February 17, 2009, was a watershed moment for health care in the United States. On that day, the Health Information Technology for Economic and Clinical Health Act, known as the HITECH Act, was enacted, with the goal of promoting the widespread adoption of health information technology and creating a nationwide health information exchange system.\(^1\)

According to the National Coordinator of Health Information Technology at that time, David Blumenthal, MD, the legislation was based on the conviction that information technology could improve both health and health care, along with the belief that the clout of the federal government was needed to implement the changes.\(^2\) HITECH was part of the 2009 American Recovery and Reinvestment Act “stimulus program,” under which billions of dollars were allocated to implement HITECH, rapid deadlines were established, incentives were offered, and penalties were set for nonparticipation by physicians and hospitals. The rush was on for vendors to create electronic health record (EHR) systems and for providers to choose—and pay for—complicated, expensive, and sometimes insufficiently tested systems.

By the time the fourth anniversary of HITECH had passed, enough had transpired to assess both the ups and downs of this massive undertaking. The idealistic goals have now been tempered by frustration as shortcomings become apparent—especially documentation issues, lack of standardization, and poor communication among systems. Unforeseen safety, privacy, and liability issues have emerged. And some naysayers contend that the move to EHRs has exacerbated medical costs.

This issue of *infocus* examines many of these matters. For example, is there evidence that EHRs actually improve quality or reduce risk? There will be a look at what is going on nationally, but our reporting will focus on how New York City’s physicians and hospitals are faring, and what local resources are available to facilitate the transition to electronic recordkeeping as well as medical information sharing and transmission. With FOJP hospitals at the forefront of health information technology, *infocus* finds out directly from chief medical information officers about the “highlights and lowlights” of meeting goals set by HITECH. In addition, we examine what FOJP is doing to facilitate implementation of standards in documentation management.

In a recent opinion piece, Glen Tullman, EHR entrepreneur and former CEO of Allscripts Healthcare Solutions, spoke about a conference he attended 20 years ago during which a dream was expressed that information systems and technology might be used to change health care fundamentally. Two decades later, with massive effort, one-half million US physicians are using electronic health records. “To paraphrase Churchill,” Tullman wrote, “this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning of the electronic health revolution.”\(^3\) For despite all the setbacks and difficulties, there is no question of our ever going back to a paper-based system of health records.
According to the Centers for Medicare and Medicaid Services (CMS), an electronic health record (EHR) is a digital version of the patient’s medical history. It is maintained by the provider over time, and can include key data such as demographics, progress notes, problems, medications, vital signs, medical history, immunizations, laboratory data, and radiology reports. The trend now is moving away from seeing EHRs simply as repositories for record-keeping and billing to viewing them as a source of information to measure and improve health, using evidence-based decision support, quality management, and outcomes reporting.

Spearheading the nationwide move toward adoption of health information technology (HIT) and health information exchange (HIE) in the United States is the Office of the National Coordinator for Health Information Technology (ONC), located within the Office of the Secretary of Health and Human Services (see the www.healthit.gov website). According to the ONC, there are many benefits to be derived from use of EHRs:

1. Improved quality and convenience of patient care
2. Increased patient participation in their care
3. Heightened accuracy of diagnoses and health outcomes
4. Improved care coordination
5. Increased practice efficiencies and cost savings

From a risk management perspective, the hope is that EHRs will minimize factors that contribute to medical error and malpractice lawsuits. These include poor communication among providers, difficulty in accessing patient information quickly, unsafe prescribing practices, poor record documentation, illegibility, and failure to follow clinical guidelines.

Functions of EHRs

The ONC requires that eligible professionals and hospitals must demonstrate meaningful use (MU) of certified EHRs to qualify for financial incentives from the CMS—and avoid future penalties if deadlines are not met. EHR systems must meet the government’s MU criteria, objectives, and measures as outlined in three successive stages (Table 1).

Every eligible professional must meet 15 core objectives in Stage 1 to receive an EHR incentive payment. (For more information about each core objective, refer to the CMS website, particularly to “An Introduction to the Medicaid EHR Incentive Program for Eligible Professionals.”) The following are the 15 core objectives:

1. Initiate computerized provider order entry (CPOE).
3. Maintain an up-to-date problem list of current and active diagnoses.
4. Use e-prescribing (eRX).
5. Maintain an active medication list.
6. Maintain an active medication allergy list.
7. Record demographics.
8. Record and chart changes in vital signs.
9. Record smoking status for patients 13 years or older.
11. Implement clinical decision support.
12. Provide patients with an electronic copy of their health information, upon request.
13. Provide clinical summaries for patients for each office visit.
14. Establish the capability to exchange key clinical information.
15. Protect electronic health information.

Table 1. Stages in Attaining Meaningful Use of EHRs

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<tr>
<td><strong>Data Capture and Sharing</strong></td>
<td><strong>Advanced Clinical Processes</strong></td>
<td><strong>Improved Outcomes</strong></td>
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<tr>
<td>Meaningful use criteria focus on:</td>
<td>Meaningful use criteria focus on:</td>
<td>Meaningful use criteria focus on:</td>
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<tr>
<td>Electronically capturing health information in a standardized format</td>
<td>More rigorous health information exchange (HIE)</td>
<td>Improving quality, safety, and efficiency, leading to improved health outcomes</td>
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<td>Using that information to track key clinical conditions</td>
<td>Increased requirements for e-prescribing and incorporating lab results</td>
<td>Decision support for national high-priority conditions</td>
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<td>Communicating that information for care coordination processes</td>
<td>Electronic transmission of patient care summaries across multiple settings</td>
<td>Patient access to self-management tools</td>
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<td>Initiating the reporting of clinical quality measures and public health information</td>
<td>More patient-controlled data</td>
<td>Access to comprehensive patient data through patient-centered HIE</td>
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<tr>
<td>Using information to engage patients and their families in their care</td>
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<td>Improving population health</td>
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Source: http://www.healthit.gov/providers-professionals/how-attain-meaningful-use
There are also 10 menu objectives (objectives in blue are public health objectives). Providers must select one public health objective and four others from this list:

1. Submit electronic data to immunization registries.
2. Submit electronic syndromic surveillance data to public health agencies.
3. Perform drug formulary checks.
4. Incorporate clinical lab-test results.
5. Generate lists of patients by specific conditions.
6. Send reminders to patients for preventive/follow-up care.
7. Provide patient-specific education resources.
8. Provide electronic access to health information for patients.

**MU Objectives**

To achieve meaningful use, eligible professionals must have a system that meets all 15 of the core objectives and five of 10 menu set objectives. Practitioners must also reach specified standards for clinical quality measures.

Hospitals and critical access hospitals (CAHs) must meet 14 of 15 core objectives and five out of 10 menu set objectives, plus 15 clinical quality measures. Through 2013, there are three core clinical quality measures relating to blood pressure measurement, tobacco use, and weight.4

To reach Stage 2, physicians must attest to 17 MU core objectives and three of six menu objectives, while hospitals must meet 16 core objectives and three menu objectives. Physicians must also report on 12 clinical quality measures.

Stage 1 MU regulations originally gave providers two years to advance to Stage 2, but the onset of Stage 2 criteria has been delayed. At the earliest, eligible hospitals can reach Stage 2 during fiscal year 2014, while it is calendar year 2014 for eligible providers.

Providers have a 90-day reporting period during their first year of Stage 2, and can report all year long during the second year. CMS has published an interactive toolkit to walk users through Stage 2 MU preparation.5

**Differences between Stage 1 and Stage 2**

The toolkit being used here goes into detail about the MU requirements of Stage 2, modifications that have been made to Stage 1, and comparisons of Stage 1 with Stage 2 for eligible professionals (EPs), hospitals, and CAHs. Most Stage 1 objectives are now core objectives under Stage 2 criteria, although the threshold has been raised for many of them, so that more patients are covered. Important considerations are new Stage 2 core objectives: For EPs there is one regarding the use of EHRs to improve quality of care. Hospitals and critical access hospitals (CAHs) must meet 14 of 15 core objectives and five set objectives. Practitioners must also meet specified standards for public health objectives. There are also new Stage 2 core objectives for EPs, which include three menu set objectives, plus 15 clinical quality measures. Stage 2 also asks that both professionals and hospitals provide timely access to patient health information. Another criterion emphasizes care coordination for patients and the need to supply and exchange electronic summaries of care records. There are also new Stage 2 measures that make reaching meaningful use dependent on patients accessing, downloading, or transmitting their health information electronically. (See “EHRs and the Patient Portal.”)

**Deadlines and Incentives**

As Table 2 shows (page 4), since 2011 physicians have felt pressure to meet MU criteria in order to maximize the incentives available to them. If EPs met the requirements in 2011, they could have received up to $44,000 in incentive payments from Medicare across five years of program
Electronic Health Records: A National Report Card

continued from page 3

participation or $63,750 from Medicaid over six years. (Physicians can receive incentives from one or the other, but not both. Beginning in 2013, the incentive cap for Medicare begins to fall, and disappears entirely in 2015. The cap remains the same through 2016 for Medicaid.)

Once the incentives expire, penalties can kick in. Physicians who have not adopted a certified EHR or have not met MU standards by 2015 will find their Medicare reimbursements reduced by 1 percent in 2015, 2 percent in 2016, 3 percent in 2017, and 4 percent in 2018. For a family physician who is reimbursed 20 percent by Medicare and has an annual income of $500,000, that translates into $1,000 in 2015, $2,000 in 2016, and so on. No penalties are assessed in the Medicaid EHR program.

It is not surprising that EHR systems are designed to allow physicians and hospitals to fulfill MU criteria as part of their marketing. EHR vendors point out if their products are certified by one of the ONC’s six authorized testing certification bodies, such as the Certification Commission for Health Information Technology—reminding customers of the government financial incentives that go with achieving MU criteria. The ONC provides a certified health IT product list, and professional groups such as the American Academy of Family Physicians (AAFP) provide lists of EHR products that have been certified. The AAFP has joined with other professional medical organizations to form a group known as American EHR Partners to help physicians select certified EHR systems. Certification means that the EHR technology in question has the capacity to meet the goals and objectives of MU.

Table 3 provides some examples of how EHR functions align with MU objectives.

