

# Health Information Technology: Benefits and Problems

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*Proponents of health information technology (HIT) often claim that the United States lags behind other developed countries when it comes to the use of electronic medical records (EMRs), physician order entry systems and personal health records in clinics and hospitals. For example, only about 17 percent of doctors and 8 percent to 10 percent of U.S. hospitals use EMRs.*



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## Executive Summary

Although many proponents discuss the *perceived* benefits of HIT, missing from the debate is an honest discussion of experiences with actual HIT systems, and the obstacles and pitfalls of poorly designed systems. The ultimate goal should be to improve quality, increase efficiency and add convenience — not just to create wired facilities.

**Health IT in the United States.** There are different forms of HIT — many of which are widespread in the United States:

- Suppliers of pharmaceuticals and medical equipment are often completely wired, including large pharmacies such as Walgreens.
- Virtually all medical billing by U.S. hospitals and physicians is done using computers.
- Hospitals use computerized systems to track supplies, account for profits and losses, control inventory and process payroll.
- Results for diagnostic images are stored electronically and often shared with radiologists half a world away.
- Disease databases on clinical trials are widely available on the Internet.

Yet, EMRs are not in widespread use, despite being often cited as the technology with the greatest potential to improve quality and reduce costs. Indeed, no country really has the comprehensive system envisioned by HIT proponents.

**Potential Savings.** Two well-known estimates put the *potential* savings at around \$78 billion annually. However, the Congressional Budget Office (CBO) found that no evidence yet exists to support claims of substantial savings from HIT, saying, “[N]o aspect of health IT entails as much uncertainty as the magnitude of its potential benefits.”

**Potential to Improve Quality.** Proponents hope that research utilizing integrated databases of patient treatments across large populations will yield information on which treatments work best. To be effective, this would require following patients over many years. Clearly some patients with complex health conditions will benefit from better communications

## Health Information Technology: Benefits and Problems

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and coordination. However, organizations that merely spend money on HIT systems without also investing in training and redesigning processes to take better advantage of the new technology are unlikely to fare well.

**Potential to Increase Access to Care.** A potential advantage of storing patient records electronically is that, in some cases, distance becomes irrelevant when consulting with a physician. In fact, many concierge and other cash-based physicians already use the telephone and e-mail to communicate with their patients. Increasingly, doctors may use HIT to assist patients in managing chronic diseases.

**Problems with Health Information Technology.** Installing HIT systems in a physician's office or hospital is much more complicated than installing software on a computer connected to the Internet. Although HIT systems may prevent common errors, they also have the potential to introduce new ones. For instance, overreliance on the accuracy of EMRs can lead to grievous errors if a patient record contains false information.

**Privacy and Security Concerns.** Privacy and security risks are a concern due to hackers, identity theft, unau-

thorized access and corruption (alteration) of patient data. Making EMRs available to far-flung health care providers necessarily makes them more accessible to the world at large.

**Government Mandated Technology Is Not the Solution.** Many HIT proponents support government-imposed HIT. They assume that a plan devised by a few people at the top (such as government officials) will work, even though the plan may not be in the self-interest of those at the bottom (such as physicians) who are required to implement it. This sort of mandate is especially unlikely to succeed if it provides no incentives for health care providers to adopt and properly use the technology.

Employers, insurers or the government can provide appropriate financial incentives to doctors and hospitals if they allow them to innovate and share in any savings, provided that they deliver the same quality of care for less cost. In those parts of the health care marketplace where third parties do not dominate, providers are free to repack-age and reprice their services and HIT is actually quite common. Walk-in clinics, telephone and e-mail services, concierge physicians and pharmacy outlets are examples.

### About the Authors

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## Introduction

Proponents of health information technology (HIT) claim there are tremendous benefits for the U.S. health care system, including greater integration. They often lament that the United States lags behind other developed countries in HIT use.<sup>1</sup> The Obama administration champions government action to speed its adoption.<sup>2</sup> For instance, the American Recovery and Reinvestment Act of 2009 included \$19 billion dollars to encourage use of electronic medical records (EMRs) in hospitals and doctors' offices.<sup>3</sup> Both conservative and liberal politicians have promoted the use of electronic medical records, electronic prescribing and systems to improve coordination of care among providers. For example, former Secretary of Health and Human Services Mike Leavitt, a Republican who served in the Bush administration, said the adoption of effective HIT is necessary to improve health care quality.<sup>4</sup>

Although many experts tout the *perceived* benefits of HIT, formal evaluations and evidence regarding its successful implementation are generally lacking. Proponents often do not understand the conditions that exist where HIT has worked, nor are they aware of the perverse financial incentives that discourage health care providers from adopting such technologies. Also missing is an honest discussion of experiences with actual HIT systems and the problems engendered by poorly designed systems. There has also been little discussion of the potential problems that might arise if the technology is imposed from the top down.

The ultimate goal for HIT should be to improve quality, increase ef-

**TABLE I**  
**Use of Information Technology**  
**by Hospitals and Physicians**

### Hospitals

- Administrative and financial
  - Patient billing
  - Accounting systems
  - Personnel and payroll
  - Materials management
- Clinical
  - Order entry for drugs, lab tests, procedures
  - Electronic health records
  - Diagnostic image archiving
  - Lab results
  - Clinical decision support systems
  - Prescription drug fulfillment, error-alert, transcriptions
  - Monitoring of patients in intensive care units
- Infrastructure
  - Personal computers
  - Servers and wireless network routers
  - Voice recognition systems for transcription, physician orders, and medical records
  - Bar-coding for drugs, medical device inventory control
  - Information security systems

### Physicians

- Administrative and financial
  - Billing
  - Accounting
  - Scheduling
  - Personnel and payroll
- Clinical
  - Online references
  - Receiving lab results and other clinical information online
  - Electronic prescribing
  - Computerized provider order entry
  - Clinical decision support systems
  - Electronic health record
  - E-mail communication with patients
- Infrastructure
  - Desktop and laptop computers
  - Handheld technology
  - Servers and network

Source: "Report to the Congress: New Approaches in Medicare," Medicare Payment Advisory Commission, June 2004, Table 7-1, page 159.

## Health Information Technology: Benefits and Problems

efficiency and add convenience — not just to increase the number of wired facilities.<sup>5</sup>

### Health Information Technology in the United States

More than a decade ago, J. D. Kleinke, a noted health care futurist, argued that the HIT systems prevalent at the time were not yet sufficiently developed for broad implementation, but that technological breakthroughs such as the Internet could pave the way.<sup>6</sup> In 2004 researchers Robert Miller and Ida Sim surveyed physician practices about their use of HIT. They found that very few physicians had adopted fully-functioning HIT systems. Some of the barriers they identified included difficulty understanding how the systems work and uncertain financial benefits in the face of high upfront costs.<sup>7</sup>

However, there are various forms of HIT, many of which are in widespread use in the United States. Indeed, suppliers of pharmaceuticals and medical equipment are often completely wired. Walgreens, for example, has an electronic database that allows pharmacists at any of its stores nationwide to fill a patient's prescription, regardless of where the prescription was originally filled. It also allows registered users to access their prescription histories. Excluding prescriptions for controlled substances, in 2009 the chain filled 22 percent of eligible prescriptions electronically.<sup>8</sup>

Computers are universally used in medical billing by U.S. hospitals and physicians. Hospitals also use

computerized systems to track supplies, account for profits and losses, control inventory and process payroll.<sup>9</sup> [See Table I.]

