Electronic Medical Records:
Barriers and Progress in the United States

IESE SANIT Report
Chris Pounds
December 2004

Executive summary:
The National Institute of Health in 1991 issued a call to action for the health care system in the United States to create a system of electronic medical records (EMR) by 2001. In 2004, there are a few limited cases of EMR implementations but current surveys indicate less than 10% of hospitals are using EMR. This paper investigates the history of EMRs in the US and describes the functions and possible uses for them. From this, we identify barriers to implementation of the system from attitudinal, technical, regulatory and financial perspectives. As managers in health care, we need to understand how to find solutions to these barriers and some strategies are discussed. The greatest challenges are aligning the rewards to those who bear the costs for implementing EMRs and creating financial incentives that balance the long-term rewards with the short-term costs.
Introduction

The United States’ healthcare system is typically seen as being on the vanguard of new technologies. New imaging technologies, new devices, and new pharmaceutical products are constantly being produced in the US. Because prices are uncapped for products that offer direct benefits to patients, the payers are pressured to accept high prices for these goods. Although these devices and drugs are tested in clinical trials with carefully monitored results, once they are approved, the monitoring is much more poorly controlled. This points to a need for better access to patient medical information. Product recalls in pharmaceuticals including Rezulin (diabetes), Serzone (depression), and Vioxx (pain/arthritis) point to the need for better vigilance of patient records to capture the epidemiological evidence that would lead to recall. Each of these products was pulled after two or more years on the market, but the evidence that lead to a recall might have been seen earlier if a systematic record of patients could be compiled by the public health authorities.

One solution to this monitoring problem is the electronic medical record. If the healthcare system could automatically monitor the outcomes of patients on a given therapy, then post-marketing surveillance could be part of the review for every new therapy on the market. This monitoring would be just one of the benefits if a unified health information network.

History and Definition

On the US National policy level the EMR movement points back to the Institute of Medicine report “Crossing the Quality Chasm” in 1991 calling for EMRs by 2001. Several hospitals had begun to automate physician practice well before this, but this call to action has yielded poor results. Part of the problem may be due to the fragmented nature of providers and payers in the US, but there are other barriers to adoption that deserve discussion. In this paper we want to layout the background of EHR and their potential benefits. From this we will then describe how the barriers stand in the way. We will talk about some strategies to overcome these barriers.
What is an Electronic Medical Record? The Gartner group is a leading firm on Information Technology and provides this as a definition:

“A system that contains patient-centric, electronically maintained information about an individual’s health status and care. It focuses on tasks directly related to patient care, unlike other healthcare information systems that support providers’ and payer’s operational processes. The system completely replaces the paper medical chart and thus must meet all clinical, legal and administrative requirements.”

This broad definition from Gartner misses a key element that most definitions include: physicians do direct entry into the system. Currently much medical information is electronically stored, however the information coded is typically for reimbursement or payment systems and therefore misses out on the rich information that the doctor’s notes provide. Support applications such as lab, radiology, and OR, might or might not be connected to this framework so again this definition might fall short.

If we take then a broader definition that includes direct physician input into the system and integration of non-text based data, we have a system that enables the provider an enhanced environment for care management. Functionally, we might look at eight types of tasks that the system would manage:

<table>
<thead>
<tr>
<th>Task</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewing</td>
<td>Distributed information can be integrated into a single record that improves chart availability and structures the data</td>
</tr>
<tr>
<td>Documentation and care management</td>
<td>This might be through templated forms or with dictation and transcription. EMRs improve legibility and accessibility and some include problem-specific templates in entering the data.</td>
</tr>
<tr>
<td>Ordering</td>
<td>Electronic prescribing is the most common form, but in the hospital this might include lab work or other tests.</td>
</tr>
<tr>
<td>Messaging</td>
<td>Messages from one provider to another may be managed within the system with better hand-offs and fewer “dropped balls.”</td>
</tr>
<tr>
<td>Analysis and Reporting</td>
<td>Reviewing results of treatment over time can help direct training and closer patient monitoring. Reports may also go to external providers or accreditation units.</td>
</tr>
<tr>
<td>Patient-directed functionality</td>
<td>Visibility of patients into the system is not common presently, but this is an avenue that may be developed.</td>
</tr>
<tr>
<td>Billing</td>
<td>With physician entry, the complete coding of treatments would be common and the physician would be able to defend directly claims from payers (Medicare) regarding treatments.</td>
</tr>
</tbody>
</table>
Outside of the list of tasks for the provider, someone needs to store the information and secure the system itself as well as train users, update the system, and provide accessibility to the different parties involved.