Benefits and Drawbacks of EHR Systems

Four years post-HITECH, EHR naysayers have gained prominence in the published literature and popular press. Here are some recent headlines:

- "What It Will Take to Achieve the As-Yet-Unfulfilled Promises of Health Information Technology"12
- “Electronic Medical Records a Disappointment in the USA”13
- “The (So Far) Failed Promise of Electronic Medical Records”14
- “EHRs Heading for Iceberg. HHS Says ‘Full Steam Ahead!’”15

And such criticisms have triggered a response. "There’s an evolution going on here. This is a process, not a short-term project," said Steven J. Davidson, MD, Chief Medical Informatics Officer (CMIO) at Maimonides Medical Center. Dr. Davidson, an ER physician with a business degree

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Table 2. Incentive Payments by MU Stage

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<tr>
<th>Maximum Payment by Start Year</th>
<th>Annual Incentive Payment by Stage of Meaningful Use</th>
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<tr>
<td>2011</td>
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<td>2012</td>
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<td>2013</td>
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<td>2014</td>
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<td>2015</td>
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Table 3. EHR Functions for MU Objectives

<table>
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<th>MU Criteria</th>
<th>EHR Function</th>
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<tr>
<td>Core requirement: To record and chart changes in vital signs such as height, weight, blood pressure, BMI, and growth</td>
<td>Electronic documentation of vital signs (height, weight, blood pressure), calculation of BMI, plot and display of growth charts for patients ages 2–20 years. For Stage 1, this must be done for ≥50% of all unique patients age 2 and over seen by the EP.</td>
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<tr>
<td>Core requirement: To implement one clinical decision support rule relevant to specialty or high clinical priority along with the ability to track compliance with that rule</td>
<td>Example: Implementation of order sets. When items are frequently ordered together, such as medications and monitoring laboratory tests, they may be grouped into an order set to both facilitate the ordering process and enhance patient safety by prompting the provider to order these associated items. For instance, if a person is on a statin, liver function monitoring tests may be suggested. The system should have the ability to generate notifications and care suggestions—automatically, electronically, and in real time.</td>
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<tr>
<td>Core requirement: Use CPOE for medication orders directly entered by any licensed health care professional with the licensure and privileges to do so</td>
<td>CPOE must enable a user to electronically record, store, retrieve, and modify the following order types: medications, laboratory, and radiology/imaging. When CPOE is coupled with clinical decision support (CDS), research has shown that medical errors may decrease and costs often drop (see <a href="http://www.cpoe.org">www.cpoe.org</a> for further information). Under Stage 1, more than 30% of all unique patients with at least one medication in their medication list and seen by the EP must have at least one medication order entered using CPOE.</td>
</tr>
<tr>
<td>Core requirement: Generate and transmit prescriptions electronically, maintain active medication allergy list, maintain active medication list, implement drug–drug, drug–allergy checks</td>
<td>E-prescribing refers to a prescriber’s ability to send an accurate, error-free, and understandable prescription directly to a pharmacy from the point-of-care, and is seen as a very effective way to reduce errors and enhance safety. Typically, e-prescribing includes the ability to check for drug interactions, dosage errors, medication allergies, and patient-specific medication factors. Under Stage 1, more than 40% of all permissible prescriptions written by the EP must be transmitted electronically using certified EHR technology. Medicare Part D will require drug plans participating in the prescription benefit to have e-prescribing capability.</td>
</tr>
<tr>
<td>Core requirement: Provide patients with an electronic copy of health information</td>
<td>Enables user to create an electronic copy of a patient’s clinical information—including, at a minimum, diagnostic test results, problem list, medication list, and medication allergy list in human readable format and on standardized electronic media.</td>
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from Wharton, explained his perspective: “Businesses made big investments in technology in the 1950s and 1960s with computing, but productivity benefits didn’t begin accruing until the 1970s. … Here, we have been handed good tools and it is our job to make them work. We’ve begun to see improved uptake, satisfaction, and effectiveness.”

James Cimino, head of the NIH Clinical Center’s Laboratory for Informatics Development, said that current EHR systems are paving the way to more advanced technology: “Rather than complain about the challenges that EHRs have introduced, clinicians should recognize that current EHRs are illuminating the opportunities for the next generation of systems that will support clinicians as active partners across the spectrum of health care settings and tasks.”16

Agreeing that the current situation with EHRs is complicated, it is worthwhile looking at some of the main complaints lodged against them, pretty well summarized in this comment: “Though EHR platforms may vary in their bells, whistles, and targeted specialties, there seems to be an ever-present general frustration, [along with] hope that it will get better, among users, management and their staff.”17

Keeping Current
A widespread criticism of EHR systems is that hospitals and providers are hard pressed to maintain their currency. Thus, it is said that by the time the EHR systems are developed and installed, and people are trained to use them, they may already be outdated. Among other things, this means that MU is something of a moving target, with the result that systems must constantly be upgraded to meet evolving MU rules and regulations.

The Clunkiness Factor
A survey by the American College of Physicians showed that user satisfaction with EHRs has decreased steadily since 2010. Workflow and ease of use were two of the major gripes. One-third of respondents

Where Does the Nation Stand on EHR Implementation?
A March 2013 Data Brief from the Office of the National Coordinator for Health Information Technology (ONC) reported that, from 2008 to 2012, hospitals’ capability to meet each of seven meaningful use (MU) objectives grew significantly, with jumps ranging from 32 percent to 167 percent. For example, of 24 MU goals examined in 2012, 16 had adoption rates of at least 80 percent. In 2008, only 27 percent had computerized provider order entry (CPOE), but that capability rose to 72 percent in 2012. Ability to provide patients with electronic copies of their health information grew 62 percent between 2011 and 2012.

By 2012, more than 90 percent of hospitals were set to meet MU objectives related to quality, safety, and efficiency, but fewer than 60 percent were capable of meeting MU objectives on improving public and population health.1

Looking at practitioners in December 2012, the ONC issued a Data Brief on physician adoption of EHR systems. It found that in 2012, nearly three-quarters of office-based physicians (72 percent) had adopted some form of EHR system, and 40 percent had implemented basic EHR systems with certain advanced capabilities. Also in 2012, 50 percent or more of physicians had the capability to meet each of 12 MU core objectives, while 80 percent had CPOE capability, 68 percent electronic medication allergy lists, 68 percent active medication lists, and 67 percent drug interaction checks. More than half of physicians were able to offer patients clinical summaries and electronic copies of their health records. E-prescription capabilities more than doubled over the 2009 figure, jumping from 33 percent then to 73 percent in 2012.2

A recent study of two different data sources (American Board of Family Medicine [ABFM] administrative data and the National Ambulatory Medical Care Survey [NAMCS]) found that 68 percent of family physicians had adopted EHR systems by 2011, a rate that was significantly higher than for non-family physicians (55.2 percent, p < 0.0001). There is wide variation by state, with a low of 47 percent in North Dakota but almost 95 percent in Utah. New York was at the low end of the range. Data from the ABFM established that 58.4 percent of family physicians in New York were using EHRs. For New Jersey, the rate was 51.3 percent.3

A separate analysis from a NAMCS 2012 mail survey of physicians reported that 66 percent of office-based physicians intended to participate in the Medicare and Medicaid EHR incentive programs. As of 2012, 27 percent of physicians intending to participate in those incentive programs had a computerized system equipped with capabilities to support 13 of the Stage 1 Core Set objectives for meaningful use. By this measure, the highest rate, 39 percent, was reported for Wisconsin.4

said they had not yet returned to pre-EHR productivity. Physicians said the systems are tricky to navigate and cumbersome, with order sets and drop-down menus often making it difficult to individualize care or ask for relevant information. The net result, said some, is a lengthening of the physician’s work day and decreased productivity. “It has cut down on the number of people we see per day,” said internist Anne Galloway, MD. “The sad reality is this: EHR interactions consume more of the physician’s time than direct patient care.”

Documentation

“As medicine moves forward in its most technologically advanced era yet, we continue to struggle with basic concepts such as record-keeping. The medical record is vital to the care of the patient. … The idea of centralizing all pertinent medical information is, in theory, a step in the right direction … however, in practice this is a monumental task,” wrote blogger Kevin Campbell. He suggested that with EHR systems, physicians object to becoming “data entry clerks.” Just as in the era of the paper record, EHR systems must be capable of documenting critical information patient flow; point-of-care instructions and findings; communications within the practice (orders, patient requests); communications arising outside the practice (phone calls, mail, lab orders or results); and chart abstraction, as with moving information from the paper chart to the EHR.

In a recent review, B. Dacey and M.A. Bholat outlined the “dark side” of EHR documentation. They said, for instance, that the history and physical examination part of the notes have become disproportionate and overlarge—observing that word processing software, the EHR, and preformatted reviews of systems and physical exams promote carryover and repetitive fill-ins of stored information. “Cloning” of information, referring to “cutting and pasting” materials (whether it is from one visit to another for a particular patient, or from one patient’s record to another’s) is a further big issue. “Cloning of documentation is considered a misrepresentation of the medical necessity requirement for coverage of services … and can lead to denial of services … and recoupment of all overpayments made,” wrote Dacey and Bholat. Other problems associated with EHR documentation include identification of the actual provider—especially in large teaching institutions, where the notes of residents and attendings may become blended—over-documentation, and documenting time spent counseling.

Recognizing that incorrect or incomplete electronic documentation is a critical issue for all its member hospitals, FOJP has assembled a committee to study the matter. Its goal is to identify principles and procedures that can improve and standardize documentation for clinicians and hospitals, no matter what EHR system is used. For instance, because documentation sometimes falls through the cracks during transitions of care, one of the panel’s first tasks is to see how this can be remedied. (See “FOJP Committee Encourages Hospitals to Brainstorm and Collaborate on Risk Management Solutions.”)

Costs

Beyond their concerns about purchasing EHR systems, physicians and hospitals are apprehensive about ongoing costs for maintenance, software upgrades, training, and IT support. A 2011 Texas report found that, for an average five-person practice, EHR implementation cost an estimated $162,000 to start—with an additional $85,500 in maintenance expenses over the first year. In a 2013 survey of 49 community practices in Massachusetts, it was estimated that physicians would lose a total of almost $44,000 over five years once they adopted an EHR system—even after governmental subsidies. Only 27 percent of practices said they would achieve a positive return on investment, and 14 percent would see a profit if the subsidies were included. EHRs were viewed as having a positive financial impact if they were used to accommodate more patients per day or improve billing.

A common perception is that smaller offices shoulder the biggest burden. Some solo practitioners say the financial toll is too great, and they plan on closing up their practices. Exacerbating this is the view that the financial benefits of an EHR may really go to third-party payers—in the form of errors averted and improved efficiencies that translate into reduced claims payments—rather than providers.

On the other hand, some hospitals and physicians may actually be making more money from electronic medical record and billing systems, according to a 2012 report in the New York Times. The paper did an analysis of Medicare data from the American Hospital Directory and found that hospitals received $1 billion more in Medicare reimbursements in 2010 than they did in 2005. It also concluded that
in 2010 alone, 1,700 of more than 440,000 US doctors were responsible for an aggregate of as much as $100 million from Medicare. According to the Times’ analysis, billing for the two top-paying categories of emergency department services rose from 40 percent in 2006 to 54 percent in 2010. The analysis also found that those receiving government incentives saw their Medicare payments increase at a higher rate than those hospitals not receiving incentives. While physicians and hospitals say the increased revenue is due to more accurate coding and billing, the report suggested that EHRs may allow doctors and hospitals to “upcode” (seek a higher rate of reimbursement than is justified) or bill for services that were never rendered through cloning or clicking on overly inclusive drop-down menus. These were some of the reasons cited in a report from six US senators who called for an overhaul of HITECH initiatives. CMS is scheduled to investigate this further in 2013.

Training
Proper use of electronic systems depends on users being adequately trained. Trainees, who come with backgrounds of varying degrees of technological comfort, must learn the complexities of the systems, which mean devoting a considerable amount of time to didactic and hands-on training. Although medical students and residents may easily learn to use EHRs, previous-generation physicians may not have had as much formal training. Moreover, there still is a shortage of qualified HIT professionals to provide advice or support.

“I personally don’t think I received enough training,” said Dr. Anne Galloway, who is an internist in a group practice along with eight partners in Bronxville, NY. Her vendor chose first to train several “super-users” within the practice who would eventually be able to provide in-house support once the vendor made sure the system was up and running. These super-users included a physician, a nurse, two office managers, and an IT specialist. Dr. Galloway says that the super-users became quite skilled, but there were always new challenges that required vendor support.

