

Doctoring in a Digital World



Boston internist “Dr. Sean James” greets patient “Sara Hill” in an examination room, then sits down at a computer and calls up her electronic health record on a state-of-the-art system. A colorful screen pops up on the monitor, showing Hill’s height, weight, and other statistics in the left column, existing health problems in the middle column, and a list of several drugs—and Hill’s response to each—on the right.

In the top left corner, a red box draws the doctor’s eyes to a reminder: “Patient is overdue for a mammogram.” Dr. James then clicks on a button that brings up Hill’s latest blood test results, showing an elevated LDL cholesterol level of 170. He checks her previous test and, after discussing it with Hill, orders a higher-dose statin drug, emailing the prescription to her local pharmacy. A few more clicks and he has ordered another blood test in three months’ time, along with Hill’s mammogram.

If this scene sounds like science fiction to you, you’re far from alone. As few as 4 percent of physicians today use electronic health records, known as EHRs. And hospitals have been similarly slow to adopt this technology. In response to a recent survey by the Healthcare Information and Management Systems Society, not one hospital reported having achieved the highest level of technology adoption. One-third lacked even the foundation on which to build an EHR system. *continued*

Electronic health records could make care safer and save money. So why aren’t more doctors and hospitals using them?



Many people in government and in public health say health information technology—health IT for short—has the capacity to stem skyrocketing

Electronic vs. Personal Health Record: What's the Difference?

Whereas an electronic health record (EHR) is a computer record that originates with and is controlled by doctors, a personal health record (PHR) can be generated by physicians, patients, hospitals, pharmacies, and other sources but is controlled by the patient.

Google and Microsoft are now promoting Google Health and Microsoft HealthVault, respectively, to hospitals and individuals. These services house PHRs on secure networks. Among Microsoft's early partners is Kaiser Permanente's integrated managed care organization. Google's links include Beth Israel Deaconess Medical Center, in Boston; the Cleveland Clinic, in Ohio; the pharmacy chains CVS Caremark and Walgreens; and Medco, a prescription-drug benefit manager.

"Personal health records can be either linked to electronic health records or stand alone, but linking the two is by far the most useful approach," says HSPH's David Bates. "It's a lot to ask a patient to keep track of all their medical data."

U.S. health care costs, which in 2007 amounted to \$2.3 trillion, an average of \$7,600 per person. But given the obstacles to adopting EHR systems—hundreds of vendors vying for clients, hefty installation and operating costs, and a still-developing effort by industry and government to standardize the technologies—implementation of health IT is, at best, inching along. Debate rages as to whether the free market can quickly winnow compet-

on their Web sites. McCain wants rapid adoption of health IT to allow doctors' practices to span state lines. Obama has pledged \$50 billion over five years to help fund the transition to "standards-based" electronic health information systems.

Adoption of health IT's best technologies will transform the U.S. health care system by making it safer, more efficient, and more cost-effective, proponents say.

"Health IT is one of the few things that has the potential to both improve quality and reduce costs at the same time."

—HSPH's David Bates

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ing systems down to a few optimal, compatible choices, or whether government will need to intervene through incentives or mandates.

SETTING PRIORITIES

Getting more doctors and hospitals to use health IT is one of the federal government's top health care goals. In 2004, President George W. Bush set the goal of having EHRs available for most Americans by 2014. By executive order, he established the Office of the National Coordinator for Health Information Technology to lead the way.

Presidential candidates John McCain and Barack Obama have laid out their own ambitious goals

Doctors' offices in Colby, Kansas will be able to exchange records with doctors' offices in Waycross, Georgia—or anywhere else in the country—without having to photocopy a raft of pages and FedEx the paperwork along with X-rays and other test results.

It's a lofty goal, but its realization is a long way off, according to Ashish Jha, assistant professor in the Department of Health Policy and Management at HSPH.

A new physician survey, the results of which were published in the *New England Journal of Medicine (NEJM)* in July, shows just where we stand in this colossal endeavor. According to a representative sample

Anatomy of a Health Record

In this example of an electronic health record, the patient's vital signs and other statistics are at the top left. Body mass index (BMI) is calculated automatically when the weight is entered. The patient's current medications are at middle left, and problems that have been diagnosed or of which there has been a family history are at top center.

