

# Health care IT adoption could save USD162 billion



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## Abstract

This article looks at how healthcare IT can save hospitals and health services valuable funding and how these saving compare to the costs involved. The chief barriers to success and possible solutions to these difficulties are outlined. The author also points to the need for government intervention in implementing healthcare IT on a board scale.

Today's savvy consumer is far more likely to make an airline reservation in front of a personal computer than in front of an airport ticket counter. Cash is obtained from an automated teller machine (ATM) whether at the office, on vacation or two blocks from home. Holiday shopping includes as much or more time on amazon.com, barnesandnoble.com or ebay.com than at the crowded local mall.

But consumers who embrace technology to improve the quality, efficiency and convenience of their travel, banking and retail experiences have fewer options when it comes to health care.

The US health care industry offers some of the world's most impressive medical talent and powerful interventions and medicines, but it is also one of the world's most inefficient information enterprises.

For an industry dedicated to enhancing our well-being, the US health system does not produce the world's best health outcomes. Although it absorbs more than USD1.7 trillion per year – twice the Organisation for Economic Cooperation and Development (OECD) per-capita average – premature mortality in the United States is significantly higher than OECD averages. Numerous respected industry organizations report the loss of tens of thousands of lives each year as a result of avoidable error. In addition, while consumers contend with the safety risks perpetuated by information fragmentation, they pay astronomical costs for health care services. US health care expenditures are by far the world's highest, with citizens investing an average of USD5,267 for health coverage in 2002, USD3,074 more than the median OECD country (see Table 1).

Why does a system that boasts some of the world's top medical talent and innovative scientific discovery perpetuate such a cost-to-quality discrepancy? Poor information management is a primary cause. Most medical records are paper-based. They cannot be used to maximize safety, coordinate care, measure quality or promote adherence to best practices and care standards. What's more, consumers generally lack the information they need about costs or

quality to make informed decisions when seeking and selecting health care services.

In 2003, RAND began a study to better understand the role and importance of health care information technology (HIT) and electronic medical record (EMR) systems in improving the clinical and operational performance of the health care industry. Our discoveries revealed that:

- Properly implemented, HIT would save money and significantly improve quality.
- Total annual savings could reach USD162 billion, stemming from improvements in three areas:
  - increased efficiency (USD77 billion);
  - reduced occurrence of adverse drug events (USD4 billion);
  - improved condition management and preventive care (USD81 billion);
- Implementation of EMRs would cost approximately USD8 billion per year.
- Obstacles include market disincentives. Generally, those who pay for HIT do not receive the related savings.
- The government should act now to overcome obstacles and realize benefits.

Overall, the study reinforced the growing belief that widespread adoption of EMR systems could dramatically enhance the safety, quality and efficiency of health care, fundamentally improving

Percent of GDP	Country	Per capita (\$PPP)
9.1	Australia*	2,504
9.6	Canada	2,931
6.1	Mexico	553
7.7	United Kingdom	2,160
14.6	United States	5,267

Source: Organisation for Economic Cooperation and Development, *OECD Health Data 2004* (Paris: OECD 2005). Notes: PPP is purchasing power parity. GDP is gross domestic product. \*2001

Table 1: Per capita health spending in Organization for Economic Cooperation and Development (OECD) countries, 2002

## ➔ Cerner: Healthcare Solutions on a National Scale

The demands of a national healthcare IT program mean that organizations must use systems that work on two levels: at the bedside and across a large-scale network.

With more than 25 years of healthcare innovation, Cerner Corp. is uniquely qualified to meet both types of demands. Based in Kansas City, Mo. and with offices around the world, Cerner is optimizing the delivery of healthcare in the United States, Europe, Canada, Australia, Singapore, Malaysia and the Middle East.

### Caring for Patients

First known for its clinical solutions such as *PathNet*® for the laboratory and *RadNet*® for radiology, Cerner now has 57 software solutions spanning all areas of healthcare. Cerner is the recognized market leader in the areas of computer physician order entry (CPOE) and the electronic health record.