Information technology plays a growing role in clinical practices. For instance, the use of software-controlled digital medical imaging, such as magnetic resonance imaging (MRI), is widespread. Diagnostic images are often shared electronically and read by radiologists half a world away. Clinical drug trial databases are widely available on the Internet.<sup>10</sup>

*“The goal should be to improve quality, efficiency and convenience.”*

**Large HIT Systems in the United States.** Many large health systems in the United States already use EMRs and other aspects of HIT. Two of the best known examples of institutions using HIT in the United States are the health insurer Kaiser Permanente and the Veterans Affairs (VA) health system:

- In 2009, Kaiser Permanente maintained EMRs for 8.7 million patients.<sup>11</sup>
- In 2007, the VA maintained EMRs for 5.3 million patients.<sup>12</sup>
- In Denmark, considered by some observers to have the most functional EMR system in the world, by contrast, only

about 800,000 individuals have activated their EMRs.<sup>13</sup>

Kaiser Permanente began using electronic health records in 2004. It employs 14,000 physicians and a support staff of around 159,000 in nine states and the District of Columbia. Patients can request consultations online, contact physicians electronically and receive reminders for follow-up care. The results of diagnostic tests are stored electronically and prescriptions are sent directly to a pharmacy. Enrollees also have Web access to decision-support tools and health information.<sup>14</sup>

The VA Health IT system (called VistA) consists of more than 100 software applications for clinical, financial and administrative functions. VistA stores a patient's medical history and medical images in an EMR, allowing doctors and nurses immediate access for diagnosis and treatment.<sup>15</sup> HIT is the primary tool the VA has used to boost the quality of patient care.<sup>16</sup> One study found VA patients received appropriate care more than two-thirds (67 percent) of the time compared with about half (51 percent) for non-VA patients.<sup>17</sup>

The VA maintains EMRs for 5.3 million patients treated at 155 hospitals, 881 clinics, 153 nursing homes and 45 rehabilitation centers. An ambitious upgrade, “My HealtheVet,” will allow patients to record health information they measure at home (blood pressure, weight, pulse, blood glucose) and continually update their list of over-the-counter medicines. Patients will also be able to add information about their health status that is linked to their health record. Before the VA

began to store records electronically, 40 percent of patient charts could not be located during a typical visit.<sup>18</sup>

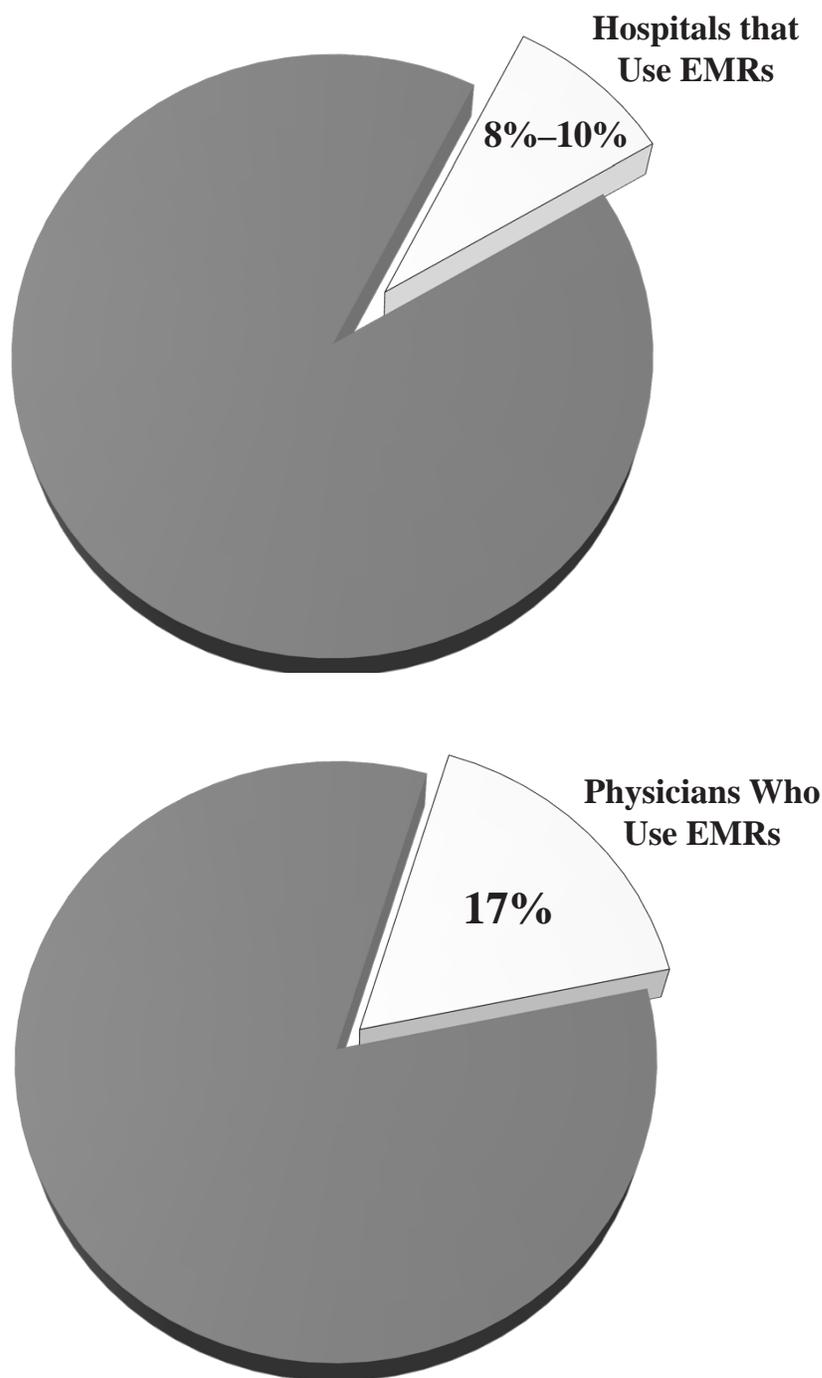
HIT is less common in smaller, nonintegrated facilities. Today, according to David Blumenthal, National Coordinator for Health Information Technology at the U.S. Department of Health and Human Services, only about 17 percent of doctors and around 8 percent to 10 percent of U.S. hospitals utilize EMRs at even the most basic level.<sup>19</sup> [See Figure I.]

The claim that the United States is trailing other countries in HIT use often refers to EMRs. But no country really has them in the comprehensive form envisioned by futurists.

**Why HIT Isn't More Widespread.** Today, one of the most significant barriers to the adoption of information technology is the lack of appropriate incentives. The entities most likely to benefit from HIT (insurers and patients) are not the ones most likely to bear the cost of these systems. By and large, providers (doctors and hospitals) are being asked to invest in systems that are likely to reduce their revenue. For instance, making the results of all tests performed available online could reduce the number of redundant diagnostic tests. But hospitals earn significant revenue from performing diagnostic tests, and thus have little incentive to reduce this number. A government mandate to institute HIT systems is unlikely to succeed if providers expect added costs and few benefits.

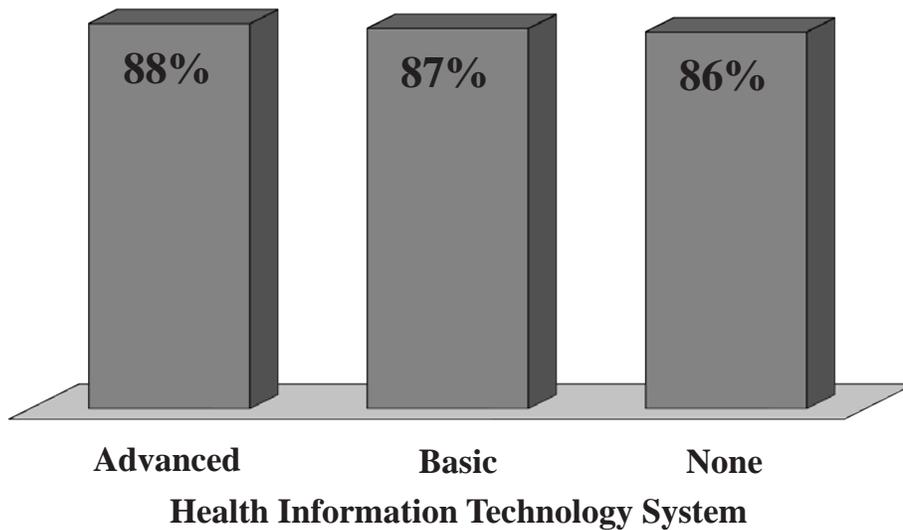
**Is a Government Mandate Necessary?** With numerous articles touting the potential benefits of HIT

**FIGURE I**  
**Electronic Medical Records Use**



Source: David Blumenthal, "The Federal Role in Promoting Health Information Technology," Commonwealth Fund, January 2009.