Communication
Lack of interoperability remains one of the most vexing issues facing health care providers. For example, Dr. Galloway—whose office EHR is different from that in her hospital—voices frustration with having to close one system and open another when reviewing one patient’s charts. Similarly, even the EHR systems of the Veterans Health Administration and Department of Defense reportedly cannot seem to communicate with each other.

Being able to access and transfer medical records and populate new data remotely to a patient’s EHR represent overriding goals of the electronic health revolution.

Improving interoperability between medical devices and EHRs in hospitals can save more than $30 billion a year, according to a recent West Health Institute report. Integrating devices such as defibrillators, electrocardiographs, vital sign monitors, ventilators, and infusion pumps with an EHR can reduce costs by shortening lengths of stay, increasing clinician productivity, avoiding redundant testing, and dodging adverse events. The manufacturing community appears to have taken note: SuccessEHS and Welch Allyn recently announced the integration of four devices for blood pressure and vital signs into an EHR system.

There has been criticism that some vendors believe it is not in their best financial interest to offer systems with interoperability; they see not providing interoperability as a means of keeping customers tied to the systems they began with—as airline frequent flyer miles keep travelers tethered to individual carriers. However, CMS and ONC have announced an increased emphasis on ensuring electronic exchange across providers as part of their 2013 agenda. The second stage of the federal health IT incentive program also requires both vendors and providers to adopt common data standards to facilitate interoperability beginning in 2014. That may be one reason that an alliance of rival EHR vendors decided at the March meeting of the Healthcare Information and Management Systems Society (HIMSS) to launch a collaborative effort, the CommonWell Health Alliance (www.commonwellalliance), to facilitate access to data across systems and settings, provided there is patient authorization. The

Interoperability is different from health information exchanges, which are communication channels between locations and providers. In a JAMA editorial published March 13, 2013, W.A. Yasoff and colleagues wrote, “There must also be an effective, efficient, and trustworthy mechanism for health information exchange to aggregate each patient’s scattered records into a complete whole when needed. This mechanism must also be accurate and reliable, protect patient privacy, and ensure that medical record access is transparent and accountable to patients.”

Within a hospital, one way to achieve internal interoperability and HIE is with the adoption of a complete single-platform inpatient system, such as those provided by Epic Systems (currently in 370 hospitals), Meditech (323 hospitals), CPSI (313 hospitals), or Cerner Corporation (208 hospitals). Almost 2,000 hospitals currently rely on a complete system, including the Duke University Health System, University of California San Francisco, Dartmouth-Hitchcock Medical Center, and Kaiser Permanente Network.

In New York City, Mount Sinai has adopted the Epic EHR system. On the other hand, some hospitals have neither the finances nor desire to completely overhaul separate EHR systems already in place, while still others are wary of trusting their entire systems to one vendor. These hospitals choose to have multiple-platform EHRs, which can decrease interoperability.
six alliance participants are Cerner, McKesson, Allscripts, athenahealth, Greenway, and RelayHealth. Initially, the alliance will focus on three core services and standards: patient linking and matching; patient access and consent management; and a record locator service and directed query.

**Health Information Exchange**

Both governmental and private sector initiatives are working toward better HIE. One program, the Direct Project, was launched in March 2010 as part of the Nationwide Health Information Network. The Direct Project allows providers to send encrypted e-mail over the Internet via EHR systems to other providers. For example, as part of the Direct Project, an electronic health record exchange arrangement known as CliniSync was formed between Ohio and Michigan.

An arrangement known as a regional health information organization (RHIO) is one that can organize and oversee facilities participating in information exchange within a geographic area. A RHIO is made up of a variety of health care provider entities—including payers, laboratories, nursing homes, clinics, hospitals, and public health departments. Stakeholders of a RHIO must develop consensus on what information can be shared.

The New York eHealth Collaborative has developed the Statewide Health Information Network for New York (SHIN-NY), which connects RHIOs to create a private and secure network spanning New York state. In February 2011, the collaborative joined a 19-state effort, along with commercial vendors, to develop consistent implementation guidelines for better interoperability.

On a nationwide basis, RHIO systems are doing less well. Several HIEs (e.g., CalRHIO) have shut down. Yasnoff and colleagues, in their 2013 *JAMA* editorial, said that, according to the ONC, more than 90 percent of hospitals in 32 states have not exchanged a single patient record. "When it comes to HIE, often implemented by the RHIOs, the lack of progress is particularly discouraging," according to the editorial. The problem evidently does not stem from lack of funding, as, starting in March 2010, $564 million in federal monies were allocated to states to develop HIEs. But these efforts have encountered obstacles such as privacy concerns, lack of stakeholder cooperation, and questions about financial sustainability.

Yasnoff et al. suggest that patient-centric community health record banks (HRBs) might be simpler, less expensive, and more secure. HRBs are community organizations that allow patients to oversee a comprehensive copy of all their personal and private health information. Similar to a credit report that can be updated by a bank, the HRB would serve as a centralized repository of health information. This would be maintained in cloud-based banks in communities across the country, and the patient’s local provider would have a copy. Several health banks are already in operation, including Microsoft’s Health Vault, Dossia, and others in Washington and Oregon.

Looking for new ideas, the ONC has issued a request for information about ways to spur progress in HIE. Some questions proposed for public comment include:

- What changes in payment policy would have the most impact on the electronic exchange of health information, particularly among organizations that are market competitors?
- To what extent do current CMS payment policies encourage or impede electronic information exchange across health care provider organizations?
- What CMS and ONC policies and programs would have the greatest impact on post-acute, long-term care providers and behavioral health providers’ exchange of health information (HI) with other treating providers?

**Privacy, Safety, and Liability**

As EHRs are used routinely by more people, privacy and safety issues have emerged. Whereas some are unique to EHR systems, other concerns are also applicable to paper documentation and information storage and exchange.

Safety and privacy considerations associated with EHRs have become controversial for the federal government, vendors, providers, and professional organizations. In 2011, the Institute of Medicine issued a report on health IT and patient safety; proposing that an infrastructure be put in place to monitor and mitigate risks that might arise from electronic health systems. These call for developing measures to reliably assess health IT safety; establishing mechanisms for both vendors and users to report health IT-related deaths, serious injuries, or unsafe conditions; reporting on a mandatory basis for vendors, and voluntary reporting for users; and establishing an independent federal entity similar to the National Transportation Safety Board to review incidents. The report also called for the dissolution of any nondisclosure agreements between vendors and users that might interfere with sharing adverse event information.

The ONC is tackling this problem, in 2012 issuing its Health Information Patient Safety Action and Surveillance Plan through 2015 and asking for
Features of the plan include a call to work with patient safety organizations (PSOs) to report, aggregate, and analyze health IT-related safety events; to encourage collaboration with private sector efforts for making available comparative user experience with different EHR systems; and to give support to providers in reporting safety events. Other suggestions include adopting Agency for Healthcare Research and Quality (AHRQ) common formats to enhance provider reporting; asking the AHRQ to work with PSOs, providers, and developers to add a focus of health IT to their adverse events reporting; and incorporating safety requirements into meaningful use criteria.

The American Medical Association (AMA) issued a public comment on this plan, expressing some physician concerns. The AMA agreed on the importance of physicians’ and other health care providers’ being able to confidentially report patient safety events to PSOs via certified EHR technology. It added, “Physicians are concerned about potential liabilities from EHR system design and software flaws as well as lack of interoperability among EHR systems that could result in incomplete or missing information, which may lead to errors in patient diagnosis and treatment.” According to the AMA, physicians were also worried that they did not have necessary tools or resources to make a meaningful safety risk assessment for their own practices.

The HIMSS Electronic Health Record Association, a vendor group, has expressed its own point of view. The association said that voluntary provider reporting to PSOs should be the primary focus for reporting of safety issues, and added that safety reports should not identify specific developers or product brands. It said that it did not see nondisclosure provisions in contracts as barriers to patient safety reporting. The association expressed concern that the ONC would publish notices of serious adverse events or unsafe conditions involving EHR technology, and asked that the ONC consider liability implications of putting additional patient safety-relevant information into the legal medical record. It added, “Irrespective of the patient safety reporting and analysis system that is eventually put into place, it is absolutely critical to patient safety that such a system not distance providers from their EHR developers.” The association’s stance was that, when a patient safety event occurred, the provider should report the issue directly to the vendor, allow the developer to address and investigate the event, resolve the issue, and inform any other clients if necessary.

A recent report by D.F. Sittig and H. Singh in the New England Journal of Medicine called for the creation of EHR-specific patient safety goals (ePSGs). The authors suggested a three-phase framework, taking into account the stages of EHR implementation and levels of complexity across clinical practice settings. The first phase would be aimed at all EHR users, but especially at novice and future adopters. In this stage, the goals would be to mitigate risks unique and specific to technology. The second phase would address issues that result from failing to use technology appropriately. The third phase would apply more to established systems and focus on how EHR technology could be used to monitor health care processes and outcomes, and identify potential safety issues prior to causing patient harm.

Over a nine-week period, the Emergency Care Research Institute continued on page 10
(ECRI), a patient safety organization, reported receiving 171 HIT-related problems. Although most caused no harm, eight were harmful and three contributed to patient deaths. General malfunction was the leading cause of problems. For example, in one case, the system did not allow a nurse to type in more than five characters in the instruction notes for wound care. Other types of problems included data output problems (e.g., retrieving the wrong patient entry), data input mistakes (e.g., entering the wrong patient ID number), and data transfer failures (e.g., a physician’s order to stop anticoagulant medication not transferring properly to the pharmacy).45

In a 2012 report by the Pennsylvania Patient Safety Authority, the number of EHR-related safety events nearly doubled from 2010 to 2011. There were reports of harm to patients due to wrong medication data, administering the wrong medicine, ignoring a documented allergy, failing to enter lab tests, and failing to document properly.45

ECRI has listed patient/data mismatches in EHRs and interoperability failures with medical devices and health IT systems as two of its top 10 health technology hazards. Other user errors may arise in the use of drop-down menus or from copying and pasting. Mistakes also crop up when a user deliberately ignores EHR-generated alerts, a situation known as “alert fatigue.” Users should always double-check their entries to avoid possible auto-population of inaccurate information by the system. Users should also make sure that corrections or changes applied to one record transfers globally to other parts of the system.

Although responsibility for some safety problems falls to the user, other safety issues arise that are outside a user’s control, such as a complete system malfunction. An instance of this occurred in Rhode Island in 2010, when one-third of hospitals were forced to postpone elective surgeries and to divert non-life-threatening emergencies because an erroneous automatic antivirus software update forced a system-wide shutdown.44 Providers must also be alert to errors caused by miscommunication between EHR components, such as the case in which an order entry for 30 mg hydrocodone sustained release was changed by the electronic pharmacy system to 30 mg hydrocodone immediate release.

Providers face a difficult challenge in establishing a culture of security to prevent unauthorized access. Data should be password-protected and limited only to employees who require access. All employees must be trained and educated about the importance of data privacy and security. When an employee quits or is terminated, access should be revoked immediately. Only a secure network should be used to transfer health information, with provisions for privacy and security according to HIPAA standards. Ordinary e-mail services do not meet HIPAA requirements. Remember that HIPAA restrictions under HITECH apply also to any business associates. Thus, business vendors should never have access to patient or provider data. Destruction of medical records is also subject to HIPAA security rules, and meaning that computers must be properly scrubbed of patient-record information before disposal.