In 2004, Cerner had the largest increase in the number of acute-care organizations and hospitals live with CPOE, according to KLAS, a healthcare IT research and consulting firm. Additionally, the Medical Records Institute recently awarded, for the second consecutive year, first honors to Cerner's acute-care electronic health record at the Toward an Electronic Patient Record (TEPR) conference.

Individually, Cerner's solutions increase patient safety and improve workflow. Collectively, these same solutions can transform healthcare through a unified, enterprise-wide architecture design. Cerner believes that healthcare should revolve around the person, not the encounter, thus creating the Community Health Model. This model engages all stakeholders in the individual's healthcare, closing the information gaps that lead to inefficiency, variance and decreased patient safety.

### Large-Scale Infrastructure

The Community Health Model is based on a single platform utility that can be deployed and scaled as the model is extended to support a national health information technology agenda, as well as regional initiatives around managing targeted healthcare populations. Contributors to the Community Health Record include health organizations, clinicians, consumers, administrative staff and health plans to name a few. Access to the various levels of data is determined collaboratively among the contributors and the administrative organization as well as any governmental or region specific regulations. Through the shared responsibility of all participants, unnecessary and excess cost can be eliminated and redirected where it is needed to optimize health outcomes across the broader population.

With *Cerner Millennium*®, the company proved the Community Health Model through several large implementations.

- Cerner is providing the electronic booking component of the National Health Service's National Programme for IT in England. Despite the complexity of this massive project, Cerner has met all the deadlines the NHS has set.
- London Health Services and St. Joseph's Health Care created a technology structure to provide improved care to the residents of southwestern Ontario, Canada. These separate organizations worked with Cerner to implement a single network for 2.8 million people that focuses on the person, not the healthcare episode.
- Cerner provides an electronic health record for residents enrolled in a state-sponsored insurance plan in Tennessee. The record connects patients and healthcare professionals, and relies heavily on e-prescribing to gain efficiencies and save money. E-prescribing encourages participation by creating a network to communicate formularies, and measure and reward compliance.

With offices worldwide, Cerner is able to listen to country specific healthcare challenges and tailor solutions that meet those needs.

For more information, contact Rachel Boden at [rboden@cerner.com](mailto:rboden@cerner.com).



**Located:** Kansas City, Missouri

**Date Founded:** 1979

**Founders:** Neal Patterson, Cliff Illig and Paul Gorup. All three continue to have significant roles, with Patterson as chairman and chief executive officer, Illig as vice chairman and Gorup as senior vice president of Knowledge & Discovery.

**Employees:** More than 6,000 worldwide

**Offices:** Seven locations in the United States, plus offices in Bangalore, India; Barcelona, Spain; Idstein, Germany; Kuala Lumpur, Malaysia; London; Paris; Riyadh, Saudi Arabia; Sydney, Australia; and Singapore.

**Solutions:** 57 main solutions in seven main categories:

- Enterprise-Wide Systems, which automate process throughout a healthcare organization, including access and care management, and financial and operational management.
- Clinical Systems, which automate processes in ancillary departments such as laboratory and radiology.
- Decision Support and Knowledge, which enhance clinical and business processes with information and actions.
- Consumer, supporting Internet-based healthcare communities to connect individuals, providers and health systems.
- Packaged Solutions, addressing issues unique to specific care settings.
- Segment Solutions, which address issues unique to organization type, such as pediatric and academic organizations.
- Technologies for developing solutions or connecting other technologies and systems to Cerner Millennium.