One of the most commonly mentioned elements of the EMR system is CPOE. CPOE stands for computerized physician order entry. With a CPOE system, the physician directly orders some type of therapy for the patient and this is routed to others in the healthcare provider chain. This is most commonly an electronic prescription, but might include testing and follow-up examinations or referrals.

In the process of entering the data, the healthcare provider may also encounter a clinical decision support (CDS) system. These CDS systems provide specific clinical knowledge to help enhance patient care. It may include background on a disease, a checklist for treatment or perhaps warnings that remind of interactions of prescribed therapies. CDS systems may be deployed for several reasons

- to improve quality and safety
- to support disease management initiatives
- to foster evidence or guideline-based medical practice
- to improve reimbursement
- to improve regulatory/accreditation/reporting compliance, or
- to empower patients.

The CDS system may require different types of involvement in the treatment plan depending on the type of CDS intervention. These interventions can be classified in three ways:

<table>
<thead>
<tr>
<th>Intervention type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proactive</td>
<td>Logic that guides the choice of action, diagnosis or prescription. Might suggest a diagnosis or a plan of action for the physician. A checklist of questions regarding diseases or history would be a proactive intervention.</td>
</tr>
<tr>
<td>Reactive</td>
<td>Executed after a user action. Perhaps interaction warnings or allergies may come up, warnings about excessive dosing.</td>
</tr>
<tr>
<td>Informational</td>
<td>Do not require a change in action, but merely provide information or background on a disease or action. This might include a report that integrates data in the record relating to a single disease.</td>
</tr>
</tbody>
</table>

Again, just like the record itself, the system of guidelines and forms and questions requires support from the organization.

The EMR is far-reaching and would require some large changes in a health provider. Looking from the provider’s prospective, are the benefits truly worth all of the changes that would need to occur in an implementation of EMRs? Now that we have an idea of what information and tasks are included in the EMR, we examine what the benefits and the claimed benefits might look like.
**Benefits of EMRs**

Looking back to the Institute of Medicine 1991 report, plainly the quality of care must be one element in the improvement. Since quality in healthcare has many dimensions, we look at how this might play out with a system. One structure to consider when examining the benefits looks at analysis at different layers of aggregation of treatments. At the point of care for an individual, we have case management benefits. If we consider populations of patients then disease management strategies could detect changes in the environment. Another way of looking at the populations is to look at the utilization of resources at the population. Then if we aggregate the information across all individuals and providers we have health system management as another lens on the information.

Here we look at what different types of management would detect:

<table>
<thead>
<tr>
<th>Case Management</th>
<th>Disease Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential adverse medication interaction due to multiple providers and prescriptions</td>
<td></td>
</tr>
<tr>
<td>Failure of patient or provider follow through plan of care</td>
<td>Treatment not according to evidence-based guidelines</td>
</tr>
<tr>
<td>Unsafe home environment.</td>
<td>Potential medication error of omission</td>
</tr>
<tr>
<td></td>
<td>Lack of appropriate patient monitoring or diagnostic testing.</td>
</tr>
<tr>
<td><strong>Utilization Management</strong></td>
<td><strong>Health System Management</strong></td>
</tr>
<tr>
<td>Delay in inpatient testing or treatment</td>
<td>Disease outbreaks</td>
</tr>
<tr>
<td>Failure of provider to deliver standardized treatment</td>
<td>Post-marketing drug surveillance of adverse events</td>
</tr>
<tr>
<td>A pattern of adverse events linked to a facility that cause extended length of stay.</td>
<td>Longitudinal monitoring to detect underserved populations</td>
</tr>
<tr>
<td></td>
<td>Tighter control of individual health information</td>
</tr>
</tbody>
</table>

**Error Reduction**

The most obvious desired benefit of introducing automation into the health-system is the reduction of medical errors. Various studies have put the mortality rate at nearly 100,000 deaths per year from medical errors. Not having the right information at the right time is key problem in medical decision making errors. In prescribing, the check in the system comes from the dispensing pharmacist. According to one study, of the 8.8 MM Adverse Drug events in the US in one year, about 3 MM are preventable.