**FIGURE II**  
**Hospitals Meeting “Best-Practice” Standards of Treatment for Patients with Heart Failure**



Source: Steve Lohr, “Little Benefit Seen, So Far, in Electronic Patient Records,” *New York Times*, November 16, 2009.

and slower, less robust adoption than proponents want, it is not surprising that HIT proponents have turned to the government to speed things along.<sup>20</sup> One researcher asked, “Why has the obvious taken so long?”<sup>21</sup> Writing in *Health Affairs*, researcher Roger Taylor wondered if more aggressive government action isn’t needed.<sup>22</sup> J. D. Kleinke put it more bluntly, “The market has failed to produce a viable health information technology system; we need government intervention instead.”<sup>23</sup> Many believe federal support is vital for patient records to evolve from a facsimile of today’s paper records into an electronic “navigational system for the care team.”<sup>24</sup>

Many HIT proponents support government-imposed HIT. They assume that a plan devised by a few

people at the top will reduce medical waste, even though the plan may not be in the self-interest of those at the bottom who must implement it. Plans of this sort are unlikely to succeed, however. Market competition, on the other hand, spurs firms to think creatively and adopt new technology when it improves efficiency and reduces costs. Unfortunately, there has not been much competition in health care in the United States for more than half a century.

### **What Is Known about the Benefits of Health Information Technology?**

Proponents believe that the widespread adoption of HIT could solve

many of the problems that plague the U.S. health care system.<sup>25</sup> But data on whether or not HIT boosts quality, reduces unnecessary spending and improves access to care is decidedly mixed. Some presumed benefits may never materialize, while other benefits will be identified with additional research. In fact, a 2008 Congressional Budget Office (CBO) report said, “[N]o aspect of health IT entails as much uncertainty as the magnitude of its potential benefits.”<sup>26</sup>

**Does HIT Save Money?** In 2005, researchers for the RAND Corporation published a highly influential article on the estimated benefits of HIT. The RAND researchers claimed that HIT could potentially save up to \$77 billion per year, 15 years after implementation.<sup>27</sup> Similarly, the Center for Information Technology Leadership (CITL) estimated savings of \$78 billion annually, if the system is interoperable (that is, if all system components are able to communicate with all other components).<sup>28</sup>

In addition, the CBO pointed out that the RAND study merely looked at *potential* cost savings. It ignored peer-reviewed research that did not find net savings. Moreover, neither RAND nor the CITL looked at how likely the potential savings from adopting HIT are.<sup>29</sup> David Himmelstein and Steffie Woolhandler (who view HIT as a necessary component of a centralized health care system) wrote that “RAND’s vision of ‘gold in them thar hills’ owes more to Merlin than to metallurgy.”<sup>30</sup> Indeed, other prominent researchers found HIT was not mature enough for credible estimates of its costs or benefits.<sup>31</sup>

Although a growing number of institutions have successfully implemented HIT systems that improve efficiency, it is unclear whether their results are replicable.<sup>32</sup>

### Does HIT Reduce Waste?

Advocates for health information systems argue that they would reduce redundant medical imaging and laboratory tests.<sup>33</sup> Various estimates indicate that about 30 percent of medical care in the United States is wasteful.<sup>34</sup> However, the amount of waste that would be prevented by using more HIT is unknown. According to one study, nearly one-third of the information a physician needs is not available during an office visit due to missing records and laboratory reports.<sup>35</sup>

### Does HIT Improve Information Sharing?

HIT advocates believe it will improve clinical medicine.<sup>36</sup> They argue that integrating databases of patient treatments across large populations will enhance outcomes research, yielding information on which treatments work best. So-called “best practices” are a Holy Grail of sorts for advocates of nationalized health care systems, and some private insurers and providers as well. They hope that information gleaned from analysis of the entire population over time will identify the efficacy of various therapies.

In an aptly named *Health Affairs* article, “Speed Bumps, Potholes, and Tollbooths on the Road to Panacea,” Richard Platt argues that collecting useful information on treatment outcomes will require not only a substantial investment in equipment, but also considerable training for the staff to learn how to use the equipment.<sup>37</sup> Furthermore, treatments and

outcomes for individual patients will have to be tracked over many years.

Proponents also argue that integrating patients’ EMRs into a comprehensive network will allow a level of collaboration and information sharing difficult to achieve without wired systems.<sup>38</sup> In theory, information sharing might assist researchers in learning about treatments for such diseases as cancer

*“Some retail clinics use software to guide diagnosis and treatment.”*

through “rapid learning.”<sup>39</sup> Indeed, Medicare already supports initiatives to facilitate rapid learning.<sup>40</sup> Knowledge gleaned from HIT could even be integrated with decision-support tools to assist doctors and bridge gaps in their knowledge.<sup>41</sup> Some retail clinics already use proprietary software to guide practitioners through diagnosis and evidence-based treatment protocols.<sup>42</sup>

### Does HIT Improve Quality?

Proponents believe electronic record-keeping could improve quality.<sup>43</sup> A small but growing number of health care providers and independent services offer patients the ability to store and manage their own records securely online, so that they are accessible to the patient and his physicians. Private records management services are already used

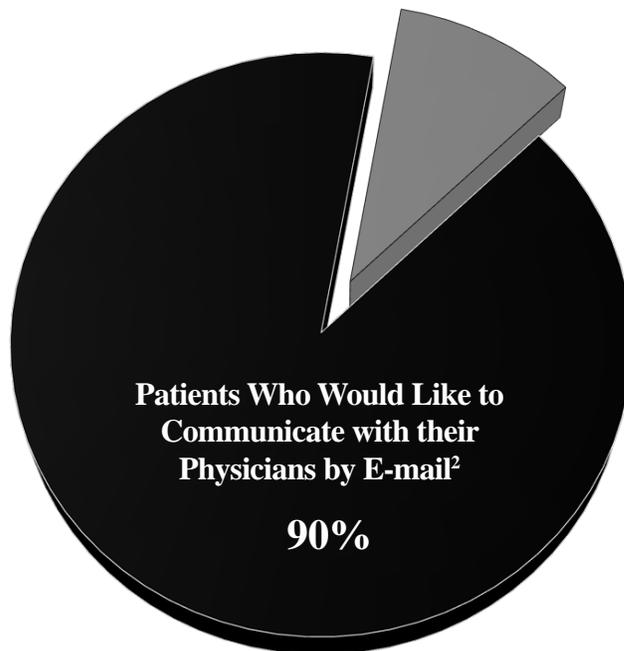
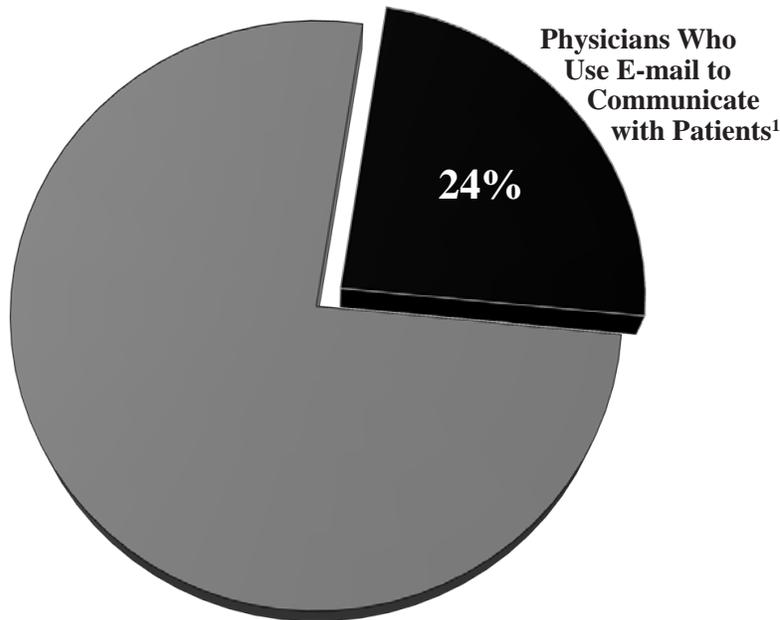
by people with complex medical conditions.<sup>44</sup> Because most patients see a number of physicians, remotely accessible medical histories could help facilitate coordination of care among different providers. They are also useful for the rapidly expanding area of telemedicine — the remote monitoring of patients with chronic diseases (see discussion below).<sup>45</sup>