Security researchers have found that popular EHR software is ripe for hacking. “Open EMR from a security perspective is a disaster,” claimed a Wall Street Journal blog.45 A breach of security is defined as an instance of unauthorized acquisition, access, use, or disclosure of personal health information in a manner not permitted by the HIPAA Privacy Rule. If a breach occurs, it must be viewed seriously; the HITECH Act spells out what measures need to be taken under the Breach Notification Rule.46 Covered entities must notify the affected patients of the breach in writing and within a certain time frame. If more than 500 individuals are affected, the Secretary of HHS must be notified, as well as the media and the public. Under HITECH, potential penalties for negligent breaches rose from a maximum of $25,000 to $1.5 million for each violation.47 A 2012 report by the accounting firm Kaufman Rossin & Co. found that the number of individuals affected by breaches doubled from 5.4 million in 2010 to 10.8 million in 2011. Physicians should have a clear data breach plan in place.

Staff at Mount Sinai Medical Center using the EHR system.


Electronic health recordkeeping is not simply a technological change—it requires a fundamental reconfiguration of how things were done before. Even proponents admit that all the snags have not been worked out yet. However, on May 22, 2013, HHS Secretary Sebelius remarked that "we have reached a tipping point in adoption of electronic health records. More than half of eligible professionals and 80 percent of eligible hospitals have adopted these systems, which are critical to modernizing our health care system."10 The question now becomes how to best utilize the technologies to improve patient care and mine the troves of data that will become available for research.  

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6 Ibid.
7 Ouelliete, P. "What Does the Stage 1 Meaningful Use Deadline—Really Mean?" EHR Intelligence, October 3, 2012; http://ehrintelligence.com/2012/10/03/what-does-the-stage-1-meaningful-use-deadline-really-mean/.
33 Yassenof et al.; see note 28.
34 Ibid.
44 Sittig and Singh see note 41.
Do EHRs Pay Clinical Dividends?

Underlying the tremendous efforts supporting the adoption of EHRs is the conviction that they will improve clinical outcomes. Now, with several years of EHR experience under the nation’s belt, observers are looking for high-quality evidence to that effect in material mined from the vast EHR databanks of patient information. Although some studies have begun to appear, many fail to see improved clinical outcomes or look at improvements in quality of care rather than outcomes. In November 2012, Kevin R. Campbell, MD, wrote in a blog: “There is no real data out there that has demonstrated improved outcomes with EMR use—it is interesting that Medicare refuses to reimburse for unproven therapies but the Federal government will mandate EMR implementation without long term outcomes data.”

Let’s examine some of the available evidence. A number of studies evaluate EHRs in terms of their effect on quality of care. For instance, Stanford University researchers looked at data collected between 2005 and 2007 from more than 250,000 ambulatory patient visits, and found that neither EHRs nor clinical decision support (CDS) was associated with ambulatory care quality. Among all outpatient visits, only one of 20 quality indicators—diet counseling in high-risk adults—was significantly better when EHRs were used. Some other quality indicators evaluated were pharmacological management of common chronic disease, appropriate antibiotic use in urinary tract and upper respiratory infections, preventive counseling, and appropriate use of screening tests. No information was provided on clinical outcomes.

With respect to EHRs and diabetes care, no difference was found in adherence to diabetes care guidelines in primary care practices that used EHR, compared with those that did not, in a study that evaluated 16 EHR-using and 26 non–EHR-using practices in two northeastern states. This study, which also looked at outcomes, developed confounding information. It found that practices that did not use an EHR were more likely than those in practices that did use an EHR to reach outcome targets—regarding hemoglobin A1c, low-density lipoprotein (LDL) cholesterol, and blood pressure—at the two-year follow-up. On the other hand, a study of more than 27,000 adults with diabetes seen at 46 practices found that those using EHRs achieved significantly higher composite standards for diabetes care—such as measuring A1c levels and LDL cholesterol, BMI, nonsmoking—compared with 15.7 percent of patients at paper-based sites. Similarly, a large-scale study of almost 170,000 diabetes patients who were members of the Kaiser Permanente health system concluded that “health IT interventions have improved access to obesity treatment and rates of screening. However, the impact on weight loss and other health outcomes remains understudied and inconsistent.”

It is hoped that, by serving as a repository for all of a patient’s lab results and imaging studies, EHRs can reduce unnecessary testing and costs. In a 2012 study, McCormick et al. found that physicians’ access to computerized imaging results, sometimes but not always through an EHR, resulted in a 40 to 70 percent greater likelihood of ordering an additional imaging test; electronic access also increased the ordering of additional blood tests. The authors attributed their finding to electronic access to test results and features of the EHR that make ordering easier.

Demonstrable benefits have been seen when e-prescribing features are combined with EHRs. At Kaiser Permanente, pharmacists have access to a patient’s EHR and can view prescription lists, allergies, and diagnosed conditions. Kaiser Permanente says that the results of having such an integrated health system is a 55 percent decrease in medication errors, near total compliance in filling prescriptions, increased use of generic medications, and fewer employee workdays lost.

Implementation of a specialized electronic patient record system reduced mortality and yielded cost savings in a retrospective study of 1,790 patients with end-stage renal disease. In this study of three dialysis units, mortality decreased by about one-third compared with national dialysis population statistics. Another benefit was a significant reduction in clinical staffing, resulting in cost savings, for these chronically ill patients with numerous comorbidities.

EHRs have also been used to identify patients at higher risk of cardiovascular disease, who then receive risk messages. After 18 months, these patients had lower LDL cholesterol associated with an increase in lipid-lowering drug prescriptions. Patients with hypertension also experienced greater blood pressure control once an EMR-based intervention using clinical decision support, alerts, and reminders was implemented.

In a recent review of 13 studies looking at the use of EHRs and other health IT in the screening and treatment of child obesity, the authors concluded that “health IT interventions have improved access to obesity treatment and rates of screening. However, the impact on weight loss and other health outcomes remains understudied and inconsistent.”

RESOURCES:

EHRs and the Patient Portal

Under Stage 2 meaningful usage requirements, participants must give at least 50 percent of their patients the ability to view and download their own medical records, within four business days of the information being available to the eligible provider—up from the 10 percent mandated in Stage 1. Additionally, at least 5 percent of patients must send secure messages to their physicians, and at least 5 percent must go online to view their health records, download them, or transmit them to a third party. Failure to meet these requirements will result in the loss of Medicare and Medicaid bonus payments to the provider. With these rules scheduled to take effect by 2014, physicians are under pressure to make sure patient portals are operational by the deadline.\(^1\)

HealthIT.gov defines a patient portal as “an Internet application that allows patients to access their EHR records and communicate with their healthcare providers.”\(^2\) When a patient signs in to the portal using a secure login, he or she usually has the ability to view lab and diagnostic imaging results, schedule appointments, request prescription renewals, and make referral requests. The system allows patients to consult with physicians electronically and access consumer health information. Through the portal, the patient can receive reminders and notifications for appointments, results, and invoices, while also accessing registration forms or pre-clinic assessment forms.\(^3\)

Is a patient portal the same as a personal health record (PHR)? No. The main differences lie in where the data comes from and who has “ownership.” The portal is controlled by the source system, such as the provider or health organization, and data come from the electronic medical record, electronic health record, or hospital. Data from these systems are published to the portal. On the other hand, the PHR is patient-centric—controlled by the patient or family member, with access granted by them. Patients can use PHRs to maintain and manage their health information in a private, secure, and confidential site that remains continually accessible even if they move or change physicians. PHRs typically include information from a variety of sources, such as all clinicians seen by the patient, the patients themselves, and home monitoring devices. Both portals and PHRs usually include information on current medications, allergies, immunization records, and lab results. With PHRs, the goal is for patients to become more engaged in managing their health. Because patients can input data themselves to the PHR, physicians who access PHRs must be aware that they cannot rely on the accuracy of these data.\(^4,5,6\)

How common are EHR patient portals? A January 2011 HealthLeaders Media Intelligence Report found that 25 percent of 178 clinic- or physician-practice-based electronic health systems and 21 percent of 187 hospital-based systems had patient portals. Because 91 percent of the respondents indicated that they expected to achieve meaningful use by 2016, it is likely that more patient portals have been added in the meantime.\(^7\) A January 2012 report by the private research firm KLAS found that about half of health systems, hospitals, and clinics surveyed reported a patient portal in place.\(^8\)

Kaiser Permanente, which serves more than nine million members, launched its patient portal, “My Health Manager,” between 2004 and 2007. As of early 2012, four million members had registered for access. A sign of its popularity: There were more than 88 million sign-ons to the system in 2012, with almost 12
EHRs and the Patient Portal
continued from page 13

million online prescription refill orders, 3 million online appointment requests, more than 13 million e-mails sent to doctors and other health professionals, plus more than 32 million lab-test results viewed.\textsuperscript{9} Interestingly, it was reported that patients with online access to key components of the EHR’s patient portal were 2.6 times more likely than nonusers to remain Kaiser Permanente members.\textsuperscript{10}

Another large-scale patient portal is the federal “Blue Button” initiative. This is a patient portal available to veterans, uniformed service members, Medicare beneficiaries, and some private-sector employees. The government is also encouraging Medicare Advantage plans to incorporate the use of Blue Button.\textsuperscript{11} Launched in 2010, the VA’s Blue Button allows veterans who register for an upgraded account to download personal health information from the VA’s EHR. Those without an upgraded account can use it more like a PHR, inputting personal information and controlling access. HHS has included expansion of Blue Button as part of its 2013 agenda.\textsuperscript{12} The one-millionth user was registered in August 2012.

In a survey of more than 13,000 patients seen at Beth Israel Deaconess Medical Center in Boston, most indicated they would like full access to their medical records.\textsuperscript{13} However, not all follow through with accessing and using patient portals. Disparities are seen with race, socioeconomic level, age, and gender. Having more than two comorbidities, though, tends to increase use.\textsuperscript{14,15} Even in this technological age, access can be limited for people who cannot afford computers or Internet services, those without computer skills, people with physical impairments, and those who have poor Internet connections.\textsuperscript{16}

Patient portal use may also be affected by another significant factor: physician attitude. An Accenture survey of more than 3,700 physicians across eight countries, including 500 physicians in the United States, found that 82 percent wanted patients to actively participate in their own health care by updating their EHRs. However, only 31 percent of doctors believed a patient should have full access to his or her medical record; 65 percent were in favor of limited access; and 4 percent said patients should have no access. Only 21 percent of those surveyed currently allowed patients to have online access to their medical summary or patient chart.\textsuperscript{17}

Physicians may be influenced here by the lack of strong evidence regarding the impact of patient portals on their care. In a systematic review of more than 1,300 trials published between 1990 and 2011, only four controlled trials on this issue were identified. No significant
With time, a portal can evolve from one that allows only patient access to medical records, to one that includes opportunities for billing, scheduling, secure messaging, and eventually e-visits.

The American Medical Association says that the prime driver behind adopting a patient portal should not be meeting MU requirements but rather fostering patient engagement. It advises selecting an EHR system that allows for portal growth. With time, a portal can evolve from one that allows only patient access to medical records, to one that includes opportunities for billing, scheduling, secure messaging, and eventually e-visits. The ultimate goal is to establish a more dynamic yet efficient relationship with patients.