Several sites that were early to implement elements of HER have shown reductions in errors.

<table>
<thead>
<tr>
<th>Site</th>
<th>Change in Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brigham and Women’s Hospital, Boston</td>
<td>55% reduction in serious medication errors; 81% reduction over 4.5 years</td>
</tr>
<tr>
<td></td>
<td>Reduced by 24% redundant lab tests</td>
</tr>
</tbody>
</table>
LDS Hospital, Salt Lake City  
CPOE for anti-infectives reduced ADEs by 30%; increased precise dosing from 40% to 99%; and decreased usage by 23%

Wishard Memorial Hospital, Indianapolis  
Drug compliance increased from 22% to 46%  
14% fewer tests ordered

According to research firm Harris Interactive, the major causes of medical errors include multiple physicians treating the same patient without all having access to all the patient’s medical records and with each storing different, incomplete medical records in different places. With EMRs and idealized visibility, coordination would advance substantially.

**Beneficiaries of EMR Implementation**

It would seem then there are large societal benefits to movement toward an integrated electronic medical record system. The structure presented has the failure of not linking to the element of the system, that is, the patients, providers and payers. If we reorient to this perspective costs and the benefits take on a less optimistic perspective with differences in alignment of costs and benefits.

Typically the costs of the EMR development is burdened on the physician practice (or more typically a group practice) and the hospital system. Costs vary on implementation from around $5,000 to $10,000 per physician for most institutions and practices. Thinking about the benefits to providers, they might be very small. Billing might improve with an EMR system, and with CDS engagement the risks involved in practicing might be reduced. Certainly patients hope to gain from better quality of care, but medicine does not want follow the service model that higher quality leads to higher customer satisfaction and therefore more repeat business.

**Payers**

- Population health management
- Improvements in formulary compliance
- Decreased lost work days
- Increased employee productivity
- Measures of provider quality
- Reductions in unnecessary admissions
- Fewer specialist referrals

**Patients**

- Better quality
- Safer medicine
- Enhanced privacy
- Greater visibility on health records
- Faster and easier prescription

**Providers**

- Information availability
- Less callbacks and rework (formulary coverage)
- Automated processes (Rx renewal)
- Lower risk of practicing
Some estimates of the savings to the system indicate a 10% to 30% reduction in costs because of less unnecessary medicine, but most of this would accrue to the payers and employers. The providers are paying the burden of the cost and with the potential for an unpleasant transition, many providers have not moved forward. The misalignment of the rewards and costs of implementing EMRs is just one of the barriers that the healthcare system faces.

**Barriers to EMRs**

To survey the barriers to EMRs, we again reflect back on the IOM 2001 report on Crossing the Quality Chasm and its key recommendations:

- Private and public purchasers should examine their current payment methods to remove barriers that currently impede quality improvement and to build in stronger incentives for quality.
- The Centers for Medicare and Medicaid Services (CMS) and the Agency for Healthcare Research and Quality (AHRQ) with input from private payers, health care organizations, and clinicians should develop a research agenda to identify, pilot test, and evaluate various options for better aligning current payment methods with quality improvement goals.

From the beginning it seems that money was needed to align the healthcare system to move toward EMRs. In our survey of the literature, certainly the financial incentives are an important element to the success of changes in the system, but other barriers exist and must be managed to make change in the system.

A 2004 survey of healthcare decision-makers by the consultancy CapGemini identified three top areas of barriers to EMR adoption. First among responses were the capital costs involved, with 58% of respondents identifying this barrier. This is not surprising given the IOM report in 1991 and the misaligned incentives. Falling behind costs is physician adoption with 46% claiming this as a major implementation barrier for his or her organization. “In particular, they identified physician resistance to change and lack of office technology as obstacles that need to be overcome. Several pointed to the need for financial incentives specifically geared toward physicians.” Falling third behind physicians was the lack of standards. About 30% of the respondents would want this resolved to improve EMR adoption.