Advocates also hope that EMRs will enhance safety by allowing providers to easily spot adverse drug interactions and to compare a particular patient’s treatment against standard protocols using specially designed software. This type of software already exists and many retail pharmacies use HIT to check for contraindicated drugs. It is too early to definitively say that EMRs contribute to patient safety.<sup>46</sup> Yet, proponents believe HIT has the potential to boost health care quality, including reducing medical errors.<sup>47</sup>

**Does HIT Improve Patient Outcomes?** The jury is still out on whether HIT improves patient outcomes. A review of computerized clinical decision-support systems found that such systems are beneficial, but the reviewers concluded that the effects on patient outcomes are inconsistent and research is lacking.<sup>48</sup>

Preliminary evidence from research conducted at the Harvard School of Public Health found limited quality gains from EMRs. For instance, facilities with advanced HIT systems met federally approved best-practice standards for treatment of heart failure patients 87.8 percent of the time, compared with 85.9 percent for firms with no HIT system. [See Figure II.] Moreover, the average length of stay for patients in

**FIGURE III**  
**Physicians and E-mail**



Source: <sup>1</sup>Allison Liebhaber and Joy M. Grossman, "Physicians Slow to Adopt patient E-mail," Center for Studying Health System Change, Data Bulletin No. 32, September 21, 2006. <sup>2</sup>"Patients Want Online Communication with Their Doctors," *Medscape Medical News*, April 17, 2002; and "Patient/Physician Online Communication: Many Patients Want It, Would Pay for It, and It Would Influence Their Choice of Doctors and Health Plans," *Harris Interactive Healthcare News*, Vol. 2, No. 8, April 10, 2002.

facilities with advanced HIT systems was 5.5 days versus 5.7 days for hospitals without such systems.<sup>49</sup>

Providers must also learn to use the technology effectively. Unfortunately, many of the metrics used to judge the outcome of HIT systems are themselves of questionable value and clinical significance. For instance, quality of care measures for patients with multiple clinical conditions have yet to be developed, often because existing best-practice guidelines consider only the treatment of a single condition.<sup>50</sup> Guidelines based on randomized controlled trials — considered the gold standard for clinical research — apply "average effects," measured as population means, to individual patients who may or may not be "average."<sup>51</sup>

HIT systems are unlikely to benefit organizations that do not also invest in staff training, workflow analysis and process redesign. That can cost 10 times as much as the HIT system alone.<sup>52</sup> Furthermore, a review of high-quality, low-cost hospital referral districts found that some were heavily wired while others were not, showing that HIT is not the most important factor in a hospital's quality.<sup>53</sup>

**What Are the Potential Benefits of HIT for Patients?** A potential advantage of storing patient records electronically is that it can make distance irrelevant for some physician consultations.<sup>54</sup> Also, some consults may be simple enough to be done by any physician who has reviewed a patient's medical records.<sup>55</sup> Thus, HIT may offer patients improved access to care.<sup>56</sup>

*Telephone and E-mail.* A Harris Interactive poll shows that most

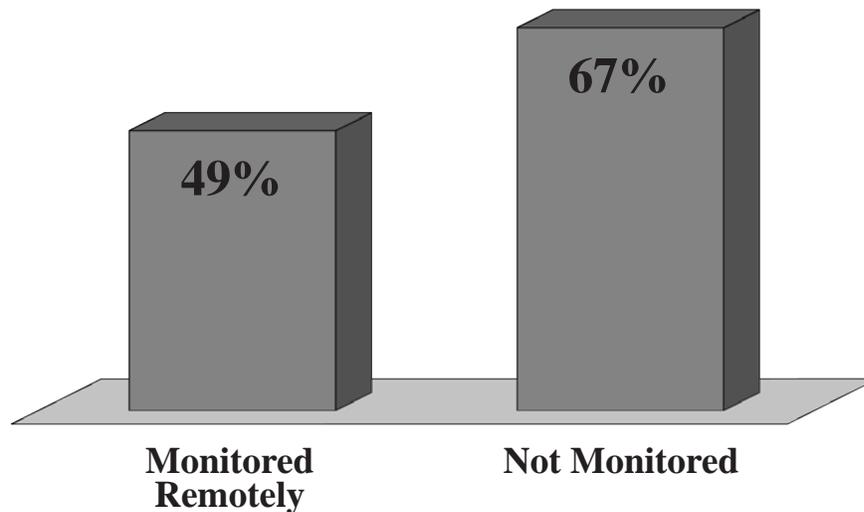
patients with Internet access (90 percent) would like the ability to consult their physician online, but only about 5 percent do so.<sup>57</sup> [See Figure III.] But for a routine prescription or answer to even the simplest medical question, patients must usually make an office visit.<sup>58</sup> Why do doctors avoid telephone and e-mail consultations? The simple answer: Most insurers do not reimburse them for phone or e-mail consultations.<sup>59</sup>

Kaiser Permanente believes many patients will embrace the convenience of scheduling appointments and obtaining lab results online, as well as communicating with their doctor over the Internet.<sup>60</sup> For example, Kaiser Permanente's new HIT system allows rural patients to exchange secure e-mail messages and have "e-visits" with their physicians. Access to electronic medical records and "e-visits" often replace an office visit.<sup>61</sup> In fact, after Kaiser implemented the new system, office visits to primary care physicians fell by more than 25 percent in four years.<sup>62</sup>

Many concierge and other cash-based-practice physicians use the telephone and e-mail to communicate with their patients. For instance, take DocTalker Family Medicine, the Virginia medical practice of Dr. Alan Dappen:

- All patients must have an initial face-to-face consultation to establish care and all patient records are kept electronically for easy access.
- Patients can schedule an in-office appointment or even request a house call.
- About half of Dr. Dappen's consults are by e-mail or telephone.

**FIGURE IV**  
**Readmission Rates for Patients With Chronic Obstructive Pulmonary Disease**



Source: Paula de Toledo et al., "Telemedicine Experience for Chronic Care in COPD," *IEEE Transactions on Information Technology in Biomedicine*, Vol. 10, No. 3, July 28, 2006, pages 567-73.

- Like an attorney, Dappen bases his consultation fees on the amount of time required.<sup>63</sup>

Another concierge practice, Brooklyn-based Hello Health, also allows patients to communicate electronically with physicians.<sup>64</sup> Members can access Hello Health's Web site (which looks more like the Facebook social networking Web site than a typical HIT platform) for a fee of \$35 per month. Members can e-mail their doctors, make appointments online, view their personal health records and even send instant messages. Patients choose between in-person office visits, house calls or videoconferencing with a physician.<sup>65</sup> Appointments are guaranteed within 24 hours of scheduling and the patient can access the doctor's blog-post style summary of each appointment.

*Chronic Disease Management.* By making distance irrelevant, providers from almost anywhere can help patients manage chronic conditions without multiple office visits. And an array of other HIT tools — such as remote monitoring, telemedicine and chronic disease management — have the potential to tailor treatments to individual patients' needs.<sup>66</sup>

EMRs and the Internet could improve doctor/patient communication and patient compliance.<sup>67</sup> For this reason, remote patient management technologies are attracting interest from health plans and third-party payers.<sup>68</sup>

For example, diabetes is a disease that affects millions of people. Long-term health can be improved through good management of the disease. Many experts hope improved

## Health Information Technology: Benefits and Problems

communication between diabetics and their doctors will lead to better disease management.<sup>69</sup> However, a review of published studies found that there is no clear evidence that existing IT-based diabetes management programs are effective.<sup>70</sup>

*“Health care providers will use HIT if it reduces costs or improves quality.”*

Researchers continue to search for systems that improve the management of other chronic diseases:

- One study found obese individuals participate in online weight loss programs more than people who are merely overweight.<sup>71</sup>
- Internet-based asthma self-management does not seem to be clinically significant in general, but one study found that adolescents with poor asthma control benefited significantly from HIT-based self-management, whereas there was little additional benefit for those with good asthma control.<sup>72</sup>

It will take time to identify which chronic diseases, program designs and populations will benefit from Internet-based chronic disease management.