RESOURCES:
3. Brookstone, see note 1.
4. Ibid.

Understanding the Differences among EMR, EHR, and PHR

As with any new medical discipline, the acronyms begin piling up and terminologies get confused. In health IT, it is important to know that EMRs and EHRs are different—and both of them are different from PHRs. According to HealthIT.gov, these are some details of the differences:

● An electronic medical record (EMR) is a digital version of the paper chart in clinicians’ offices, clinics, and hospitals. EMRs contain notes and information collected by and for the clinicians in that office, clinic, or hospital. The EMR is the legal record that is the source of data for the electronic health record (discussed below) and is “owned” by the provider or hospital.

● An electronic health record (EHR) is built to go beyond standard clinical data collected in a provider’s office, and includes a broader view of a patient’s care. An EHR contains information from all the clinicians involved in a patient’s care. Thus, all authorized practitioners involved in a patient’s care can access the information to provide care to that patient. EHRs may also be shared information with other health care providers, such as laboratories and specialists. EHRs follow patients—to the specialist, the hospital, the nursing home, or across town, state, or nation.

● A personal health record (PHR) contains the same types of information as the EHR—diagnoses, medications, immunizations, family medical histories, and provider contact information—but is designed to be set up, accessed, and managed by patients. Recipients of care may use PHRs to maintain their health information in a private, secure, and confidential environment. PHRs can include information from a variety of sources, including clinicians, home monitoring devices, and patients themselves. As we discuss in more detail elsewhere, patients “own” their PHRs and control access to them. A patient may choose to include data from the EHR as part of his or her PHR.

● A patient portal is an Internet application that allows a patient to access his or her EHR records and communicate with health care providers. (See “EHR and the Patient Portal.”) A PHR may be a self-managed part of the patient portal.

New York Resources

The Primary Care Information Project

The New York City Department of Health and Mental Hygiene’s Primary Care Information Project (PCIP) is an initiative to improve quality care in the city through health IT. Since 2005, the PCIP has aided more than 3,200 providers in adopting EHRs and provided support to more than 7,700 other New York City providers. The PCIP offers assistance in reaching meaningful use goals, navigating the federal EHR incentive program, choosing EHR vendors, and receiving quality improvement support. It also gives guidance on billing, coding, and documenting workflows.

The PCIP sends aggregate monthly data from 3,000 practitioners in 550 practices to deliver feedback on the quality of care that providers are giving. The PCIP can analyze a practice’s entire patient panel to determine whether coaching may be warranted. It has also created a Hub Population Health system to analyze EHR clinical information in order to gain insights on public health questions such as “What percentage of women in the Bronx over the age of 65 with diabetes have controlled blood sugar?”

PCIP members can participate in a regional health information organization (RHIO), are eligible for software licenses for the e-ClinicalWorks EHR system, and may receive support services such as help with data migration. According to the PCIP website, practices are expected to make both cash and “in-kind” contributions. For example, these might include a one-time fee of $4,000 to a quality improvement technical assistance fund per full-time health care provider; approximately $1,500 annually for ongoing maintenance and support beginning at year three; and in-kind contributions of about $8,000 per health care provider.

NYC REACH

The NYC Regional Adoption Center for Health (NYC REACH), administered by the PCIP, serves as the city’s regional extension center (REC). Mandated by the HITeCH Act, there are five dozen RECs across the country; the number per state is determined by population. There are two RECs in New York: one for the city and one—the New York eHealth Collaborative (NYeC)—for the rest of the state. Since NYC REACH was formed in 2010, it has grown into a 60-person group with a budget of $60 million. NYC REACH’s commitment was to get 4,545 providers using EHRs; it currently has more than 9,000. NYC REACH holds webinars and live events to help providers learn more about EHRs and MU, select a vendor, implement a system, and integrate third-party interfaces and services. It makes available on-site consulting for billing and quality reporting.

The “Kiosk Project” (Healthcare Efficiency and Affordability Law for New Yorkers, HEAL 17) provides kiosks in primary care physician’s offices to educate patients about using their patient portals. HEAL 22 offers technical support for adopting and using health information technology to mental health/behavioral health providers.

NYC Business Solutions works with the PCIP and NYC REACH to assist physicians in finding revenue sources for EHR adoption, and helps practices locate staff experienced in EHRs.

The New York eHealth Collaborative

NYeC became a REC in 2009 and has grown to a staff of 80, including local-level extension agents throughout the state. NYeC’s commitment is to get 5,107 providers to use EHRs; it currently has about 3,000 providers connected. NYeC has achieved one of its goals, formation of the Statewide Health Information Network of New York (SHIN-NY), whose aim is to connect regional health information exchanges or hubs through New York to form a statewide private and secure network. In 2010, NYeC was awarded more than $22 million under the State Health Information Exchange Cooperative Agreement Program.

NYeC provides a series of tools to help providers on matters such as privacy and security, readiness assessments, workflow optimization, and financial planning and budgeting. It also hosts regional and statewide conferences. A Digital Health Conference is scheduled for November 14 and 15, 2013, in New York City. The two New York RECs have collaborated to select vendor partners: NYC REACH picked seven vendor partners and NYeC chose five.

RESOURCES:


New York Providers Achieving Meaningful Use, by Region
The Perils of Accessing Patient Information on Your Mobile Device

Maybe you just want to check a patient’s history on your tablet as you wait in line for morning coffee. Or perhaps you need to review some abnormal patient labs on your smartphone while taking a taxi to the office. CAUTION: These mobile device activities, though seemingly benign, can be injurious to you and your patients. Why? Because as that taxi roars away with your phone left behind on the rear seat, you may just have compromised the medical records of hundreds of patients.

Accessing, receiving, transmitting, and storing patient health data using mobile technologies are examples of “mHealth”—a buzzword used to describe the mobile health field. Now that mobile devices are so ubiquitous, the risk of compromising health information security has grown exponentially. Consider the possibilities: Gadgets can be misplaced or stolen; viruses or malware may be inadvertently downloaded; unsecured WiFi connections can easily be hacked. That is why the Department of Health and Human Services (HHS) recently released an education initiative with a set of online tools that outline practical ways of protecting patient health information on mobile devices.

The HHS recommendations include the following:

- Do not store health information on a mobile device. If you absolutely must, then back up the information elsewhere as soon as possible and delete it from the mobile.
- Keep your mobile device with you.
- Encrypt your data.
- Choose “strong” passwords that are difficult to decipher.
- Install remote-activated wipe software that can be triggered to erase data if necessary.
- Make sure your device is set to automatically lock or wipe after several failed log-in attempts.
- Use a privacy screen.
- Rely on a virtual private network that works remotely to access or upload patients’ records.
- Check that you are using a secure browser connection—one that begins with “https.”
- Use automatic lock-off.
- Install a firewall.
- Do not use public WiFi connections.
- Avoid file-sharing applications.
- Keep your security software up to date.

Additionally, check the mobile device rules and requirements of your health care system. In your own practice, make sure to develop a mobile device privacy and security plan, and confirm that your employees know the rules. Conduct mobile device privacy and security awareness sessions and provide ongoing training for your staff. Make sure that all mobile devices being used for accessing or storing patient health information are registered with the proper department within your health system. If a breach occurs, follow the security incident reporting plan of your organization. Reporting a breach requires action under the HITECH breach notification rule.

The HITECH website offers easy-to-download fact sheets and posters to encourage mobile device security, at www.HealthIT.gov/mobiledevices.
One System Doesn’t Fit All: Hospitals Follow Different Routes toward EHR Adoption

For hospitals, choosing and implementing a large information technology initiative such as an EHR system can be a complicated, time-consuming, labor-intensive, and risky undertaking. Having strong physician leadership has been recognized as a critical requirement for success.1 To find out how FOJP hospitals are faring with the EHR revolution in health care technology, *in focus* spoke with those who are leading the charge at their institutions:

- Matthew Berger, MD, Director of Clinical Informatics, Montefiore Medical Center
- Steven J. Davidson, MD, Chief Medical Information Officer (CMIO), Maimonides Medical Center
- Bruce Darrow, MD, CMIO, Mount Sinai Medical Center
- Gregg Husk, MD, CMIO, Continuum Health Partners (Beth Israel Medical Center, Beth Israel Brooklyn, Roosevelt Hospital, St. Luke’s Hospital, New York Eye and Ear Infirmary)
- Robert Leviton, MD, CMIO, Bronx Lebanon Medical Center

Also interviewed were David Cohen, MD, Executive Vice President for Clinical Affairs and Affiliations at Maimonides Medical Center, who has expertise in health information exchange, and Kristin Myers, Vice President of Information Technology for Mount Sinai.

CMIOs are usually physician-executives charged with leading the implementation of clinical information systems. The roles and responsibilities may vary among institutions but, as Dr. Husk of Continuum put it, “the CMIO serves as a bridge between the techies and the clinicians.” He said his job is to determine how best to use technical information to make health care safer, improve the health of populations, and decrease per capita health care costs. Dr. Darrow of Mount Sinai sees his role as that of one who balances the financial and management needs of the hospital with the care needs of physicians and their patients.

The job of a CMIO typically includes many responsibilities:2

- Designing and integrating IT systems in medical departments
- Promoting the use of IT innovation
- Analyzing the use of technology in patient care
- Identifying problem areas and seeking solutions
- Setting standards for the use of medical terminology
- Overseeing training for varied users
- Working with senior leadership to create a strategic plan for IT
- Advising health system policymakers

All the CMIOs mentioned here are physicians, but none of them has formal training in health informatics. What they do have are backgrounds of strong clinical experience, clinical management, and often some involvement with health IT-related projects.

Dr. Berger, a general internist, was director of family practice at Montefiore and oversaw its growth and expansion. He then became involved with hospital-wide operations, including the selection of an EMR system in the 1990s.

Dr. Darrow is a cardiologist who developed an interest in hospital practice improvement, including documentation systems. He completed a clinical quality fellowship from the Greater New York Hospital Association, but said he learned about health IT “as I went along.” He was a physician-champion and member of the Inpatient Physician Advisory Committee when the Epic Enterprise System was introduced at Mount Sinai, and became the first CMIO there in 2010.

Interestingly, three of the CMIOs are trained as emergency department (ED) physicians. Dr. Husk is both CMIO and chairman of the ED at Beth Israel Medical Center. Dr. Davidson is an ED physician with an MBA. He became involved with improving patient management through EHRs while working in the ED, led EHR implementation in the ED, and was asked to fill the newly created position of CMIO for Maimonides in 2010. He said his responsibilities are evolving, and that he partners with, but is not the operations person overseeing, the EHR systems at Maimonides. He described the CMIO as a matrix role, advocating for clinicians to the health information technology (HIT) staff and vice versa. Dr. Leviton, the third ED physician/CMIO, has an MPH in health care policy and management, and has been involved with building EMRs since 1995.

Why might being an ED physician make a good foundation for becoming a CMIO? Noting that there seems to be a preponderance of ED CMIOs nationally, Dr. Husk suggested that ED physicians saw early on the value of electronic systems in patient admissions, documentation, and workflow. “Some of it relates to ED doctors’ practicing in silos where information is often at a premium but not readily available,” he said. ED physicians are often acutely aware of the need for effective health information exchange systems since they routinely see patients who have been treated at other health facilities. For his part, Dr. Leviton said that ED physicians have the greatest exposure within the hospital to clinicians from all medical divisions—along with transportation, radiology, laboratory, and even dietary issues. “ED docs know what practitioners need,” he said.
What Systems Are Being Used?