Taking the first two and categorizing issues around Financial and Attitudinal barriers, we can generalize the third point as falling into the category of Technical barriers. A final category remains and this is the regulatory area. These four categories: Attitudinal, Technical, Regulatory, and Financial form the basis for our analysis of barriers.
Attitudinal Barriers

“You can’t teach an old dog a new trick.”

Currently physicians are trained following an educational apprentice model. Students come in with a background in science then go through several more years of education (medical school) that terminates with 3 to 7 years of on-the-job training (residency) under the supervision of an experienced physician. In the course of this training, physicians cultivate paths of practice that become second nature over time.

For a physician who has been practicing for years with similar patterns, the adoption of new tools and new procedures is often going to face resistance. Although physicians are scientists, the routine nature of collecting information on a chart is one aspect of medical practice that has not evolved substantially over the course of their practice. Introduction of new technology that will change these habits is often not a welcome change.

From a doctor’s standpoint, says Glaser [EMR technology implementer], adopting the technology can seem like all risk and little reward. “It’s expensive, it’s disruptive, and it’s hard to get used to,” he says. And during the three to six months it takes for most doctors to get used to a new system, productivity can fall by as much as 20 percent, Glaser says.¹

When the economic case is not evident, this is especially troubling to a practicing physician. Demands of managed care have pressured physicians and their time management, therefore systems that slow them down for an inchoate reward are not seen as welcome. Improvement in quality of care is a stated goal of nearly every implementation of EMR, however residing at the core of this statement is that quality can be improved and that the physician as a care provider currently is not providing the highest quality product.

CDS systems in an EMR seem to take away the flexibility in the practice of medicine with lists and recommendations practices. Instead of viewing these as aids to physician decision making, CDS is seen as making choices for the physician and thus is insulting. The idea that EMRs will improve safety again insults the physician and her belief that she is doing everything possible in the care of her patients.
In some EMR installations, it was observed that those who disliked the system were more vocal about their dislike of the system than those who were satisfied. This was discovered by asking for individual satisfaction (at 83%) and then asking what percentage of their colleagues they believed were satisfied (51%).

Because the standard of care does not require electronic medical records, physicians take a negative attitude toward EMR adoption. A clear case for improvement in quality must be made, and the introduction of CDS systems must be carefully managed. Finally, the voice of the organization undergoing transition must take on a positive tone and not be dragged down by negative attitudes.

**Technical Barriers**

Health Information Technology (HIT) should be an enabler to better care. Physicians are constantly adjusting to new technology with new drugs, devices and imaging tools being introduced into the practice of medicine. Unfortunately, information technology investments seem to fall behind that of these therapeutic advances. We can attribute much of the barriers in technology to a lack of standards, poor system interfaces, and unreliable tools.

The HIT field is currently a fragmented market with a layer of large vendors that integrate information coming from the hundreds of small and medium-sized organizations that create tools to build elements in an electronic medical record. Many hospitals want to do a customized approach to implementation and will develop home-grown applications and then sell these to other providers. Practice management had its roots in technologically advanced physicians creating tools for individual practices. It is only recently that larger vendors like WebMD have entered the market with solutions.

Although Medicare is federally managed, Medicaid is managed through state organizations so the reimbursement rules are typically written state by state and this limits the opportunity for a national body to regulate how information should be collected for reimbursement. Without a single market place at the national level, and low barriers to entry because of a paucity of standards, EMR solutions come from many small vendors that market to the niches rather than providing a single solution. Interoperability and functional similarity are not on the radar when a firm picks a sub-market to approach. When hospital departments each have their own EMR element, the top-level solution for a facility may just be a system that integrates interfaces across other systems. The lack of standards at the national level is slowing development because of the information complexities in the current fragmented system. Proprietary systems abound in medical care, so a provider must invest mental energy in learning and managing information in each system that she comes in contact with. This builds up the attitudinal resistance to implementation.

System design is also an element that relates to the physician’s attitude toward EMR technology. Taking notes by hand is most natural way of recording information for most adults. Voice recording would be even better, but retrieval of voice information is generally a linear process unless transcription takes place. When technology is introduced into the charting environment, it is almost impossible for the interface to improve the recording efficiency of a pen and chart. Other benefits to the overall process...
of storage and retrieval must be identified to make the case for an improvement in the system.