**R&D Investment:** Cerner will invest more than \$1 billion in the next five years in research and development.

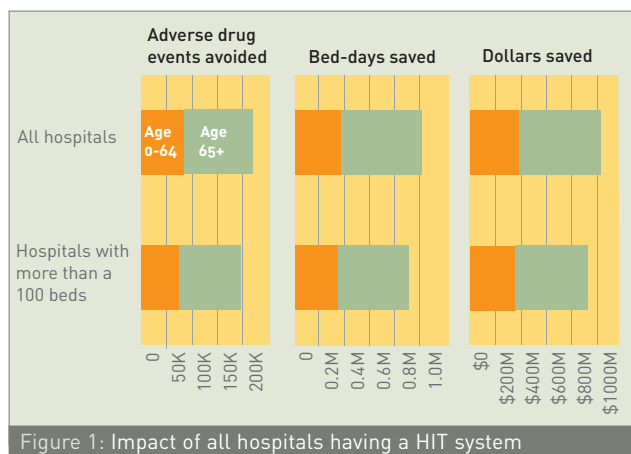


Figure 1: Impact of all hospitals having a HIT system

**Consumers’ experiences**

*A challenged industry can learn from others*

The telecommunications, finance, retail and general merchandising industries reduced costs and improved quality through investments in IT. Could health care achieve similar results? Palpable evidence of this technological commitment became apparent to consumers in the form of bar-coded checkouts, ATMs and online reservation systems. The health care industry can learn much from these examples by embracing widespread use of IT.

Today, the US health care system is in trouble. Despite consuming the largest allocation of the US economy, error and inefficiency remain prevalent. The system is widely recognized for its high price tags and propensity for wasteful practices.

More widespread use of sophisticated and comprehensive information management systems could help bring about substantial improvement in the quality, safety and effectiveness. Most providers lack the information systems necessary to coordinate a patient’s care with other providers, share needed information, monitor compliance with prevention and disease-management guidelines and measure and improve performance.

*HIT’s potential includes significant savings, increased safety and better health*

The RAND team drew upon data from a number of sources, including surveys, publications, interviews and expert panel reviews. The team also analyzed the costs and benefits of information technology in other industries, paying special attention to the factors that enabled such technology to succeed. The team then prepared mathematical models and estimates of the costs and benefits of HIT implementation.

HIT encompasses a variety of integrated data sources, including EMRs, decision support systems, and computerized physician order entry (CPOE). In addition, HIT systems provide timely access to patient information and (if standardized and networked) can communicate health information with other providers, patients and insurers. Creating and maintaining such systems is complex. But the benefits can include dramatic efficiency savings, greatly increased safety and

benefits to consumers’ health and wellness.

*Efficiency savings*

If most hospitals and physician practices adopted HIT, the potential efficiency savings for both inpatient and outpatient care could average more than USD77 billion per year. The largest savings come from reduced hospital stays made possible by increased safety, better scheduling and more streamlined care coordination; reduced administrative time for nurses; and more efficient and effective drug utilization.

Consumers stand to benefit in several ways from these types of efficiency improvements. A shorter length of hospital stay clearly impacts on patients’ comfort levels, with efficient care placing them on the road to a more rapid recovery and minimizing the cost and possible distress of a hospital admission. Nurses spending less time on administration have more time for direct care, contributing their unique skills to a person’s healing process and overall outlook. And more efficient use of drug therapy would likely return cost savings to the consumer.

*Increased safety*

Increased safety results largely from the alerts and reminders generated by CPOE systems. With thousands of articles, clinical trials and new drugs released annually, not even the top physicians can keep pace with the rapid expansion of knowledge and scientific discovery. By placing orders via computer, physicians can take advantage of automatic prompts and guides that bring the latest available evidence directly to their attention at the relevant time. These systems provide immediate information to physicians – for instance, delivering relevant warnings about an ordered medication’s potential adverse reaction with other drugs previously prescribed – which helps avoid adverse drug events (ADEs). This would optimize patient safety and provide physicians with the decision support solutions necessary to maximize health care quality at the point of care. If all hospitals had an HIT system including CPOE, approximately 200,000 ADEs could be eliminated each year, translating into an annual savings of about USD1 billion (see Figure 1). Most of the savings would be generated by hospitals with more than 100 beds. Patients age 65 or older would account for the majority of avoided ADEs in hospitals.