Now that we understand some of the players, the question moves to: What EHR systems are being used in FOJP hospitals?

Although health care reform strives for electronic systems that consolidate, document, store, and exchange critical information, the experiences of New York hospitals make clear that even though the common goals may be the same, no two hospitals have chosen the same means of achieving them. The variety of experiences at FOJP hospitals may serve as a primer for the evolving world of EHRs today.

Some hospitals have chosen to go with a single-platform EHR enterprise, meaning that one vendor supplies an integrated EHR system that handles all functionalities within the hospital or health care system—inpatient, ambulatory, emergency room, ICU, surgery, behavioral health, and labor and delivery. Examples are Mount Sinai’s Epic system and Bronx Lebanon’s Allscripts. Other hospitals, such as Maimonides and Montefiore, have selected multiple platforms, meaning that different systems manage separate departments or functionalities.

Mount Sinai Medical Center

In 2006, Mount Sinai Medical Center began implementing the first phase of its $120 million investment in the Epic EMR System. Over the next few years, it began rolling out the Epic EMR in phases, beginning with ambulatory services in the hospital and faculty practices, and expanding to the inpatient system, pharmacy, nursing, and the ED. Computerized provider order entry (CPOE) and nursing documentation went live in 2012, and later that year physicians and providers made the switch from paper notes to electronic documentation. In that same year, the first phase of Epic’s Beacon module was installed in chemotherapy infusion suites. “We felt Epic was the market leader,” said Dr. Darrow. “It was not the cheapest in the short term, but as it goes longer it will pay dividends and reduce gaps in care.” He added that choosing an integrated system was “an institutional decision” (see “At Mount Sinai, Thorough Planning Ensures a Smooth EHR Transition,” page 25).

The ability to flow information seamlessly within and outside an institution is one of the primary advantages of having a single-platform system. A barrier to this for many institutions is the cost, especially if investments have previously been made in systems already in place. Mount Sinai felt that despite the costs, the investment was worthwhile. “Based on a return-on-investment analysis, we expect to recoup the majority of costs in the coming ten years, due in part to reduction in transcription costs, recovery of record-storage space which can be expanded into clinical space, and a decrease in medical records staff,” said Ms. Myers. “There will be all kinds of offsets to the capital investment,” she said, adding that “this system has already helped the medical center achieve meaningful use (MU) goals and receive MU financial incentives.”

Mount Sinai also points to metrics showing that the system has improved quality of care, including a 56 percent reduction in Medicare readmissions, and improvements in core measures such as discharge
One System Doesn’t Fit All: Hospitals Follow Different Routes toward EHR Adoption

continued from page 19

instructions, ordering and receiving of venous thromboembolism (VTE) prophylaxis, and postoperative treatment of surgery patients.

A survey carried out eight months after the Epic Beacon module was introduced in the chemotherapy infusion suite indicated that 80 percent of the users felt the system increased their day-to-day efficiency and improved the quality of patient care, which could be attributed in part to a database of approved treatment protocols.

Some EHR systems at Mount Sinai still predate Epic, including one for hospital admission and discharge and another for billing. The long-term goal is to integrate these into the Epic system, said Dr. Darrow.

Brondx Lebanon Medical Center

Like Mount Sinai, Bronx Lebanon decided to get rid of most existing EHR systems and start fresh with a single platform. IT chose the Allscripts system, and Bronx Lebanon is now an Allscripts national showcase. Prospective purchasers from around the world travel to Bronx Lebanon to see its system at work.

“Having a single platform gives us greater ability to share information across the enterprise,” said Dr. Leviton. “It allows fluid adoption of EMR information and better data reporting elements. With the ED module, patient information is entered and then passed through to the nurse’s notes, physician admission notes, and progress notes, and then flows to the discharge instructions and summary, and outpatient doctor’s notes. The amount of time doctors used to spend duplicating that information is now recouped and I always have the benefit of the previous notes made by other medical personnel. We have 700 doctors using the system, and they love it.

“Why I like Allscripts is that it is an open platform. I can create anything I want from it,” said Dr. Leviton. He is particularly enthusiastic about a new feature he helped to create that allows easy access to the Bronx Regional Health Information Organization (RHIO) by pressing a separate tab on the Allscripts screen.

Maimonides Medical Center

“Maimonides hosts as a ‘best in breed’ environment,” reported Dr. Davidson. “At different times, we have made different choices. We have separate and distinct EHR systems for inpatients, ambulatory outpatients, ED, and labor and delivery.”

The inpatient record system was installed between 1993 and 1994, the ambulatory record system during 2002; these were followed by labor and delivery and the ED. Thus, the systems in place at Maimonides evolved over about two decades. Dr. Davidson said that each decision reflected the particular needs of a department or function, and the choice made was the best available at the time. He pointed out that even hospitals that have chosen a single platform still use other systems that are not fully interoperable: “With a single enterprise, interoperability issues are mitigated but not obviated.” He said that subspecialty units, such as those for critically ill cardiology patients and the neonatal ICU, will always require their own systems. He also cited the expense of starting with a clean slate in a time of limited health care dollars and an aging infrastructure. “Our goal is to have interoperability but to host more than a single system,” Dr. Davidson said.

Beth Israel Medical Center

Beth Israel is also a multiple-platform EHR medical center. The inpatient system is General Electric’s Centricity Enterprise, while eClinicalWorks supports ambulatory care. The ED has had a separate system for the past 13 years.

“We prioritize bringing the best solutions to a practice environment rather than a single solution across all our areas,” explained Dr. Husk. “The point we have arrived at represents a series of decisions made over a long time point.” He continued, “There is some fragmentation and need to reconcile information from different systems, but the benefits are that you have core functionality that is optimized, for example, to suit the ED. If you use a system designed for the inpatient or ambulatory arena instead, you may not have the robust breadth and depth of ED functionality from that system.”

To improve interoperability within its systems, Beth Israel has purchased exchange software that is being customized to meet its needs. This should facilitate the transmission of information from internal sources, such as the ED, as well as from external sources, including information from partner hospitals or those affiliated with a RHIO. “We now have 2,500 end users,” said Dr. Husk.

Montefiore Medical Center

Montefiore made its first purchase of an EMR system in the mid-1990s and Dr. Berger took part in the system selection. Almost 20 years later, Montefiore is essentially a dual-platform operation, relying mostly on General Electric’s Carecast and Centricity systems. “Carecast is the backbone of our EMR. We use it for the hospital, and it handles CPOE, nurse charting, ordering, pharmacy dispensing, the laboratories, the operating room, and the radiology PACS system,” said Dr. Berger. Centricity was added five years ago to deal with ambulatory care.

“The data flow back and forth between the systems. Patients are identified in the same ways,” Dr. Berger pointed out, describing the setup as a “hub and spoke” model. Whatever the end user functionality, the data always flow back into the Carecast hub. “We feel this structure allows us to provide a product specific to our clinicians,” Dr. Berger observed.

Dr. Berger takes particular interest in the benefits of clinical decision support. In a recent publication, investigators from Montefiore reported that an electronic decision support application on inpatient medicine services improved VTE prophylaxis from 62 percent to 82 percent and reduced the incidence of hospital-acquired VTE from 0.65 percent to 0.42 percent. A separate report indicated that electronic interventions can be put into place to decrease the risk of wrong-patient electronic orders.

Implementation Challenges

All the CMIOs were asked what they see as major challenges facing EHR
implementation and growth, and some common themes emerged. One obstacle is simply getting physicians to be comfortable with using the systems. "The biggest challenge is getting doctors to use a keyboard and mouse, and migrate away from paper and pen," said Dr. Leviton, "The beauty of the EHR is that it provides doctors who are being bombarded with thousands of pieces of information the guidance to give the care their patients need," said Dr. Leviton. Clinical decision making helps physicians meet the standards of core measures. For example, when dealing with pneumonia, an alert will be given if a vaccine is needed, indicating whether an antibiotic should be prescribed, offer a menu of antibiotics to be used depending on the patient’s clinical status, and alert the doctor that the patient will not be discharged if these requirements are not fulfilled. According to Dr. Leviton, "As a cardiologist, I feel I have a much greater awareness of what is happening to my patients," said Dr. Darrow. "Prior to having an integrated system, if a patient was seen in another practice, I might not know that unless I received a paper report. Often I would not get the proper information but now that information is retrievable."

"We are beginning to see an improvement curve," commented Dr. Husk. He encounters more use of EHRs, greater user satisfaction, and better patient care—but said that definitive proof of improved quality or cost of care is still elusive. "We have been handed good tools and now we must try to make them work."

For Dr. Berger, the biggest revolution is in the availability and legibility of information: "I can get the answers often while the patient is still sitting in front of me." He said that clinical decision support is not simple and is not a panacea, and emphasized the importance of alerts that add value.

As Dr. Leviton sees it, "We are meeting all the core measures above benchmarks set by the government and seeing improved patient safety by ensuring care is being coordinated by evidence-based practice guidelines. We have neat, legible notes that can be easily reviewed. EHRs provide alerts in a timely manner to make us aware of changes in patient parameters."

Looking to the future, Dr. Husk feels that the distance between EHR users and nonusers will shrink as EHRs become more universally adopted. He expects data exchange to go more efficiently and that technology will foster collaborative support to make transitions of care more effective and "connect the separate silos of the ED, inpatient care, and ambulatory services." He also believes that EHRs will help hospitals meet the challenges of payment reform and the demands of accountable care organizations.

Many of the CMIOs feel the unrelenting pressure of adapting to evolving technologies and government regulations. Recognizing that their fellow CMIOs are “in the same boat,” they evidently speak to one another collegially about common concerns. FOJP has begun to assemble them together periodically to take advantage of their collective knowledge and expertise to solve some of the challenges facing health care today.

RESOURCES:
2. Rosee, M. “CMIO.” SearchHealthIT, May 2010; http://searchhealthit.techtarget.com/definition/CMIO.
Closed Claim Review: Fine-Tuning Use of the EHR to Avoid Medication Errors

Case Details
This case involves a medication error that began with an electronic order entry for an anti-hyperglycemic medication in the wrong patient’s record.

On May 10, an 84-year-old female patient was admitted for a small bowel obstruction following a recent small bowel resection. She spoke limited English. She had a history of atrial fibrillation, hypertension, and COPD; there was no history of diabetes. Her only medication was hydrochlorothiazide. She was alert and had no neurologic deficits. Blood chemistries revealed normal glucose levels, and scheduled finger-stick glucose monitoring was not ordered or indicated.

By May 18, the small bowel obstruction had resolved with nonsurgical interventions. The patient was ready for discharge home but remained hospitalized pending the resolution of home care issues.

On May 21, a PGY-1 surgery resident entered an order in the CPOE (computerized physician order entry)—also referred to as EPOE, electronic physician order entry—for the anti-hyperglycemic medication glipizide (Glucotrol) XL tabs 20 mg PO, with the first dose to be given stat, and then continued daily. The documented indications were for diabetes and home medication. The pharmacy received the electronic order and released the medication to the patient’s unit, where a nurse gave the ordered glipizide that same day.

