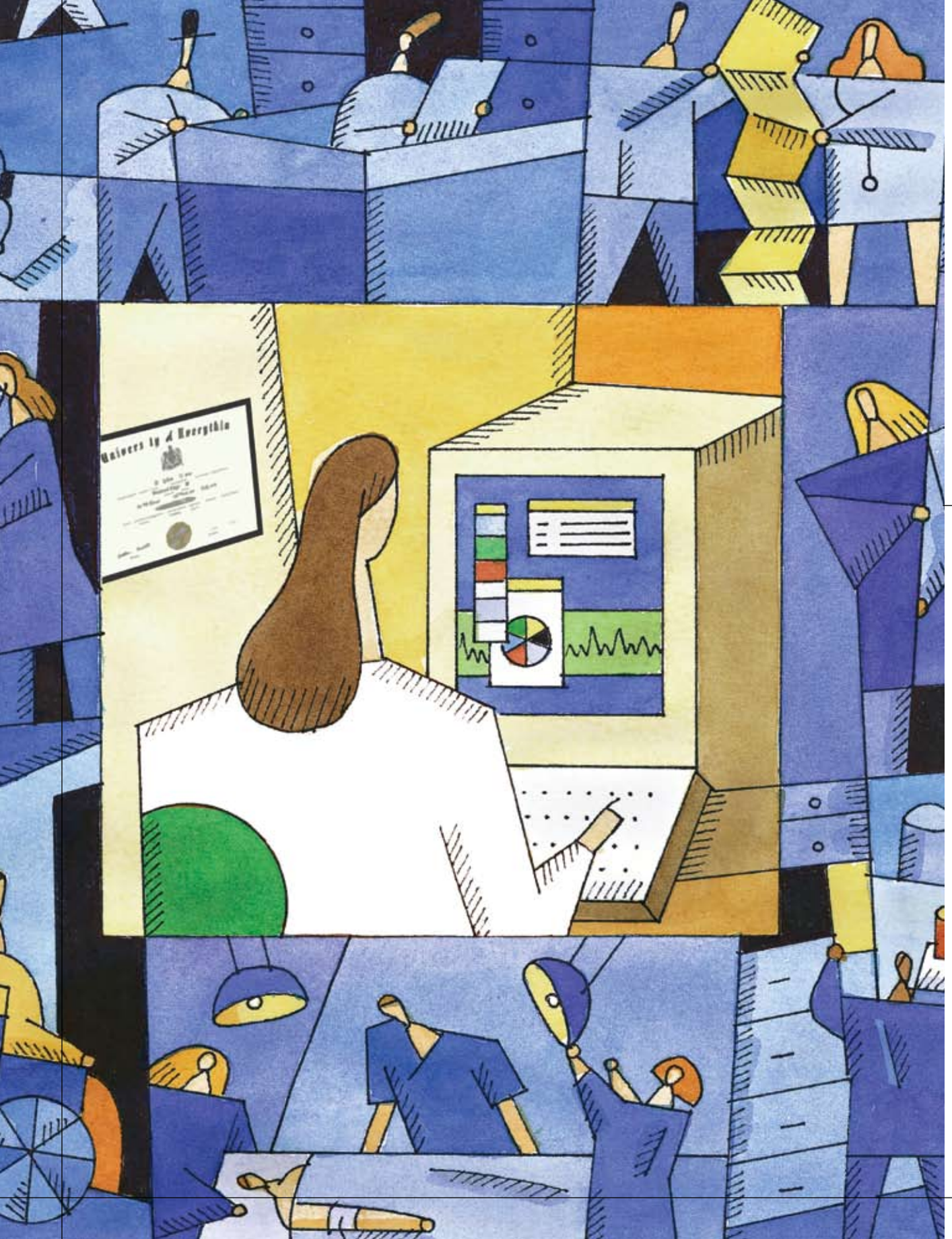

Champions of Change

Physicians initially challenged, but ultimately succeed when adopting technology

Hospitals and physician practices automate systems based on the potential to improve patient care and prevent medical errors. Successfully directing such change requires effective management, system reliability and extensive preparedness.

By **Dr. Christopher DeFlitch**
Penn State Hilton S. Hershey Medical Center
Dr. J. Michael Kramer
Trinity Health System
Dr. George Saleh
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Jason Lee, Ph.D.
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Studies show that healthcare information technology (HIT) can significantly reduce medical errors. Yet, despite such benefits, fewer than 10 percent of the nation's 6,000 hospitals have implemented computer physician order entry (CPOE). HIT has received a somewhat warmer reception in small physician practices, where approximately 60 percent of the nation's 800,000 physicians work. Studies show that among physician practices of 10 or fewer, 11 percent to 24 percent routinely use HIT.