Medication errors and adverse events have been less widely studied in the ambulatory space. Data indicates that approximately 8 million adverse drug events occur in the

Service	Annual cost (in Millions)	Deaths avoided each year
Influenza vaccination	\$134-\$327	5,200-11,700
Pneumonia vaccination	\$90	15,000-27,000
Breast cancer screening	\$1,000-\$3,000	2,200-6,600
Cervical cancer screening	\$152-\$456	553
Colorectal cancer screening	\$1,700-\$7,200	17,000-38,000

Notes: Assumes 100-percent participation of all persons recommended to receive the service by the US Preventive Service Task Force. This is intended to set an upper boundary for potential costs and benefits, not to suggest that 100-percent participation is probable.

**Table 3: Increasing preventive services could save lives with only a small increase in cost**

outpatient setting each year; of those, one-third to one-half could be avoided via broad use of CPOE. Each averted ADE would save USD1,000–USD2,000 in avoided office visits, hospitalizations and other care. Nationally, this estimate translates into approximately 2 million ADEs avoided for a total savings of about USD3.5 billion.

### Health benefits

The RAND team analyzed two kinds of interventions intended to enhance health – disease prevention and chronic disease management.

HIT could help with prevention by integrating evidence-based recommendations with patient data. For example, an EMR system could scan patient records for risk factors and proactively recommend appropriate preventive services, such as vaccinations and screenings, based on risk factors such as age or gender. The system could support health care providers by reminding them to suggest the service during office visits and encourage patients to schedule the recommended care – before a missed service results in the more costly treatment of a condition. Table 2 shows the estimated effects of increasing five preventive services – two types of vaccinations and three types of screenings. Together, these measures would modestly increase healthcare expenditures. But the costs are not large, and the health benefits of improved prevention are significant. For example, at a cost of USD90 million each year, between 15,000 and 27,000 deaths from pneumonia could be prevented. The opportunity to shift the health care model from costly, reactive care delivered to address existing problems in favour of a proactive, preventive approach to health care, would likely contribute to cost savings for consumers, as well as help us take an active role in managing our own health.

HIT can also facilitate chronic disease management, a high and growing burden in the United States. In one study, 15 chronic diseases accounted for half the growth in healthcare spending between 1987 and 2000; nearly one-third of the increase was attributed to costs related to just five of those conditions. The EMR system could help better manage expensive, ongoing medical conditions and treatments, identifying patients in need of tests or other services, and ensuring consistent records of results. Patients using remote monitoring systems could transmit their vital signs directly from their homes to their providers, allowing a quick response to potential problems. Effective disease management could reduce the need for hospitalization, thereby both improving health and reducing costs.

### Overall savings are large compared to costs

Costs to execute a broad-based HIT system implementation include one-time costs for acquiring it, as well as ongoing maintenance costs. Analysis of other industries indicates that full adoption of complex, networked technology requires about 15 years. Because process changes and related benefits take time to develop, net savings are initially low at the start of the 15-year period, but then rise steeply. Figure 2 shows the net potential savings (total savings minus total costs) for HIT implementation over a 15-year period.

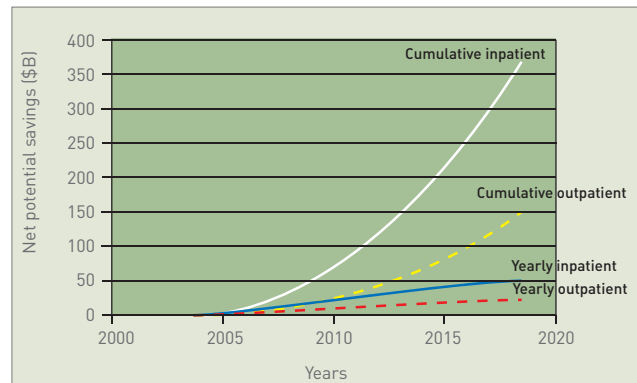


Figure 2: Potential net savings from increased efficiency over a 15-year period

These savings are from increased efficiency only; health and safety benefits could double the savings.