On May 22, a different nurse once more administered the glipizide to the patient. Finger-stick glucose monitoring was initiated by the nursing staff, although there was no physician order for it. The glucose readings were 84 and 71 mg/dL (normal is 80–120).

On May 23, a nurse found the patient unresponsive, and a physician was called and responded right away. The patient had no response to sternal rub. Her vital signs showed oxygen saturation at 99 percent with pulse and blood pressure normal. The finger-stick glucose was 19 mg/dL. Two ampules of D50 were given, and the finger-stick glucose increased to 219 mg/dL. Afterward, the patient remained unresponsive. A head CT revealed no acute changes. A physician noted that it was unclear how long the patient had been profoundly hypoglycemic, and that the acute mental status changes might be secondary to seizures in the setting of hypoglycemia.

The patient remained in an unresponsive state. An MRI and a repeat head CT revealed no acute changes. An EEG demonstrated evidence of acute cerebral dysfunction.

The situation was discussed with the family, and members requested that the patient be made DNI/DNR. She was transferred to palliative care, and was on a morphine drip for comfort until she died two weeks later.

Allegations
The allegations in this claim included administration of a contraindicated medication, failure to appreciate that the patient was not a diabetic, and failure to supervise the PGY-1 resident physician.

Investigation
Investigation revealed that when the PGY-1 resident wrote the glipizide order, she had two patients’ medical records opened on the computer—those of the patient in question and a diabetic patient. Patient names were not prominently displayed on some of the EHR screens, including the CPOE screen. An attending physician directed her to write the glipizide order for the diabetic patient, and she mistakenly entered the order into the wrong record.

At the pharmacy, a list of the patient’s medications reported at admission, which showed only the anti-hypertensive medication, was received. When the pharmacy received the order for glipizide as a take-home medication, it should have compared both the list of reported medications at admission, and the record of medications administered during the hospitalization—and questioned any inconsistencies or incongruities. In this case, the incongruity of an order for glipizide was not recognized or questioned, and the pharmacy dispensed the medication as ordered.

The nurses who administered the glipizide had not been assigned to the patient prior to the occurrence and were unfamiliar with her medical history. They did not check the stat order against her diagnoses. Nursing initiated finger-stick glucose monitoring because the anti-diabetic agent was ordered, but failed to question why the drug was ordered or why there was no prior glucose monitoring.
Subsequent to the occurrence, the hospital implemented several EHR modifications to reduce the risk of similar events occurring in the future. Among them were the following:

- For access to the CPOE screen in the EHR, the physician now must first review a screen with the patient’s name, gender, and date of birth, and confirm the correct patient selection. After the order is written, the physician must again review a screen with the patient’s name, gender, and date of birth, and confirm that the order is for the correct patient.

- The patient’s name is now prominently displayed on the CPOE screen near the field for order entry.

- When anti-hyperglycemic medications are ordered, an automatic prompt displays the most recent glucose value.

- When the CPOE is completed, the system returns to the problem list for the current patient, rather than allowing the user to move directly to another patient’s record.

**Resolution**
Defense attorneys and the hospital agreed that the care could not be defended, and the claim was settled for $300,000. A report including information on both the PGY-1 resident and hospital was made to the National Practitioner Data Bank.

**Conclusion**
CPOE is an excellent tool to decrease the risk of medication errors associated with handwritten paper prescriptions. However, a new set of risks occurs as CPOE is added to physician practice, and CPOE can never be considered foolproof. Software modifications may be needed as aggregate experience identifies hazards unique to electronic systems. However, even as CPOE systems are improved, physicians must always remain aware that an electronic system is not a replacement for critical thinking processes or professional judgments.

**Risk Reduction Strategies**

- Keep only one patient record open at a time on the computer desktop. As we saw in this case, more than one record was opened and, in error, the medication order was entered in the wrong patient’s record. Had only one record been open, the error could have been prevented.

- Verify patient identifiers before accessing the CPOE screen. In this case, the patient was not identified when the CPOE screen was accessed. Had this been done, the error might have been avoided. If this step is not included in the physician office practice’s CPOE system, investigate whether a software update is available to compel verification before and after CPOE.

- Make sure the patient’s name appears on the CPOE screen and is visible even when scrolling up/down and sideways through the screen. In this case, the name was distant from the field for actual CPOE entry, so the PGY-1 resident did not have the visual cue that she was in the wrong record. Again, if this is not in the physician office practice’s CPOE system, find out whether a software update is available for prominently displaying the patient name on the CPOE screen.

- Consider including patients’ photos on the CPOE screen. Why? Because when the physician selects a record from an electronic list of patient names, he or she may inadvertently choose the name that appears above or below the correct patient. Moreover, patient names may be similar, and the wrong patient can be selected in error. A photo is a second opportunity to prevent a CPOE error.

- CPOE programs for a physician’s office practice may require software modifications specific to that practice. For example, for high-risk medications, an automatic prompt can be set to display the most recent relevant laboratory value in the electronic record. In the case here, the hospital modified the software to display the most recent glucose value. This can also be done for medications that are not high risk, but do require monitoring of patient findings, including vital signs and diagnostic test results.

- CPOE programs include embedded practice guidelines and alerts. Consider using these as practice reference. If a decision is made not to follow the guideline or to disregard an alert, document the rationale for that decision in the record.

- Remain aware of the risk of practitioner safety-alert fatigue. Symptomatic behaviors include ignoring or overriding alert warnings without reading them and/or disabling alert warnings, reminders, and embedded practice guidelines. If a plaintiff’s attorney can show in a lawsuit that following an alert or guideline would have prevented an injury, the physician may be found liable for ignoring these signals.

- In hospitals as well as ambulatory settings, there are frequent handoffs in care. In the case we have here, the nurses who administered the glipizide were unfamiliar with the patient, but when this new drug was ordered, they failed to review the patient’s diagnoses. CPOEs may need to be written for unfamiliar patients, but critical thinking must always be part of the medication ordering and administration process. If a handoff does not include information to support a CPOE decision, then the record should be reviewed and, if necessary, questions must be asked.

- Practices should maintain a current patient medication list, and at every office visit the patient should be asked for updates. Enter these updates in the EHR before entering a CPOE so that any alert/warning relevant to the update will be triggered when the newest medication order is put into the CPOE.

- Also keep up a current allergy list, and at every office visit ask the patient for updates. Enter them in the EHR before entering a CPOE so that alerts/warnings from the update will be activated when new medication orders are placed in the CPOE.

- CPOE and EHR systems are increasingly sophisticated. Software to improve patient safety is under active development, while at the same time, previously unknown risks associated with these systems are being identified. Physicians should stay abreast of these changes and how they may apply to their own practice. ■
The goal of FOJP's Clinical Risk Management group is to work together with insured hospitals, physicians, nurses, allied health professionals, and risk managers to improve health care quality and safety and reduce malpractice risk. One way FOJP does this is by engaging leaders in their fields to brainstorm about possible solutions to risk-related health care practices.

About a year and a half ago, David L. Feldman, MD, FOJP's Chief Medical Officer, invited a group of chief medical information officers (CMIOs) and chief information officers (CIOs) from New York-area hospitals to join a committee to look into documentation standards and electronic health record systems. To date, not only has this group been able to identify common pitfalls, but it has also come together to develop concrete solutions.

"FOJP is helping us identify problems," said Matthew Berger, MD, Montefiore Medical Center's Director of Clinical Informatics. "This has been a great committee. It has taught us that we all deal with the same issues and can come up with similar solutions, even if the products we use are different."

Gregg Husk, MD, CMIO of Continuum Health Partners, agreed. "The committee is bringing people together to develop shared goals, 'swap recipes,' and identify areas to drive improvement. I have learned things from my colleagues that I probably would not have learned in the normal course of events. It has exceeded my expectations."

"One accomplishment has been sharing information about patient handoffs and creating documentation for use to support handoffs," said Steven Davidson, MD, CMIO of Maimonides Medical Center. The handoff refers to the juncture at which the responsibility for patient care is transferred from one physician to another, such as when a resident physician's shift ends and another resident assumes care. "There is a clear set of data showing that care transition among providers is a time of risk for patients. We see this when we do critical incident reviews or root cause analyses of a sentinel event. Handoffs are a particular subset of care transition," said Dr. Davidson. "FOJP has helped us reach a consensus on identifying who is the physician in the hospital most immediately responsible for a patient, and what key information needs to be transferred. It has helped us create an appropriately structured handoff document."

Mount Sinai Medical Center’s CMIO, Bruce Darrow, MD, shares this view: "It has become increasingly obvious that often we give appropriate care but do not document it as well as it should be done."

"I appreciate that the FOJP leaders listen as well as lead. It is a different way of collaborating," said Dr. Husk.

Doctors review electronic medical records at Mount Sinai Medical Center.

According to Montefiore's Dr. Berger, "In a big, complicated hospital, being able to quickly identify the responsible physician about an urgent situation is not a trivial matter. ... Driven by FOJP, which provided the financial support for the committee, we were able to address the problem of a noncontinuous provider stream." He said that Montefiore soon will be able to provide real-time updates of responsible providers, and have that information available to operators and laboratories. Dr. Berger also hopes to have an electronic signoff tool added to the hospital's EHR system.

FOJP has come up with an incentive to fuel the creative process: It is offering a substantial premium discount to the hospital that develops a comprehensive solution to the handoff issue. "We know we lose money in malpractice suits when the handoff is not done well," says Bronx Lebanon Medical Center's CMIO, Robert Leviton, MD. "What FOJP is doing is encouraging systems to provide care in a manner that is consistent with its needs and aligned with good patient care."

Dr. Husk of Continuum is impressed by FOJP's willingness to offer premium reductions if hospitals accomplish certain goals perceived as adding value and reducing risk. "It takes us from a place of speculating to being mutually committed to a body of work," he said. "This is very helpful in getting organizations to focus on achieving these critical tasks."

It is anticipated that all hospitals will achieve their goal with the handoff tool and move forward to the second phase of the project by developing system standards to easily identify, at any point in time, the first call physician responsible for a patient's care. "I appreciate that the FOJP leaders listen as well as lead. It is a different way of collaborating," said Dr. Husk.
At Mount Sinai, Thorough Planning Ensures A Smooth EHR Transition

Once Mount Sinai Medical Center decided to adopt the Epic Electronic Medical Record system, the herculean task of implementing it throughout the 1,171-bed Mount Sinai Hospital—and the Icahn School of Medicine—fell to Chief Medical Information Officer (CMIO) Bruce Darrow, MD, and Vice President of Information Technology Kristin Myers. They knew from the beginning that success depended on both getting those who were to work with the system trained technically, and convincing them to accept a drastically new way of working.

“This was not just an IT project—it was a medical-center-wide clinical transformation initiative,” said Ms. Myers. “We knew the human dimension would determine how successful the transition would be.” To reach this goal, they created a highly specialized change-management program at the very beginning, involving all stakeholders in the process. The result was that three years after the selection of the inpatient platform selection, Ms. Myers could characterize the Mount Sinai Hospital and Icahn Medical School “go-live” order as a non-event—accomplished on time and on budget, with very few training or workflow issues. The process developed there was so innovative that it earned the 2012 Davies Award of Excellence from the Healthcare Information and Management Systems Society.

Initiative leaders recognized from the outset that they faced clinician skepticism because of previous uneven IT changes. Moreover, they had to design 60-plus new workflows while training thousands of users. In a survey prior to implementation of more than 1,000 employees, respondents expressed concerns about system functionality, time to implement, training, and support.