Clicking on this "i" brings up a monograph on the topic next to it.

The star takes the doctor to guidelines and other decision-support information.

This button leads to the patient's history of key parameters used to measure diabetes, such as blood pressure, hemoglobin A1C, and cholesterol.

Sticky notes serve as handy reminders to health care providers.

This section contains the patient's recent health maintenance data, such as mammogram results.

This section lists the patient's highly individualized responses to drugs, including known allergies that are potentially life-threatening.

Courtesy of Brigham and Women's Hospital/Partners HealthCare System

of more than 2,700 U.S. physicians practicing in outpatient clinics as of late 2007 and early 2008, a mere 4 percent were using "fully functional" EHR systems. Only 13 percent were using a "basic" EHR system. (See "A

Tool for Tracking EHR Adoption Rates," page 11).

Just what does that 4 percent mean? "It means that about five out of six doctors in America are completely paper based," says Jha, one of the report's authors.

"It means 24 out of 25 doctors in America don't have a robust electronic record. It means we have a long way to go in achieving the kind of health care system we all can be proud of."

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HOW HEALTH IT SHOULD WORK

Health IT encompasses several elements. One basic component is the EHR, a health record that physicians enter and maintain for each patient in their practices' computer systems. How the EHR is set up and maintained determines how "functional" it is. Goals set by the federal government call for EHRs to be standardized and interoperable, meaning that multiple clinics and hospitals should be able to access and update them as patients seek treatment at multiple locations. (See "Electronic vs. Personal Health Record: What's the Difference?" Page 8.)

Interoperable EHRs have the potential to improve people's health in a number of ways. In 2006, a review in the *Annals of Internal Medicine* concluded that four benchmark institutions, including Brigham and Women's Hospital/Partners Health Care system in Boston, demonstrated that health IT could provide public health benefits, including:

Fewer medication errors:

EHRs would immediately notify physicians of potential interaction problems among prescription medicines or possible allergic reactions by the patient, among many other such checks.

Increased adherence by doctors to guidelines:

As a physician enters a patient's diagnosis into the record, it would display treatment guidelines and highlight any with which the patient is not already complying.

Results from the *NEJM* survey seem to bear these predictions out. First author Catherine M. DesRoches, a project director at the Institute for Health Policy at Massachusetts General Hospital and Harvard Medical

School, explains: "The findings show that physicians who use this technology really like it. They said it had a positive effect on the quality of their clinical decisions and their communication with other providers, and with their patients. They're very happy with the timely access to medical records. They think it helps them avoid medication errors and they think it helps them deliver care that meets guidelines."

EASE OF ORDERING

One function of an ideal EHR is computerized physician order entry, or CPOE, technical language for Dr. James's way of ordering Sara Hill's statin. When a physician uses CPOE to enter a prescription, the system alerts him or her to potential interactions with other drugs the patient is taking. Common dosages, contraindications such as pregnancy, and patient allergies are also flagged.

Brigham and Women's Hospital (BWH) has helped pioneer the development of CPOE. If set up properly, "it reduces the serious medication error rate by at least 55 percent," says David Bates, HSPH professor of health policy and management and chief of the Brigham and Women's General Medicine Division, who led a BWH study that described this finding in 1998. CPOE's most beneficial aspect is in renal dosing, Bates says, because it "helps the doctor choose the appropriate dose of a drug given a patient's level of kidney function."

If enough indications and contraindications in evidence-based medicine are in the system, the physician can have "Google-like experiences" when entering a diagnosis, says HSPH alumnus Joe Bormel, MPH '95, vice president and chief medical officer at QuadraMed, a



A Tool for Tracking EHR Adoption Rates

Tracking the progress of anything, including health IT adoption, requires reliable record-keeping. The July 3 *New England Journal of Medicine* survey report, funded by the Office of the National Coordinator of Health Information Technology (ONC), set a baseline so that future changes can be measured accurately.

"If you want to get somewhere, first you've got to know where you are," says a co-author, HSPH's Ashish Jha. "What this study does is establish the baseline of, 'Here's where things are in 2008.' The good news is, it tells us exactly where we are; but the bad news is, we're a lot further behind than we'd like to be."

