complete implementation of these systems at all its acute care facilities by the end of 2010.

TEAM 3: UNIFORM HIGH QUALITY

The third initiative seeks to assure high quality care for key populations of patients, such as those with acute myocardial infarction, heart failure, or diabetes. Software has been developed and implemented to help identify and track populations of patients with specific diagnoses, and then measure the quality of care. For example, software tracks the percentage of diabetics who have received all recommended interventions, such as eye exams, and met treatment goals, such as control of blood sugar levels. This software facilitates comparison of one

unit’s performance with regional and national “best in class” providers. Such comparisons can highlight additional interventions that might improve care. Optimal treatment of diabetes both improves outcomes and lowers treatment costs. Box 3 describes elements of the quality improvement program. It has helped Partners to improve faster than other hospitals in Massachusetts and the nation as a whole and to exceed the national 90th percentile on all diabetes care process measures.

TEAM 4: DISEASE MANAGEMENT

The fourth initiative addresses both quality and cost. It focuses on providing highly personalized care to the sickest and most expensive patients, such as those with heart failure, cancer, and depression. Such patients usually receive care from multiple physicians at multiple locations, and typically are prescribed numerous medications. They are the most vulnerable to errors due to poor coordination of care. They account for a disproportionate share of costs. In our experience, 3 percent of patients account for nearly half of all healthcare costs.

The potential of disease management programs both to improve patient outcomes and save money has been demonstrated most definitively for patients with congestive heart failure. One study reported that a nurse-driven disease management program for heart failure patients could reduce hospital admissions by 56 percent and improve patient quality of life. (M. W. Rich, et al., *New England Journal of Medicine*, . 1995;333:1190-1195). Although this study is more than a decade old, few hospitals have implemented such programs. The reason? Under fee-for-service payment systems, hospitals are paid

for admissions and services rendered, not for preventing admissions and avoiding the need for services. Nurse practitioner-based programs to manage heart failure at Partners' acute care hospitals reduced rates of admission for heart failure for enrolled patients by at least 15 percent in the first three years of operation.

Experience with this program illustrates one of the obstacles to changes in practice patterns. At first, referral of patients to these programs was left to physician discretion. It became apparent, however, that only about a quarter of potential beneficiaries were being referred. So, physician leadership decided that all patients would automatically be referred into a heart failure program unless their physicians indicated that such referrals were inappropriate. With this more systematic approach, the proportion of patients referred to a heart failure program has jumped from 25 percent to about 80 percent.

Another program provides telephonic nurse "coaching" to high risk Medicaid and uninsured patients. Patients are identified via administrative data, the electronic medical record, and clinician referral. The patients' physicians are contacted by email to seek permission for enrollment in the program. Unless the physician declines within one week, the patient is automatically enrolled, and contact is initiated by the call center nurses. By June 2006, 20 percent of Medicaid and uninsured patients in our system had been identified as eligible for this program because of the presence of chronic conditions and more than one hospitalization in the past year, and half of these were enrolled and agreed to work with the health coach. During any given time, about 1,500 patients are actively being "coached." Preliminary data on the impact of this intervention on costs and patient and physician satisfaction will become available in late 2006.

Box 3
Systems for Improvement of Care of Patients with Diabetes

Function	System
Identification and "tracking" of patient population	Development of computerized registries that can be updated by payer claims data
Decision support software to highlight opportunities to improve care	Electronic records call attention to patients who have not received all recommended interventions, and those whose clinical data (blood pressure, hemoglobin A1c, cholesterol levels) are not in optimal control
Development of non-physician clinical team	Diabetes educators (nurses, nutritionists) provide training and continuity of care outside of physician visits
Patient engagement in "self care"	Patient educational materials made available to physicians via information system; educational materials sent to homes of consenting patients; support for practices to obtain ADA certification (allows for reimbursement for group visits from CMS)
Financial incentives	Improvement in diabetes care made a major focus of all pay-for-performance contracts
Peer pressure/best practice sharing	Quality improvement forums held at which best practices for diabetes care are shared and recognized with awards



TEAM 5: TREND MANAGEMENT

The fifth initiative directly addresses costs by reducing needless use of costly medications and expensive radiology tests. Decision support systems have been developed to guide physicians to the most cost effective choices. Committees of physician experts, supported by pharmacists and other staff, develop guidelines for which medications and which tests should be used first, ranging from “green” (most favored), through “yellow” (second choice), to “red” (last choice). Because of on-line decision support systems, physicians do not have to call a toll-free number to seek authorization for use of such high cost radiology tests as an MRI or a nuclear cardiology scan. Although our system includes two hospitals that handle highly complex cases, we use high cost radiology tests less than average rates for the New England region or the United States as a whole.

CONCLUSION

The U.S. health care system faces three

daunting challenges: sharply rising expenditures, the erosion in insurance coverage, and a large gap between the best and the typical medical care. Fundamental reorganization of health care financing may be necessary to deal with the first two problems. But we believe that even before such reforms are undertaken the current system can deliver far better quality than is now the national norm. We have described a series of steps that one system—consisting of hospitals, clinics and physicians—can do and is doing to narrow the gap between reality and potential. Scattered systems around the nation have undertaken similar efforts, improving quality, cutting costs, or both. Evidence that these measures do make a difference is available. All large systems can and, we believe, should adopt them because doing so will improve quality. Unfortunately, some current public policies do not encourage and, in some cases, obstruct some of the steps we believe are beneficial. We shall examine those policies in a companion brief. **B**

**Tell us what you think of this Health Policy Brief.
E-mail your comments to feedback@brookings.edu.**

Editor
Jennifer Ambrosino

Production/Layout
MillerCox Design

**Vice President of
Communications**
Melissa T. Skolfield

**The Brookings Office
of Communications**

(202) 797-6105
communications@brookings.edu

The views expressed in this brief are those of the author and are not necessarily those of the trustees, officers, or other staff members of the Brookings Institution.

Copyright © 2006
The Brookings Institution

The Brookings Institution

1775 Massachusetts Ave., NW
Washington, DC 20036

NONPROFIT ORG. U.S. POSTAGE PAID FREDERICK, MD PERMIT NO. 225