An early step involved developing a program management office and assigning project managers to oversee the plan. The implementation team included clinical champions (physicians), front-line nurses, trainers, super-users, and other personnel. “We realized that every area of the medical center would be affected by this clinical transformation, even the nonclinical areas,” observed Ms. Myers. “The backbone of the communication efforts was to ensure that all impacted stakeholders were aware of and involved in the implementation.” The project leaders also realized the importance of engaging senior executives of the medical center. To demonstrate full commitment to the effort, members of top leadership were featured in a series of videos shown on large screens in the main lobby. In these, executives voiced their enthusiasm for the project.

Those spearheading the implementation came up with creative ways to build support for the project with communications that were varied and frequent. Physicians and nurses were paired for “road shows” featuring workstations on wheels. Trained peers (also known as super-users) were available for “show and tell.” In addition, there were posters, articles in the hospital newspaper, an intranet site, raffles, wine-and-cheese events, grand rounds, and faculty meetings. An information booth, the Epicenter, served as a resource hub for information and training registration.

Getting more than 7,100 users up to speed on 50-plus curricula over a 12-week period represented a huge logistical challenge. Although training rooms were available on the hospital campus, there were not enough to accommodate all sessions. In addition, project leaders realized that they needed a small army of credentialed trainers, but didn’t know where to find them—so they created a novel recruitment initiative: an “American Idol” type of event, during which people from different backgrounds, but not necessarily in IT, auditioned to become trainers. The 100 people selected earned their credentials by going through an intensive four-week training course, and generally were hired for six to seven months. “The audition process was a huge success, and it is now being replicated by other hospitals and health systems across the country,” said Ms. Myers.

Most clinicians required eight hours of EHR training, although some specialists took as much as 16 hours. Nurses received 23 hours of training. An ED simulation-training program led users through real-life case scenarios, from triage to admission.

This extensive preparation produced a smooth “go-live,” thanks in part to the help of 260 super-users per shift, 90 contractors per shift on the floors, and 70 IT personnel per shift—all available 24/7. Users reported little “pain” in adapting to the new systems. The result was that productivity and reimbursement were affected only slightly and there was 100 percent computerized provider order entry adoption and acceptance of redesigned clinical workflows.

Participants attributed some of the project’s success to hospital leadership’s commitment of significant financial support. Of the $120 million that Mount Sinai allocated to the EHR implementation, change management program costs accounted for 4.44 percent. This included $3.8 million for credentialed trainers and $551,000 for offsite training space.

Less than a year after the medical center went live, the lessons learned there were applied again when the Epic system was brought to the 235-bed Mount Sinai Queens. “It went wonderfully,” said Ms. Myers. “We had a few glitches, such as individuals forgetting their passwords, but the volume of calls to our help center was low and very few issues were reported. Once again, go-live was a non-event.”

Caryn Schwab, Executive Director of Mount Sinai Queens, agreed. “I am amazed and proud of the collaboration of the teams to gain such an achievement,” she said.

Even Epic Systems learned from the Mount Sinai experience: Epic now offers the Mount Sinai Program Management Office protocol as a reference for clients wanting to incorporate change-management protocols to facilitate EHR transition. ■
From the Chief Nursing Officer

EHRs: Powerful New Tool to Complement Nursing Care

Even though there is no question that electronic health record (EHR) use has had a positive impact on many aspects of nursing practice, the jury is still out on whether the experience has been all good—that is, whether the adoption of EHRs in nursing has been a total success.

This question may not yield a single, unqualified answer because the adoption of EHRs in nursing continues to grow, making an assessment of the transition from paper to electronic recordkeeping a work in progress, and a moving target.

What we do know is that hospital- and office-based nurses across the country rely daily on EHRs with the expectation of achieving their promised benefits. These include improving patient safety, reducing medication errors, accessing health information at the point of care, aligning health care decisions with best practice guidelines, performing complex clinical calculations, and rapid scanning of large amounts of information.

Beyond nurses’ hopes of realizing the targeted improvements, the literature reports on how they are adapting and otherwise making practical use of EHR technology in their jobs, with conclusions based on analyses of their interactions with clinical information systems.

Among other things, nurses are putting their electronic resources to work in organizing job tasks, developing care plans, improving clinical care documentation quality and thoroughness, enhancing team communication, and increasing job efficiency. Further EHR benefits include eliminating the burden of “translating” handwritten notes, and—when used in conjunction with technologies such as electronic medical administration records—cutting down on medication errors by means of drug-to-drug interaction alerts.

As for results—what may transpire when nurses adopt EHRs—a 2011 study at the University of Pennsylvania School of Nursing reached some interesting conclusions. Looking at some 16,000 nurses working at more than 300 hospitals in four states, the researchers reported that “implementation of EHRs in nursing continues to grow, making an assessment of the transition from paper to electronic recordkeeping a work in progress, and a moving target.”

What does the rising tidal wave of data really mean for nursing, and how will it affect patient safety and care, as well as nursing efficiency?

So, back to that original question: Has the adoption of EHRs by nursing been an unqualified success? The record says no. But it also says that the bulk of experience has been on the positive side of the ledger—giving nurses a powerful new tool to complement, not replace, their crucial skills. The emergence of nursing informatics and chief nursing information officer (CNIO) positions is further proof nursing is committed to developing evidence-based information systems that enable delivery of efficient, effective nursing care.

As with any other nursing tool, the usefulness of EHRs depends on how well they are applied, case by case. Nurses remain the key, exercising their tremendous faculties to compensate for whatever shortcomings EHRs may present, while at the same time exploiting their enormous strengths.

Ten Key EHR Lessons for Nurses and Nurse Administrators

1. Make sure your current infrastructure can support robust, interoperable EHRs.
2. Involve nurses and nurse informaticists in design and implementation.
3. Strike a balance on customization.
4. Prepare the staff, but anticipate resistance.
5. Gird for productivity losses in the initial week.
6. Design a system focused on using data to improve care.
7. Understand and prepare for the impact on patient interactions.
8. Strive for interoperability across settings.
9. Guard against information overload.
10. Measure results and have a process in place for nonstop change.


Pat Kischak, RN, MBA, CPHRM

3. Ibid.
From the Chief Medical Officer

There is little doubt that electronic health records (EHRs) have the potential to improve the quality, safety, and efficiency of patient care. Unfortunately, human factors and usability issues remain as significant barriers to their successful adoption and widespread use, although that outlook may soon change. With the introduction of “meaningful use” requirements, EHR implementation goes from being a choice to becoming a mandate. Even so, in the absence of consistent standards, the use of EHRs for large-scale data exchange may be years away from achievement.

Our CMIO/CIO committee, profiled in this edition of infocus, reviews the current work being done by the FOJP facilities to establish standards within the hospital setting, starting with handoff documentation—the key patient information that needs to be transferred for the care of patients between shifts, services, or providers. Considering the problems that some institutions are having with EHRs, the ability of the CMIOs to reach consensus on processes, along with implementation within their own systems, marks an important step in the right direction. The second project will focus on development of system standards to easily identify, at any point in time, the first call physician responsible for a patient’s care.

The adoption rate for the EHR by individual physician practices has been lagging somewhat, for a variety of reasons, including high costs, rollout complications, and staffing issues. Although communication among physicians, staff, members, and patients is a key benefit, connecting with other provider organizations, including hospitals, remains a challenge.

What does the future hold? The benefits of EHRs are undisputed—superior clinical decision making, reduced medical error, and comprehensive patient information, to name a few. However, widespread adoption is taking a lot of time. Concerns about confidentiality, absence of standards, and lack of interoperability remain as primary challenges despite government funding and pressure to move forward.

Our institutions, however, are pressing ahead with small, but meaningful, steps to ensure the continued delivery of quality care.

Upcoming in infocus
In the next issue of infocus, we will explore what is happening with prescription medication use—management, reconciliation, risk factors for adverse drug events, and prevention of adverse events. We will explore technology interventions (e-prescribing) and bar code administration (eMAR) and continue the discussion about computerized physician order entry (CPOE).

The goal of medication reconciliation is to obtain and maintain accurate and complete medication information for a patient with the ability to use this information across the care continuum. As of July 2011, medication reconciliation was incorporated into National Patient Safety Goal #3, “improving the safety of using medications.” This imperative requires that organizations “maintain and communicate accurate medication information” and “compare the medication information the patient brought to the hospital with the medications ordered for the patient by the hospital in order to identify and resolve discrepancies.” Reconciliation is done to prevent medication lapses such as omissions, duplications, dosing errors, or drug interactions.

Some figures to think about in the meantime:

- 82 percent of American adults regularly take at least one medication and 29 percent take five or more.
- Adverse drug events (ADEs) lead to 700,000 emergency department visits and 120,000 hospitalizations annually.
- 3.5 billion is spent on extra medical costs of ADEs annually.
- At least 40 percent of the costs of ambulatory (nonhospital settings) ADEs are thought to be preventable.1

Additionally, we will explore related work being done at FOJP hospitals and independent physician practices, and share some best practice ideas from our Risk, Safety, and Quality Committee, the American Society for Healthcare Risk Management, the American Pharmacists Association, and others.


David L. Feldman, MD
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Glossary of Commonly Used Acronyms

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<tr>
<th>Acronym</th>
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<tr>
<td>AAFP</td>
<td>American Academy of Family Physicians</td>
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<td>ACP</td>
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<tr>
<td>AHRQ</td>
<td>Agency for Healthcare Research and Quality</td>
</tr>
<tr>
<td>ATCB</td>
<td>Authorized testing certification body</td>
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<tr>
<td>CAH</td>
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<td>CCHIT</td>
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<tr>
<td>CDS</td>
<td>Clinical decision support</td>
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<tr>
<td>CHPL</td>
<td>Certified Health IT Product List</td>
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<tr>
<td>CMIO</td>
<td>Chief medical information officer</td>
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<tr>
<td>CMS</td>
<td>Centers for Medicare and Medicaid Services</td>
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<tr>
<td>CPOE</td>
<td>Computerized provider order entry</td>
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<tr>
<td>ECRI</td>
<td>Emergency Care Research Institute</td>
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<tr>
<td>ED</td>
<td>Emergency department</td>
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<tr>
<td>EHR</td>
<td>Electronic health record</td>
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<tr>
<td>eMAR</td>
<td>Electronic medication administration record</td>
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<tr>
<td>EP</td>
<td>Eligible provider</td>
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<tr>
<td>ePSG</td>
<td>Electronic National Patient Safety Goal</td>
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<tr>
<td>eRX</td>
<td>Electronic prescribing</td>
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<tr>
<td>HEAL</td>
<td>Healthcare Efficiency and Affordability Law</td>
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<tr>
<td>HI</td>
<td>Health information</td>
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<tr>
<td>HIE</td>
<td>Health information exchange</td>
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<td>HIMSS</td>
<td>Healthcare Information and Management Systems Society</td>
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<td>IE</td>
<td>Information exchange</td>
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<td>MU</td>
<td>Meaningful use</td>
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<td>New York eHealth Collaborative</td>
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<td>Primary Care Information Project</td>
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<td>PHR</td>
<td>Personal health record</td>
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<td>PSO</td>
<td>Public safety organization</td>
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<td>REC</td>
<td>Regional extension center</td>
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