Previous surveys had pegged EHR adoption rates at anywhere from 9 percent to 25 percent of doctors and had relied on various definitions for technology terms. "One of the reasons ONC funded this was for us to develop standardized methods, so that when people do these surveys in the future, the data are compa-

table," explains first author Catherine DesRoches, of the Institute for Health Policy.

To develop questions, the researchers consulted a panel of 20 experts in survey research, health IT, and health care management and policy, plus representatives of hospitals and physician groups. For the survey's purposes, a fully functional EHR system was defined as having the capability to:

- * Record patients' clinical and demographic data;
- * View and manage results of laboratory tests and imaging;
- * Manage order entry, including electronic prescription and the ability to order tests and imaging;
- * Support clinical decisions, including warnings about drug interactions or contraindications.

A basic EHR system, for the survey's purposes, is one that allows just some of the first three of those functionalities.

Reston, Virginia company highly active in health IT. "The things that show up at the top of the screen in prioritized order are the things the doctor needs to review, document, or order," he adds, and that means "getting it right every single time."

SUCCESSES SO FAR

The U.S. Military Health System and the Veterans Health Administration have deployed EHR systems with some success. Portability has been an immediate benefit of the VA's system. "Right now the VA's electronic record is such that if you get seen in the Boston VA today and you get on a plane and fly to Honolulu and go to a VA physician there tomorrow, they'll be able to pull up the records from Boston in electronic, real time there," says Jha.

Referring to recent bad publicity about VA health care, Jha says those complaints have mainly to do with health benefits and access to care. "Those are not issues that an electronic health record is going to help you with," Jha notes. "Most of the scientific evidence suggests that the quality of the care is good, and an electronic record has been a key part of that."

One of the leaders in the military's effort is HSPH alumnus Bart Harmon, MPH '95, chief medical officer at Harris Corporation in Falls Church, Virginia. Prior to joining Harris in 2007, Harmon was chief medical information officer and director of information management for the Military Health System, where for more than 10 years he led the transition from paper to computer.

The military implemented its initial EHR functions, including CPOE, in the 1980s. In 2006, it completed worldwide deployment of an outpatient record that normalized elements such as laboratory test names. Planning for the system began in 1997. The immediate benefits from the system, which covers 9.1 million people, were its portability and depth, says Harmon. "We have a global database of electronic records," he explains. "The military wanted data collection mechanisms that supported population health in multiple different dimensions, so the military really drove very hard to a highly structured electronic health record."

The military's EHR is available no matter where a person is when he or she needs medical help. Its structure

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is designed to advise physicians on potentially dangerous differences in diagnoses, such as whether a person has a simple cold, or COLD (chronic obstructive lung disease), Harmon says. The prescription medicine aspect of the record can also be delivered to commercial pharmacies, so a prescription written anywhere in the world can be checked for possible adverse interactions or reactions.

SO WHY NOT WIDELY USED?

If EHRs are so good for the public's health, why aren't more doctors'

Education Commission for Healthcare Information Technology (CCHIT).

Jha sums up the deterrents this way: "For most doctors, the question is: 'Do you want to invest in something that's expensive, where the vendor may or may not be around tomorrow, that's going to disrupt the way you work, so that there might be a theoretical financial benefit for the insurance companies that pay you?' That doesn't sound like a great value proposition, so you can completely understand why a lot of doctors have been nervous

Web announcement. The U.S. Congress has asked both Defense and the VA to use a common system.

COSTS UNCLEAR

Confusion also swirls around the perceived cost savings of fully adopting health IT. Some say there won't be any savings at all, or that costs will go up because people will be prompted to make more doctor visits and get more tests than they do now.

Few gross hard numbers exist on costs. In a RAND Corporation study conducted from 2003 to 2005,

"We have a long way to go in achieving the kind of health care system we all can be proud of." —HSPH's Ashish Jha

offices and hospitals using this technology? Basically it boils down to culture, costs, and confusion.

Culture is tough to change. Most physicians are accustomed to writing on paper and, according to recent surveys and reports, many who haven't adopted health IT fear that it will infringe on patient privacy and lead to government directives for their practices.

Costs can run from \$25,000-plus per physician to install a system, plus maintenance and license expenses, and the installation and learning process causes a loss of productivity in the doctor's office that can cost thousands more dollars.