Often the marketing brochures for the EMR providers set expectations beyond what technology can deliver. When a physician wants to record information on a chart, he can pick it up, click on his pen and begin. But with computing, 100% availability is a promise that cannot be kept. Yes, the pen may need ink or it may explode in his pocket but it does not need to reboot or shutdown for backups. Because systems have to interact with many other systems without a single standard of exchange, the EMR faces challenges to reliability that cast doubt on things.

**Regulatory Barriers**

Although the IOM recommendations talk of adapting payment methods to move the country toward EMRs, two pieces of federal legislation seem to stand in the way of this progress.

The Social Security Act, Sec.1877 is referred to as the Stark Act. In order to prevent anti-trust activities, this legislation limits the incentives for payment that can be made to providers who are providing care under contract of the federal government. Whereas Medicare and Medicaid are less than 40% of all payments made in the health care system, they represent a substantial segment of the healthcare system and helped move the system toward DRG based reimbursement in the 1980s. We mentioned earlier that because management of payments are handled at the state level, national policies regarding payment methods or information systems are not part of the equation. State boards also control licensure of physicians, so national standards would be an exception to this system.

The Health Information Portability and Accountability Act (HIPAA) has also played a part in slowing EMR adoption. This act speaks to privacy concerns and the handling of personal medical records. Under the act, providers need to take steps to secure private medical information from outside sources. The typical consumer has heard stories of credit card numbers on the internet and might believe that her medical information was typed into a computer and broadcast to millions. While this has been the case for certain public figures (Katie Couric of the NBC Today show), the act makes providers responsible for safeguarding this information. Because this may require additional investment, providers have been reluctant to implement advanced measures because of security.

One study from URAC, an auditing and accrediting non-profit agency, found just 3 out of 300 healthcare organizations had comprehensive security- management programs that enable them to comply with HIPAA standards.

Regulatory and policy changes would help move the US toward EMR adoption.

**Financial Barriers**

The IOM recommendations both mention payments as an issue with EMR adoption. The lessening the burden of system costs and realignment of reimbursement incentives would help move EMR adoption ahead.
Costs for buying and installing even a simple practice based solution run to $50,000 or $60,000 without including conversion of historical data. If we consider conversion of historical data, then the price tags run much higher. For a hospital system, the price tag of $10,000 per physician is a typical benchmark for installation with additional costs around $1,000 per year on IT infrastructure and maintenance. Going back to the discussion of the beneficiaries, it is the providers who are given these bills with most of the benefits accruing to the patients and the payers. Because of the agency issues involved with private health insurance, the patients are not going to willing to pay directly for the quality improvements. Payers, both private and public, must put together incentives for providers to swallow the bitter pill of deployment costs along with temporary disruptions in productivity during deployment. Small and mid-sized community hospitals (100-400 beds) will be reluctant to invest in EMR technologies without a convincing business case.

Given the attitudes, technology, regulation, and money challenges, it would seem that health technology is hard pressed to advance to a universal EMR solution. Clinicians react poorly to Clinical Decision Support systems when they limit the free practice of medicine. Collecting information electronically is difficult and together with the lack of standards creates technical barriers. Privacy legislation and the limit of incentives for federal payment present regulatory barriers, and the rewards and costs of systems are not aligned financially.

In the next section, we talk about approaches that help overcome these barriers. Some of these barriers will require coordinated efforts from all parties involved to be resolved.

**Solutions**

**Attitudinal**
Organizational commitment can be built up through participation in creating processes for the institution. Because an EMR implementation presents a great change to the practice of medicine in a hospital or practice, involvement of the actors in design is key. One review of 5 institutions that were early to adopt EMR systems found:

All sites undertook enormous efforts to involve physicians and other clinicians in the design and modification of these systems. This goal was achieved through a wide range of formal and informal mechanisms to capture timely feedback from clinicians. All sites recruited respected clinicians from medical, nursing, and therapy backgrounds, with informatics experience or interest, to act as the bridge between practicing clinicians and the information systems. It was considered crucial that the decision support and rules within the order entry and event monitoring systems were seen to have ownership by an expert physician or clinical group and not by the “computer.”