### Market forces present obstacles to HIT savings and benefits

Current market conditions place serious obstacles in the way of effective HIT implementations:

- **Access.** Relatively few providers have access to HIT. Approximately 20% to 25% of hospitals and 15% to 20% of physicians' offices have an HIT system. Small hospitals and hospitals with half or more of their patients on Medicare are less likely to have HIT.
- **Connectivity.** As a whole, connectivity – the ability to share information from system to system – is poor. HIT implementation is growing, but little sharing of health information between existing systems is occurring today. There is no market pressure to develop HIT systems that can seamlessly communicate with each other. The piecemeal implementations currently under way may actually create additional barriers to the development of a future standardized system because of the high costs of replacing or converting today's non-standard systems.
- **Return on investment.** One of the most serious barriers is the disconnection between who pays for and who profits from HIT. Patients benefit from better health, and payers benefit from lower costs, but providers pay in both higher costs to implement HIT and lower revenues after implementation. Figure 1 shows one part of the problem: hospitals that use HIT to reduce adverse drug events also reduce bed-days, which translates into reduced hospital income.

### The government should act now

Overcoming market obstacles will require government intervention. RAND's recommended policy options fall into three groups – continue current efforts, accelerate market forces and subsidize change. All three groups rely on the aggressive use of federal purchasing power. Medicare is the nation's payment policy leader, the party with the most to gain from HIT's cost and health benefits and the health care system's largest payer. Medicare's leadership would send strong market signals for adoption.

- **Continue current efforts.** Actions include: continue

support for the development of uniform standards, common frameworks, HIT certification processes, common performance metrics, and supporting technology and structures. To help allay fears regarding confidentiality, expand liability protection for hospitals using HIT and for providers who comply with federal privacy regulations while using HIT networks. Promote hospital-doctor connectivity by allowing hospitals to subsidize portable, standardized HIT systems for doctors (this would require relaxing the current laws that prohibit such subsidies). These actions require little or no new federal funding.

- **Accelerate market forces.** Develop targeted investments and incentives to promote HIT. Set up a pay-for-use programme for those providers using certified, interoperable HIT systems.

Additional actions include:

- Create a national performance reporting infrastructure to receive and report comparative performance data.
- Fund research on pay-for performance incentives.
- Educate consumers about the value of HIT in improving their ability to manage their own health. These actions require a moderate initial investment in policy and infrastructure development, with larger investments in later years. For example, pay-for-use programmes, which are relatively easy to implement, could be followed by broad-based pay-for-performance programmes, which require substantially more development.
- **Subsidize change.** Direct subsidies would greatly speed HIT adoption. Subsidies may be particularly important in overcoming barriers to network development. Actions include:
- Institute grants to encourage the development of organizations, tools and best practices to help HIT

succeed.

- Make direct subsidies to help selected providers acquire HIT.
- Extend loans to support the start-up and early operation of HIT networks.

Convincing individual physicians and their patients of the value and safety of networking confidential data will be critical. Overcoming these challenges requires ongoing investment in framework, standards and policy development.

### Conclusions

Widespread adoption of HIT and related technologies, applied correctly, could greatly improve health and healthcare in America while yielding significant savings. Another outcome – an enhanced consumer experience characterized by greater speed, accuracy and convenience, as well as a greater focus on consumer involvement and proactive condition prevention and management to promote quality, efficiency and cost savings. A range of policy options could be used to speed the development of HIT benefits. Government action is needed; without this, it may be impossible to overcome market obstacles. Our findings strongly suggest that it is time for government and other payers to aggressively promote the adoption of effective HIT. To achieve optimal health for our nation's citizens, and to maximize clinical and financial outcomes in healthcare, the time to act is now. □

#### Editor's Note:

*A complete technical executive appendix expanding upon the study's research data and methodology is available at [www.healthaffairs.org](http://www.healthaffairs.org). – This article is reproduced with the kind permission of The Cerner Quarterly 2005.*