Confusion reigns, owing to the fact that hundreds of vendors offer systems. Sorting through all the specifications is a daunting, time-consuming task. And not all products and services are certified by the proper agencies, such as the Certifi-

cation Commission for Healthcare Information Technology (CCHIT).

Harmon recounts many obstacles to setting up the military's system. "We were changing the types of tools that everyone on the health care team uses to document their care," he explains. "There were small changes to health culture, health practice, health process. Their note reads differently than it used to, because it's a more structured note. Parts of it don't flow as smoothly as something you would just write on paper. There were many challenges, and they're still working through some of those."

Indeed, in August military officials were still considering how to adapt their system so that it is fully interoperable with the VA's system. "There is a strong feeling here and at the VA that the best approach is a convergent evolution of the two systems," Deputy Assistant Defense Secretary Stephen Jones posted in a

researchers estimated health IT's costs to be \$120 billion over 15 years and the savings to be \$80 billion per year at an adoption level of 90 percent. Other cost estimates have ranged from \$150 billion over eight years to \$156 billion over five years. According to an article in the May-June 2006 *Journal of the American Medical Informatics Association* by Bates, Jha, and colleagues, Brigham and Women's saved a total of \$28.5 million over a 10-year period using computerized physician prescribing and ordering.

However, the U.S. Congressional Budget Office (CBO) has disputed the potential cost savings cited by RAND, claiming in a May 2008 report that they "are not an appropriate guide" to projecting savings. Among the reasons: RAND projected *potential* impact rather than *likely* impact.

CBO's director, Peter Orszag, told a U.S. House of Representa-

tives committee in July that health IT “appears to make it easier to reduce health spending if other steps in the broader health care system are also taken,” but he added that active federal intervention will be necessary to spur adoption. Orszag’s position differs from that of Secretary of Health and Human Services Michael Leavitt, who holds that the free market will spur adoption of EHRs because patients will demand it.

Bates says rebuttals are being prepared to the CBO report. “The single biggest issue in health care in the U.S. today is cost,” he says. “We’re spending more on health care than any other industrialized nation. We need to reduce

Also, when the U.S. Congress passed legislation in July to halt a scheduled 10.6 percent pay cut to physicians by Medicare, the new law provided for bonuses to physicians who use electronic prescribing, and for penalties beginning in 2012 to those who don’t. The Department of Health and Human Services estimated that that will save Medicare \$156 million over five years, based on, among other points, the Institute of Medicine’s estimate that 1.5 million Americans are injured every year by prescribing errors.

In June, Representative John W. Dingell introduced a bill in the U.S. House of Representatives that,

but can’t afford it is a trend among hospitals toward helping physicians purchase EHR systems. “Recently, there’s been a relaxation of [regulations] to allow hospitals to give some degree of electronic health record to small practices,” Bormel says. Previously, the hospitals were prohibited from doing that because it was perceived as a conflict of interest. There are some caveats, such as the systems must be approved by the CCHIT, but that should be a benefit to the doctors and their patients to have standardized systems.

Another sign that more doctors are leaning toward broader EHR use comes from the *NEJM* survey. Among



those costs, and health IT is one of the few things that has the potential to both improve quality and reduce costs at the same time.” It’s not a panacea, he adds, but it is a foundational tool.

WHERE TO NOW?

Help is on the horizon for physicians who want to adopt EHR technology but are having difficulty overcoming the barriers. The Centers for Medicare and Medicaid Services launched a pilot program in June that provides incentive payments to doctors in eight states and four metropolitan areas for using certified EHRs.

among other things, would establish a competitive, matching grant program to encourage health IT adoption. Providers would invest \$1 for every \$3 of grant money, and a preference is built into the legislation for small, nonprofit, and rural health care providers, and for practices that will link to a network of multiple providers. Senator Edward Kennedy of Massachusetts introduced similar legislation in the U.S. Senate in 2007.

INKLINGS OF PROGRESS

One good sign for small practices that might want to adopt the technology

the respondents, 42 percent noted that they had either bought EHR systems but had not yet installed them (16 percent) or that they planned to buy systems within two years (26 percent). “Should that happen, then we could, in the next three to five years, see a pretty good uptick in the adoption of this technology,” DesRoches says. “Should we be even close to 42 percent, that would be a huge jump forward.”

Larry Hand is associate editor of the Review.