When the champion of a change process is someone who the participants identify with rather than an outsider (or even worse, an administrator!), resistance is easier to manage. In-group-out-group behaviors fall away and familiarity mediates conflict. In the case of group practice implementations, the internal champion is a requirement for success.
These physician leaders commit extra effort to developing the practice technology and may even train colleagues to make the system go.

Training is another way of keeping the physician attitudes from stopping the process. Phased implementation is one way to ease the information burden for the resistant class of care providers. Basic functions can be rolled out then training on more advanced functions could take place over the coming months. The technical teams must be willing to invest a lot of time in post-deployment hand-holding to move the system forward. Because the systems often promise advanced analysis techniques, power-users may be separated from the herd so that they will be satisfied with the delivered product.

In the review of early leading organizations in EMR adoption, exchange between the sites was part of the implementation success. This type of sharing is common among the pioneers of technology adoption, but findings from these sites and others in the early mainstream can be propagated to ease the process for the mainstream adopters.

CDS deployment may be an especially difficult element in the deployment. Although this is the underpinning of the quality improvements, rapid deployment can alienate providers and give them a sense that the system is managing the patient. Starting the implementation of informative CDS and then moving to Proactive and finally Reactive will reflect a slow tightening of practice. The story from the airline industry that the new planes will have a pilot and a dog in the cockpit, and the dog’s job is to watch the pilot to make sure that he does not touch anything may be a fear in technology-aided medicine.

At the same time that transitions are slowed to aid the change process, this may be a time of greatly depressed productivity for the provider. The pressure to generate revenue with a rapid deployment while still insuring buy-in with a careful deployment must be managed by the organization.

Surveys among users and non-users of EMRs indicate large perceptual gaps about the features and benefits of EMRs between the two populations. Users have a stronger opinion about the security, confidentiality, and ease of data entry with EMRs compared to non-users. These changes in attitudes may be a function of exposure to EMR systems; therefore EMR evangelism from physician to physician may be the most effective path for attitude adjustments.

Attitudinal barriers can be worn down through EMR exposure, training, and phased implementation. Organizations should consider that the implementation does not end with the go-live date but must be ongoing to build momentum for the project.

**Technical**

In 2003, the Kaiser Foundation did a study that found that Health invests only 2% in IT, vs. 10% in other information intensive industries. These technical barriers maybe overcome with greater investment, however this would only increase the financial barriers. Here we focus in on improving the approach to the lack of standards, poor system interfaces, and unreliable tools.

The lack of standards in the system is true at the aggregate level, but through several government and global organizations there have been steps toward standards. HL7 is a message standard currently being used by 2,000 US hospitals. Canada, Australia and
much of Europe share this standard with the US CDC and most pharmaceutical companies. About 90% of vendors use HL7 as part of their systems. An imaging standard called DICOM has been established and links to all imaging vendors. Additional standard sublanguages exist for lab work, drugs, and units of measure, organism names, topology and pathology. This is one step toward portability and interoperability; however a comprehensive standard would include all of these areas. These standards must also be updated and linked to external systems so that an evolving standard can be part of the system.

FDA issued a final rule in December 2003 that all labeling changes need to be submitted electronically. This established a formal standard for the label. Barcoding has been explored and a database of adverse events may follow. Federal government organizations require standard processes are the best way to move the healthcare market toward a standards body.

System interfaces have been another barrier to adoption, but a deployment process that engages the participant can help balance the pressure for structure with the ease of free text. Using a computer to enter free text is much easier than structuring the communication, but the retrieval process is imperfect and distribution of free text to others may require linear processing. Forms with templates to guide recording of information or lists of options can help bring valuable clinical information to the healthcare provider as they interact with the patient. Historical data may be displayed and organized in ways that help highlight a specific disorder or disease.

With fixed standards and careful deployment, the promises of the vendors may be something that are met in the near-term. Standard and open source systems could be created to be a part of larger implementations. Just as the Linux operating system has various flavors on an open-source base, the model for developing EMR solutions could evolve into a consultative environment with service implementers including small customization routines as part of the deployments.

A single national standard for EMRs would go the farthest in managing the technical barriers around EMRs, but a formal certification process might be a self-regulating activity for the vendors. Some organizations currently produce reviews of products, but not all vendors are participating in the reviews.