*Remote Patient Monitoring.* Would telemonitoring improve care for acutely ill, intensive care patients?<sup>73</sup> One study found that

telemonitoring lowered hospital readmission rates for patients with chronic obstructive pulmonary disease. Patients were trained in the use of an inhaler for drug therapy (to improve lung function) and a spirometer to monitor pulmonary airflow. Of those monitored from home, only 49 percent were subsequently readmitted to a hospital compared to 67 percent of patients who were not monitored remotely.<sup>74</sup> [See Figure IV.] A similar study of remote monitoring of congestive heart failure patients over a six-month period found that the group monitored from home required only half as many rehospitalizations as the control group.<sup>75</sup>

A pilot project is currently examining whether telemonitoring can allow the frail elderly to stay in their own homes longer.<sup>76</sup> A recent presentation of the International Conference of the IEEE (Institute of Electrical and Electronics Engineers) Engineering in Medicine and Biology Society even suggested that “unobtrusive” in-home telemonitoring for the elderly could be a cost-effective way to monitor their cognitive abilities.<sup>77</sup> Although this sounds rather intrusive, apparently seniors are less concerned about the loss of privacy than they are about the loss of independence.<sup>78</sup>

### Innovative Providers and Practices Using Health Information Technology

HIT has been successfully implemented where it makes business sense, either by reducing overall costs or improving the product that

a business offers compared to its competitors. Cancer Treatment Centers of America (CTCA) is a prime example. It uses HIT to improve care coordination for cancer patients. [See the “Case Study: Cancer Treatment Centers of America.”]

*Solo Practices.* It is often assumed that large, multispecialty physician practices are necessary to provide quality care and HIT. A new model beginning to emerge is the low-overhead, solo physician practice. Solo providers rely on technology to fill the void of little or no support staff. Patients often schedule their own appointments online and patient records are stored electronically. Sometimes referred to as *ideal medical practices*, these arrangements offer the personalized care doctors provided before third-party payment. Low-overhead allows physicians to spend more time with their patients.<sup>79</sup>

*MinuteClinic.*<sup>80</sup> Walk-in clinics are small health care centers located inside big-box retailers (such as Walmart and Target) or in strip shopping center storefronts. They are staffed by nurse practitioners and offer limited services. The consulting firm Deloitte estimates there are 1,100 to 1,200 retail clinics currently and the number is likely to grow to 3,200 by 2014.

MinuteClinic is the pioneer of clinics operating within large retailers. It allows shoppers in places like CVS pharmacies to get routine medical services such as immunizations and strep tests without an appointment. Most clinics are open from 8:30 a.m. to 7:30 p.m. on weekdays and for more limited weekend hours. Prices — which are clearly listed — range from \$30 to

\$110, and are often half as much as traditional medical practices charge. In addition, electronic medical records are kept for all visits.

Evidence suggests that the quality of routine care in walk-in clinics is comparable to, if not better than, treatment in traditional physicians' practices. In fact, MinuteClinic received high marks for appropriateness and quality of care (according to evidence-based guidelines) for two common ailments among children: colds and sore throats. MinuteClinic scored 91 percent for the treatment of sore throats and colds compared to the average score of 86 percent.

*“Records stored by one provider typically cannot be accessed by another provider.”*

*Convenient Care by TelaDoc.*<sup>81</sup> TelaDoc Medical Services is a phone-based medical consultation service that links physicians, patients and health plans across the country. The service is not intended to replace primary care providers, but it allows patients who are away from home to obtain less expensive and time-consuming treatment by contacting a local physician, rather than visiting an emergency room or expensive urgent care center.

An individual enrollee pays \$35 for each consultation (compared to

an emergency room visit costing an average of \$383), and the service is available around the clock. For efficiency, medical records are digitized and placed online, allowing medical personnel access from anywhere. TelaDoc guarantees a physician will return the call within three hours or the consultation is free, but customer surveys show that most calls are returned within 30 to 40 minutes. Moreover:

- A physician returns a patient's phone call within 30 minutes (or less) 50 percent of the time.
- Seventy-five percent of patient calls are returned within one hour.
- Eighty-eight percent of those who used the service reported they saved time and money compared to a traditional office visit or a trip to the emergency room.

A recent analysis by the consulting firm Mercer found that 97 percent of users rated the service good or outstanding, and 98 percent said they would use it again.

*Home-Based Care.* An example of a firm that could not exist without HIT is American Physician Housecalls (APH), a Texas-based, multispecialty physician practice that provides house calls to home-bound Medicare patients.<sup>84</sup> EMRs are a necessary part of APH's treatment model, which seeks to coordinate care among multiple physicians. APH coordinates the care of frail seniors who are at high risk of hospital readmission after discharge:

- APH specializes in managing congestive heart failure, chronic obstructive pulmonary disease, diabetes and hypertension.

- These diagnoses afflict the sickest 5 percent of seniors and account for about half of Medicare spending.
- Services provided to home-bound seniors include portable X-ray imaging, echocardiograms, phlebotomy and other lab procedures, podiatry and geriatric psychology consultations.

Health care reformers wish all doctors and hospitals would provide coordinated care that is managed in the least costly setting. However, it is not in the financial interest of most providers to do so. APH has a financial interest in low-cost, home-based medicine because if a senior is readmitted to the hospital, the company loses a paying Medicare client.

## Problems with Health Information Technology

Federal policymakers and public health advocates claim that expanding the use of HIT will lower costs and improve quality.<sup>85</sup> The problem, as a recent article in *Health Affairs* put it, is that HIT is “a vehicle, not a destination.”<sup>86</sup> Installing HIT systems in a hospital or clinic, an article in the *Journal of the American Medical Association* points out, is “more complicated than connecting a computer to the Internet or installing software from a CD-ROM.” Moreover, most health data, whether on paper or stored electronically, is still compartmentalized in “silos,” where records stored on a system by one provider cannot be accessed by another provider.<sup>87</sup>

**New Errors Caused by HIT.** Though HIT systems prevent com-

### Case Study: Cancer Treatment Centers of America<sup>82</sup>

Cancer Treatment Centers of America (CTCA) is an innovative provider of cancer care with hospitals in Illinois, Pennsylvania, Oklahoma and Arizona. Every patient works with a multidisciplinary team of specialists and other experts to create individualized choices and therapies.

As part of CTCA's commitment to patient-centered, personalized care, it implemented a system of electronic medical records in March 2008. CTCA believes EMRs help its integrated teams of caregivers communicate more effectively with each other and with the patient. Its system provides real-time access to a comprehensive patient medical record. CTCA believes there are four primary benefits of this system:

- There is better communication and collaboration across all clinical specialties.
- Tests and treatments are scheduled faster.
- Delivery of patient orders, recommendations and treatment plans is improved.
- Turnaround for test results is faster.