**Regulatory**

The Medicare Modernization Act of 2003 was passed with the primary goal of providing coverage of pharmaceuticals to the elderly population. Some parts of the act speak to reform of the private insurance market to expand flexibility, however the funding limitations of the Stark act remain in place.

President George W. Bush has stated privacy concerns over digitizing medical records are minimal.

"[A]s you hear the idea of moving your information across the Internet, you've just got to know it's got to be with your permission," he told the media. "These are your records, it's your health, and you can decide whether or not people can use your records. This is important for people to understand that, that [sic] those of us in
government who talk about spreading information also, first and foremost, keep your privacy in mind."

As with many things, the current US president seems unaware of the URAC survey on medical records privacy. A comprehensive review of HIPAA with guidelines and specific standards for the health information technology sector may be required by the government to move this to the mandated level.

Federalism reflected in Medicare reimbursement and state licensure could be trumped by Federal guidelines in the coming round Medicare reform. Currently the CMS is examining reform of funding sources, but a side benefit to information technology would be a mandate to standardize some processes so that a national marketplace could be created. Just as DRG based reimbursement became part of Medicare, compliance targets for EMR can be made part of state funding formulae. Governance of the EMR data market needs to be spelled out and federal organizations seem to be best able to mandate policy choices.

**Financial**

Finding financial solutions seems to be the hardest hurdle to overcome. Changes in the regulatory environment can help adjust the way rewards are given from the public funding and therefore can lead the entire healthcare system toward.

One financial reward from payers can be quality based rewards. These systems typically include EMR components especially in the ambulatory care market. The Leapfrog Group is a quality assessment group for hospitals and other providers. Leapfrog compliant hospitals are mandated to have CPOE and employers (through payers) are rewarding institutions that are Leapfrog compliant with bonuses. Mandating CPOE is seen as a more palatable solution than a Proactive or Reactive CDS system that would face attitudinal resistance. Although access to capital was a complaint from the CapGemini survey, a survey of hospital parking lots would indicate that at the practice level it does not seem to be a problem for physicians to make capital purchases. For the hospitals themselves, the consolidation of the industry has shown that capital markets are not closed here either.

For smaller or isolated providers, government funding through low interest loans can be made available. In the UK, initiatives were started in the late 1990s to increase health information technology at the local level, but additional funding was approved at the national level to help move the process forward to the tune of £1.3 billion

Several types of incentives can be associated with the payment stream. One model is to pay a bonus to providers who provide the EMR with the claim submission.

**Conclusions**

Today, the Veterans’ Administration has system-wide access to medical records and this really helps serve a client base that is mobile. Across more than 160 hospitals, residents are being trained in the new system and hopefully this will provide a new cadre of physicians who can champion the technology. Cities such as Santa Barbara, Seattle, and Indianapolis have built data-exchange models that give visibility to patient information.
across providers and care sites while still respecting privacy. In May 2004, Kaiser Permanente began deployment of EMR to its entire system of 8.3 MM covered lives. Because Kaiser is a payer and a provider, the benefits can accrue to the same entity, but generally this is not the case in the US market.

These cases show that on a limited scale, EMRs are a reality.

To drive wholesale change in this area, government leadership is essential, and this has been missing. The potential savings for the involved parties in health care delivery are very large, but because the benefits are not aligned to the gains and the costs are incurred in the short term with long-term rewards, we have barriers to success. Steps such as the creation of a National Coordinator for Health Information Technology by President Bush show that there may be progress in the area. By pressuring the government at the state and federal level to create the proper incentive structure, today’s Americans can hope for an integrated information delivery system for health care.

**Selected Bibliography**

Electronic Medical Record: Electronic patient chart manager helps physicians efficiently access data, Life Science Weekly 21 September 2004


Medical Records Institute’s Sixth Annual Survey of Electronic Health Record Trends and Usage for 2004.  


Feldstein, M.J., Medicine lags far behind in use of electronic records, St. Louis Post-Dispatch 26 September 2004 A10.


Jonietz, E., **Paperless medicine** Technology Review 106:3 p62, Apr 2003.


McDonald, C., **The Barriers to Electronic Medical Record Systems and How to Overcome Them**, J Am Med Inform Assoc. 1997;4:213–221.


---

1 **Paperless medicine** Erika Jonietz *Technology Review: Apr 2003; 106, 3 p62.*