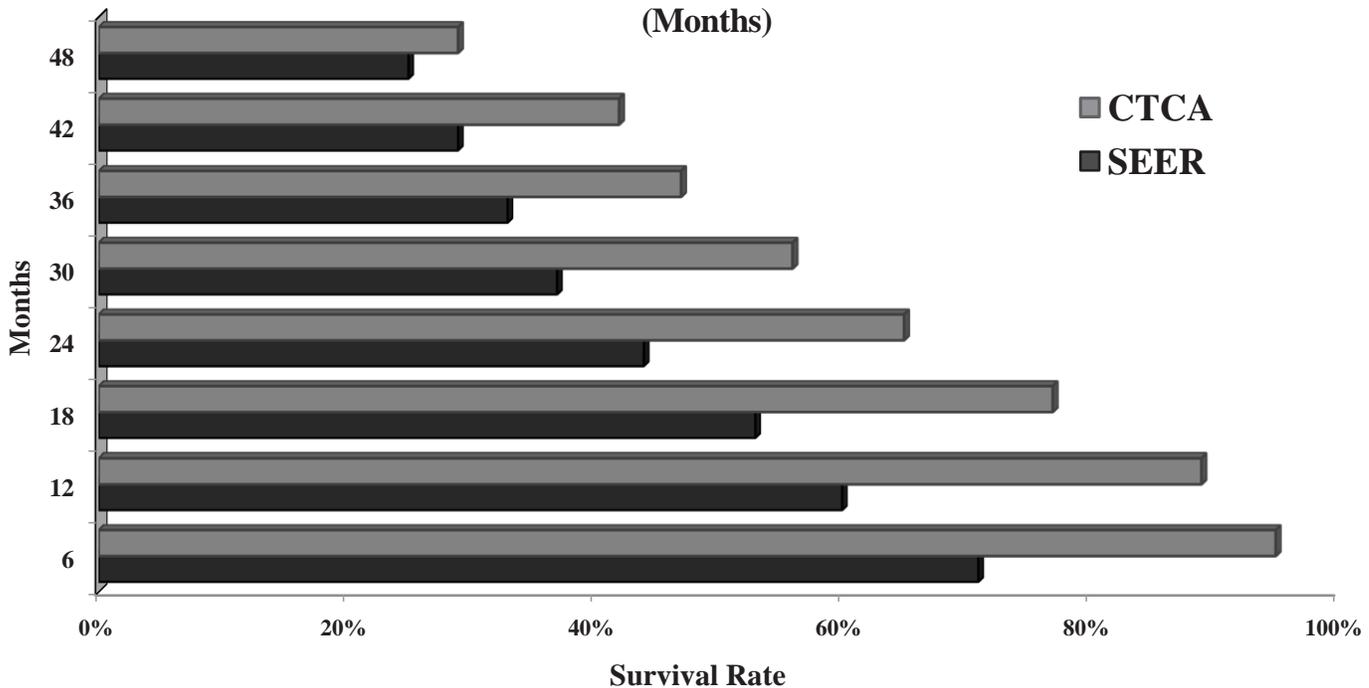
CTCA uses HIT across its network of hospitals to foster a culture of continuous process improvement. The systems are designed to boost efficiency, facilitate communication and aid data collection for analysis. Patients are lodged in on-site hotels at CTCA hospitals. Patient rooms are wired with information technology allowing patients to immediately update CTCA staff on their health status daily. Some of the information collected includes whether patients feel fatigued or have a low energy level, the types of side-effects they may be feeling from treatments or chemotherapy, and their mental condition. Team members continually update each patient's continuity of care record. CTCA staff members are also available by phone to assist patients and family members or answer questions about treatments. In addition to clinical care, CTCA believes its HIT system improves patient satisfaction: 95 percent of its patients say they would recommend CTCA to a friend.

Integration appears to be improving outcomes as well. For instance, compared to breast cancer patients with similar diagnoses, survival rates for CTCA patients are above the national average [see Figure V]:

- The one-year survival rate is 27.7 percent higher than the national average.
- The two-year survival rate is 19.2 percent higher.
- Survival at three years is 13.7 percent higher than the average.
- After four years, CTCA's survival rate is 4.4 percent higher than the national average.

The survival rates are higher than the average for other types of cancer as well. For advanced-stage prostate cancer, 41 percent of CTCA patients are alive at 54 months compared to 27 percent of similar patients from the government's National Cancer Institute database (SEER). More than half of CTCA patients with pancreatic cancer are alive at six months compared to just over one-quarter of typical patients. Nearly 30 percent of CTCA patients with pancreatic cancer are alive after one year compared to about 11 percent of patients as represented in the SEER database. Nearly twice as many (37 percent versus 21 percent) lung cancer patients survive one year under CTCA's care compared to the national average.<sup>83</sup>

**FIGURE V**  
**Advanced-Stage Breast Cancer Survival**  
(Months)



Source: Cancer Treatment Centers of America. Chart depicts a comparison of advanced-stage survival rates at CTCA hospitals to publicly available data from the National Cancer Institute Surveillance Epidemiology and End Results Program. CTCA based on a relatively small sample of 71 women.

mon errors, they also introduce new ones.<sup>88</sup> The risk is that HIT systems will “foster errors rather than reduce their likelihood.”<sup>89</sup>

*Over-Reliance on the Accuracy of EMRs.* A case recorded by the Agency for Healthcare Research and Quality illustrates how new errors fostered by an EMR led to an inaccurate diagnosis at an academic medical center. Three days passed before the patient’s care team realized the results entered into his electronic record were for a biopsy they did not order of a lesion he did not have. Various sources cited as contributing to the error were: weak linkages among computer systems,

insufficient safeguards against patient misidentification, data fragmentation and poor hospital work processes. Because no single person was responsible for this patient’s care, each person who provided care had come to rely unquestioningly on the (erroneous) EMR.<sup>90</sup>

As this case shows, HIT can affect information flows both for good and for ill. While it increases information flow in some directions, it can also reduce it in others. A study of a computerized physician order entry system for medication in the Netherlands found that it “impaired” the synchronization and feedback mechanisms in nurse-physician col-

laborations.<sup>91</sup> The impairment can be such that professionals from different disciplines may need more phone calls or face-to-face discussions to properly coordinate care, defeating the purpose of an HIT system.<sup>92</sup>

This concern is echoed by Iowa Senator Charles Grassley, who recently asked 32 hospitals across the nation to describe problems they are having implementing HIT, including “administrative complications, formatting and usability issues, [and] errors in interoperability.” Grassley noted, “Some health care providers have said the software is producing incorrect medication dosages because it miscalculated body

## Health Information Technology: Benefits and Problems

weights by interchanging kilograms and pounds.”<sup>93</sup> Senator Grassley also sent letters to 10 companies supplying the technology to hospitals. He asked for copies of complaints or concerns received from health care providers. He specifically wanted to know if contracts routinely included “gag orders” forbidding hospitals and clinics from airing concerns, and whether service agreements use “hold harmless” clauses to shift blame for medical errors caused by HIT systems away from the companies supplying them.<sup>94</sup>

*Physician Order Entry System Errors.* Due to their relatively rapid adoption by academic teaching hospitals, hospital-based computerized physician order entry systems have been extensively studied. They have been widely credited with reducing medication errors and adverse drug events. They also improved adherence to guidelines. However, recent literature reviews note that few studies examined changes in error severity or the effect of the introduction of new errors — like mistakenly choosing the wrong drug on drop-down pick-lists. Nor did they discuss the possible catastrophic effects of rare events such as being completely unable to access critical medications when an electronic system fails.<sup>95</sup> In pediatric and intensive care, notes one study, the “introduction of computerized physician order entry systems clearly reduces medication prescription errors; however, [the] clinical benefit of computerized physician order entry systems in pediatric or ICU settings has not yet been demonstrated.”<sup>96</sup>

It is generally agreed that HIT system design should take into account how clinicians work.<sup>97</sup> Furthermore,

software developers should allow systems to be tailored to the special needs of patients and providers.<sup>98</sup> Successful adoption of HIT requires an understanding of how clinical tasks and clinical workflows will be affected — something that relatively few researchers appreciate.<sup>99</sup>

*The Problem of “Assured Performance.”* Another area receiving little attention in HIT, though it has been extensively studied in other applications, is what researchers call the problem of assured performance in safety-critical computing systems. Researchers note, “The irony of seeking safety through systems that may not be safe to begin with seems to have been lost in the enthusiasm for remaking health care via IT.”<sup>100</sup>

*“There is an irony in seeking safety through systems that may not be safe to begin with.”*

One case involved a large hospital where a nurse reported that the medications that had just been delivered to a patient did not match the patient’s Medication Administration Record (MAR). The pharmacy’s computer record did match, but before the error could be evaluated, discrepancies began to be reported all over the hospital. Neither the MARs nor the unit dose carts already on the wards could be trusted. It turned out that the system was working as designed, but the MAR database had been internally corrupted — a set of

circumstances the system designers had not anticipated. “Ironically,” the authors write, “one critical factor in the successful recovery was that the entire system was not automated. Correction and recovery would have been much more difficult if not only the MAR system, but also the order entry and the dispensing functions, had been integrated into the same flawed system.”<sup>101</sup>

*The Problem of Data Overload.* Other unanswered questions include data on what constitutes information overload and whether the time spent entering data detracts from patient care. The results of studies comparing the effect of information systems on the time available for direct patient care are mixed.<sup>102</sup> Researchers note that pen and paper workarounds are used even in health systems with long-established electronic systems. Among other things, paper-based communication is used to improve efficiency, stimulate awareness and better organize data.<sup>103</sup>

There is even concern that current HIT systems convey information in a less useable form than the nonelectronic systems. One study describes how the transition to an electronic scheduling system for an operating room at a major urban teaching hospital imposed extra burdens on the team using it. The electronic display offered only a “static or a narrow, limited ‘keyhole’ view of the day,” requiring clinicians to perform extra cognitive work to foresee overlaps, bottlenecks or gaps in resources. Displays allowed only truncated descriptions of procedures, creating misleading representations of what should be prepared in advance.”<sup>104</sup>

**Problems with Government-Mandated Systems.** HIT used

by clinicians must be well-suited for one of the most “complex and varied work setting[s] that IT has tried to support...with attention to subtleties and complexities of the real world that are unforgiving in their consequences.”<sup>105</sup> Successful HIT systems must be tailored to the needs of users, and this increases the odds that systems imposed by governments will fail. Medicare has empanelled several commissions to investigate the possibility that structured physician records could be configured for reimbursement purposes. The problem is that patient medical records have historically been used to record what individual physicians needed to know about the treatment of individual patients, and therefore the information contained in them is not the same as the information that would be needed for billing, pay-for-performance or utilization controls.

Another problem faced in implementing centralized HIT is the fact that the workflow in clinical environments can be variable, complex and time dependent. Some physicians must make extremely rapid decisions in the face of uncertainty. Others require meticulous planning and study. This means that the information systems that are cost-effective for a pediatric practice that mostly deals with routine matters will probably not suit an emergency room staff facing several major trauma cases. A physician doing a routine vision exam for a 55-year-old patient probably does not need to be burdened with the complex details of a cancer surgery at age 40.

The difficulty in specifying one HIT system for all health care settings is exacerbated by the fact that

information requirements can change from one moment to the next in the same clinical setting. The information conveyed and the time taken to do it — in between shifts in the intensive care unit, for example — depends on case severity, the level of uncertainty about a patient’s condition, patient stability and overall workload.<sup>106</sup> A hospital that moves from normal occupancy to high occupancy must make moment-to-moment decisions to coordinate bed allocation, surgical procedure starts and intra-hospital transfers.<sup>107</sup> This requires complex decision making by more staff members. To allocate resources that have suddenly become severely constrained, the staff needs a lot of information on what is actually going on at any given time — information that may or may not be available from an HIT system designed for normal operations.

## Privacy and Security Concerns

Widespread HIT must also confront the issues of privacy and security. In order to be used effectively for comparative effectiveness research, medical records must be amassed in a distributed health data network.<sup>108</sup> However, the Health Insurance Portability and Accountability Act of 1996 (HIPAA) is an impediment to the creation of integrated health information networks. For instance, HIPAA standard 270/271 limits communications between health plans and providers. Navigating this process can also be expensive.<sup>109</sup> Making EMRs available to far-flung health care providers necessarily makes

them more accessible to the world at large. Given the frequency and costs associated with identity theft, medical record security is a big issue.

*“Pen and paper are common, even with long-established electronic systems.”*

There are also legitimate concerns about government access to data. Proper privacy protections must be implemented before patients will trust an integrated information-sharing system.<sup>110</sup> Who owns patient information and who should have the authority to change it is another issue. There is an age-old assumption that providers — not patients — own medical records, but this is debatable.<sup>111</sup>

Sharing records runs the risk of replicating incorrect information, making it harder for patients to track down and correct. Current privacy laws require providers and insurers to give patients access their records and provide them with a process to correct errors. Certainly, patients should be allowed to opt out of data collection they believe to be intrusive.

### **Privacy and Security Risks.**

The information stored in a medical record is valuable. Hospitals may use it to obtain grants, while insurers may consider claims proprietary. Privacy and security risks are a concern due to hackers, identity

## Health Information Technology: Benefits and Problems

theft, unauthorized access or corruption (or alteration) of patient data. [See “Case Study: Where HIT Security Has Failed.”]

There are numerous reasons why these possible security hazards are of concern:

- Patients could be embarrassed by conditions they may have.
- Employers and insurers might use the data to avoid costly employees or enrollees.
- Drug companies and health care product firms would consider comprehensive information on individuals’ medical care to be a treasure-trove of data for marketing purposes.

The best-known privacy and security breaches concern sports

figures and celebrities. In October 1994, Dallas Cowboys Pro Bowl defensive tackle Erik Williams suffered a season-ending knee injury when he lost control of his car late at night.<sup>112</sup> Although Williams refused to make his medical records available to the media or authorities, rumors quickly surfaced that his blood alcohol level was well above the legal limit. Curiosity was high as Williams was integral to the Dallas Cowboys bid to reach the Super Bowl.

According to a former Parkland Hospital computer records specialist, during a seven-day period while Williams was hospitalized, his electronic records were viewed online by 1,754 separate Parkland employees. It is unknown how many of these employees had a legitimate reason

to view Williams’ records, but it was likely to be less than a few dozen.

After several high-profile breaches of privacy, the California Health Department conducted an investigation on incidents of patient record “snooping” at the UCLA Medical Center. It found that, from 2003 to 2008, more than 100 hospital workers had inappropriately accessed the records of 1,041 patients — including California first lady Maria Shriver. Some of those hospital workers were passing information on hospitalized celebrities to the tabloid media.<sup>113</sup> Moreover, between January 2009 and May 2009 alone, California hospitals reported over 300 instances where patient records were inappropriately accessed.<sup>114</sup> In 2009, Kaiser Permanente fired 15 employees for reading the

### Case Study: Where HIT Security Has Failed<sup>117</sup>

U.S. health care reformers who advocate that all hospitals and physicians participate in centralized HIT systems for patient health records, physician orders and test results should be careful to avoid problems that occurred in Britain. HIT systems at several large hospitals in London were shut down by a virus in late 2008, with nearly 5,000 computers infected or at risk.

When this occurred, patient records were not accessible, causing delays in care and treatment. Some ambulances had to be diverted to other hospitals, while the affected hospitals had to quickly rely on an emergency backup system (paper and ink to order X-rays, for example).

A centralized network allowed the virus to spread to other hospitals as patient records were shared, whereas a decentralized system (if infected) would likely have caused only isolated or localized disruptions.<sup>118</sup> This particular virus had first appeared nearly three years earlier. It could have been blocked by standard antivirus software, so it is a mystery why the hospitals were unprotected.<sup>119</sup>

In another incident the same year, a computer used to view digital images in the operating room rebooted mid-surgery at a hospital in England. To correct the problem, information technology managers disabled automatic security updates on nearly 8,000 hospital computers. Within days, 800 hospital computers were infected with a virus.<sup>120</sup> Although Microsoft and other organizations issued advance warnings about the threat, the hospital lacked the ability to quickly install antiviral updates or software patches. Since then, there have been numerous other accounts in the British press about virus and malware breaches at National Health Service hospitals.

records of Nadya Suleman, the much publicized mother of octuplets.<sup>115</sup>

This isn't just a problem for celebrities. In 2006, thieves stole backup tapes and computer equipment containing 365,000 records from a home care service in Portland, Ore. In San Jose, Calif., a clinic manager stole computer equipment containing 187,000 patient records. A survey of data breaches from health care and social service organizations has identified breaches of more than 345 million records since 2005. Of those, 10 million were records of insurers or health care organizations, many of which contained confidential medical information.<sup>116</sup>

## Public Policy Solutions

To achieve its potential, HIT should do more than merely wire a "broken health care system."<sup>121</sup> HIT should provide "useful, valid, and portable health information" through an "orderly evolution of technology."<sup>122</sup> The way to ensure that health care providers adopt HIT is to create the appropriate financial incentives.

**Create Appropriate Incentives.** The U.S. health care system provides few incentives for doctors and hospitals to adopt information technology and decision-support systems.<sup>123</sup> In the United States, most people are covered by employer health plans and many change jobs frequently. This churning reduces the incentive for insurers to assist health care providers with the cost of HIT systems that may take years to reduce individual claims.

Providers need to be able to repackage and reprice the services

they provide. Instead of fixed fees for a list of authorized tasks, they should be allowed to innovate and profit if they deliver the same quality of care for less cost.<sup>124</sup> In the past, managed care providers were simply paid on a per capita basis, but this often gave them an incentive to skimp on care.<sup>125</sup>

In addition, individuals would have better incentives to use systems that create long-term health benefits if they owned their own health insurance and paid for their own health care. If they reaped some of the long-term rewards of any reduction in costs due to a greater reliance on HIT, individuals would have a strong incentive to buy care from firms that invest in it.<sup>126</sup>

Furthermore, providers could compete by offering individuals different privacy and security standards. Individuals could then choose the level of these services they prefer.

**Reform Laws Governing the Practice of Medicine.** A final consideration involves state laws that govern the practice of medicine. An advantage of HIT is that it makes the practice of medicine both convenient and efficient:

- When medical records are accessible online, distance will become irrelevant.
- Physicians will be able to consult with patients online while accessing patients' complete medical records.
- Specialists can consult with emergency room doctors when needed.

None of this is currently illegal (except in a few states). However, a 50-state patchwork of regulations means that the physician must be

licensed in the same state as the patient. This reduces the opportunities for remote physician care.

## Conclusion

Proponents of government support for expanding HIT point to tremendous benefits for the U.S. health care system. However, although many experts discuss the *hoped-for* benefits of HIT, formal evaluation and evidence regarding successful implementation is lacking.

Also missing from the debate is an honest discussion of experiences with actual HIT systems, and the obstacles and pitfalls that could make poorly-designed systems worse than useless. Many presumed benefits will never materialize, while other benefits will be identified over time. Firms that have successfully adopted HIT systems use them as a necessary part of their business model. Without the appropriate incentives, these systems are likely to fail to live up to their potential.

Policymakers should let the market, not the federal government, pick the technology that works best. Consumers should also have a say in the appropriate level of privacy that meets their needs. If government bureaucrats had arbitrarily picked privacy and security standards for the banking industry, access to balances online might be impossible and automated teller machines (ATMs) might not exist.

At a minimum, policymakers should let the health care industry propose security and privacy standards that balance the need for privacy and security with the optimal amount of protection for patients.

## Health Information Technology: Benefits and Problems

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*The NCPA is a nonprofit, nonpartisan organization established in 1983. Its aim is to examine public policies in areas that have a significant impact on the lives of all Americans — retirement, health care, education, taxes, the economy, the environment — and to propose innovative, market-driven solutions. The NCPA seeks to unleash the power of ideas for positive change by identifying, encouraging and aggressively marketing the best scholarly research.*

### Health Care Policy.

The NCPA is probably best known for developing the concept of Health Savings Accounts (HSAs), previously known as Medical Savings Accounts (MSAs). NCPA President John C. Goodman is widely acknowledged (*Wall Street Journal*, WebMD and the *National Journal*) as the “Father of HSAs.” NCPA research, public education and briefings for members of Congress and the White House staff helped lead Congress to approve a pilot MSA program for small businesses and the self-employed in 1996 and to vote in 1997 to allow Medicare beneficiaries to have MSAs. In 2003, as part of Medicare reform, Congress and the President made HSAs available to all nonseniors, potentially revolutionizing the entire health care industry. HSAs now are potentially available to 250 million nonelderly Americans.

The NCPA outlined the concept of using federal tax credits to encourage private health insurance and helped formulate bipartisan proposals in both the Senate and the House. The NCPA and BlueCross BlueShield of Texas developed a plan to use money that federal, state and local governments now spend on indigent health care to help the poor purchase health insurance. The SPN Medicaid Exchange, an initiative of the NCPA for the State Policy Network, is identifying and sharing the best ideas for health care reform with researchers and policymakers in every state.

**NCPA President  
John C. Goodman is called  
the “Father of HSAs” by  
*The Wall Street Journal*, WebMD  
and the *National Journal*.**

### Taxes & Economic Growth.

The NCPA helped shape the pro-growth approach to tax policy during the 1990s. A package of tax cuts designed by the NCPA and the U.S. Chamber of Commerce in 1991 became the core of the Contract with America in 1994. Three of the five proposals (capital gains tax cut, Roth IRA and eliminating the Social Security earnings penalty) became law. A fourth proposal — rolling back the tax on Social Security benefits — passed the House of Representatives in summer 2002. The NCPA’s proposal for an across-the-board tax cut became the centerpiece of President Bush’s tax cut proposals.

NCPA research demonstrates the benefits of shifting the tax burden on work and productive investment to consumption. An NCPA study by Boston University economist Laurence Kotlikoff analyzed three versions of a consumption tax: a flat tax, a value-added tax and a national sales tax. Based on this work, Dr. Goodman wrote a full-page editorial for *Forbes* (“A Kinder, Gentler Flat Tax”) advocating a version of the flat tax that is both progressive and fair.

A major NCPA study, “Wealth, Inheritance and the Estate Tax,” completely undermines the claim by proponents of the estate tax that it prevents the concentration of wealth in the hands of financial dynasties. Actually, the contribution of inheritances to the distribution of wealth in the United States is surprisingly small. Senate Majority Leader Bill Frist (R-TN) and Senator Jon Kyl (R-AZ) distributed a letter to their colleagues about the study. In his letter, Sen. Frist said, “I hope this report will offer you a fresh perspective on the merits of this issue. Now is the time for us to do something about the death tax.”

### Retirement Reform.

With a grant from the NCPA, economists at Texas A&M University developed a model to evaluate the future of Social Security and Medicare, working under the direction of Thomas R. Saving, who for years was one of two private-sector trustees of Social Security and Medicare.

The NCPA study, “Ten Steps to Baby Boomer Retirement,” shows that as 77 million baby boomers begin to retire, the nation’s institutions are totally unprepared. Promises made under Social Security, Medicare and Medicaid are completely unfunded. Private sector institutions are not doing better — millions of workers are discovering that their defined benefit pensions are unfunded and that employers are retrenching on post-retirement health care promises.

### Pension Reform.

Pension reforms signed into law include ideas to improve 401(k)s developed and proposed by the NCPA and the Brookings Institution. Among the NCPA/Brookings 401(k) reforms are automatic enrollment of employees into companies’ 401(k) plans, automatic contribution rate increases so that workers’ contributions grow with their wages, and better default investment options for workers who do not make an investment choice.

The NCPA's online Social Security calculator allows visitors to discover their expected taxes and benefits and how much they would have accumulated had their taxes been invested privately.

### Environment & Energy.

The NCPA's E-Team is one of the largest collections of energy and environmental policy experts and scientists who believe that sound science, economic prosperity and protecting the environment are compatible. The team seeks to correct misinformation and promote sensible solutions to energy and environment problems. A pathbreaking 2001 NCPA study showed that the costs of the Kyoto agreement to reduce carbon emissions in developed countries would far exceed any benefits.

### Educating the next generation.

The NCPA's Debate Central is the most comprehensive online site for free information for 400,000 U.S. high school debaters. In 2006, the site drew more than one million hits per month. Debate Central received the prestigious Templeton Freedom Prize for Student Outreach.

### Promoting Ideas.

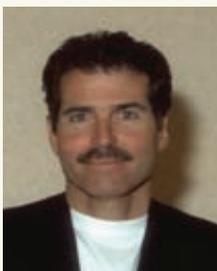
NCPA studies, ideas and experts are quoted frequently in news stories nationwide. Columns written by NCPA scholars appear regularly in national publications such as the *Wall Street Journal*, the *Washington Times*, *USA Today* and many other major-market daily newspapers, as well as on radio talk shows, on television public affairs programs, and in public policy newsletters. According to media figures from *BurrellesLuce*, more than 900,000 people daily read or hear about NCPA ideas and activities somewhere in the United States.

## What Others Say About the NCPA



*"The NCPA generates more analysis per dollar than any think tank in the country. It does an amazingly good job of going out and finding the right things and talking about them in intelligent ways."*

**Newt Gingrich**, former Speaker of the U.S. House of Representatives



*"We know what works. It's what the NCPA talks about: limited government, economic freedom; things like Health Savings Accounts. These things work, allowing people choices. We've seen how this created America."*

**John Stossel**, former co-anchor ABC-TV's *20/20*



*"I don't know of any organization in America that produces better ideas with less money than the NCPA."*

**Phil Gramm**, former U.S. Senator



*"Thank you . . . for advocating such radical causes as balanced budgets, limited government and tax reform, and to be able to try and bring power back to the people."*

**Tommy Thompson**, former Secretary of Health and Human Services