In acute and ambulatory clinical settings, the same factors impact HIT success:

- Financial and safety concerns
- An organization's culture and whether it supports or rejects adoption
- Physicians' reluctance to accept new techniques perceived to impede workflow
- Technical skills among individuals as well as technical issues with the system
- Support of administrative and clinical leadership

Such hurdles are not unique to hospitals or physician practices. Most organizations outside of the healthcare industry face the same obstacles as they undergo a process change, such as IT implementation.

Successful results can be attained in the healthcare industry with the proper mix of leadership, credibility and planning. This article details our experiences as physicians who championed for HIT implementation and adoption in our respective

healthcare settings: an academic medical center, a 24-hospital, nationwide health system and a solo private practice.

Preparing to be Connected

By Dr. Christopher DeFlitch
Vice Chairman and Director, Department of Emergency Medicine
Penn State Milton S. Hershey Medical Center

Penn State Milton S. Hershey Medical Center is *Connected*. After two years of preparation, our quaternary care medical center in Hershey, Pa., introduced its expanded information system, branded *Connected*, including house-wide CPOE in May 2005.

Even with the streamlined flow of information, it was a struggle for physicians to adapt to the conversion. Hershey Medical Center's success can be attributed to anticipating problems and having a backup plan. As physician champion for the *Connected* project, I could not think of a scenario or situation that we didn't beat to death. We prepared well, had a strong adoption process and a first-rate transformation team. There were no overwhelming design problems and no significant flaws in the system.

Hershey Medical Center physicians and other clinicians now enter virtually 100 percent of their orders for medications, diagnostic tests and ancillary services online using CPOE. Nursing documentation, which was automated during the earliest phase of implementation, is supported with wireless technology, and frees nurses to spend more time with patients. Medication safety checking occurs in the background as a routine part of the medication management processes that span physicians, pharmacists and nurses, further enhancing existing patient safety measures.

The 2005 implementation builds on Hershey Medical Center's existing platform, which includes a clinical data repository with results viewing and an inbox for physicians to sign and edit documents. The platform was first introduced in 1996.

Hershey Medical Center's most recent launch also incorporates information systems for the emergency department (ED), intensive care unit (ICU), surgery, physicians' offices and registration departments. Decision support is available throughout the care delivery process via automated alerts and reminders to clinicians, impacting decisions at the point of care with medical evidence. The improved wireless system provides clinicians with access to each patient's entire electronic medical record (EMR). Portable computers are available at a ratio of one per two rooms on the medical floors; the ICU and ED are more heavily equipped. Computers are also available outside of lecture halls and in the cafeteria so there is no barrier to access.

Communicating change

There was interest and enthusiasm among the physicians, but it was a challenge to engage them in the early stages because we couldn't say for certain how they were going to be affected. Once we went live with nursing documentation it became a reality for the physicians—they started to realize this was going to impact them. At that point, we had more excitement, maybe nervousness, about what was coming down the pike.

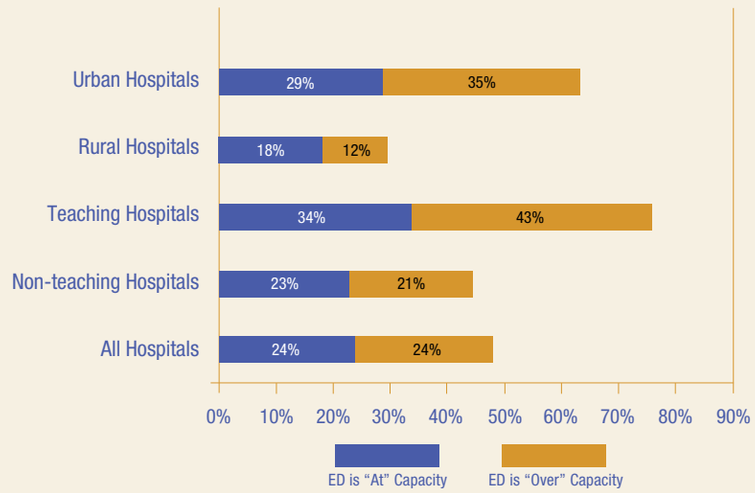
I learned early that constant, consistent communication was critical and that it would take more than one physician champion to relay the message. In addition to me, physicians from internal medicine, pediatrics and surgery were tapped to champion the cause. At a minimum, I devote 40 percent of my time to HIT. In the early stages, we attended meetings at the department, division and resident levels, showing and sharing potential benefits of CPOE and getting feedback from our colleagues. We communicated through e-mail, PowerPoint presentations, direct conversations, intranet discussions and varied publications, including a weekly internal newsletter with CPOE-related articles. We communicated in as many ways as we could, repeating the same message in every venue.

Order-set development

Like physician engagement, order-set development also lagged. Initially, we tried to virtually automate order sets through e-mail contacts, meetings and by phone. When that failed, we designated Fridays as order-set development days. Order-set development became a subset of the entire *Connected* project. Our team identified physicians to create a process for developing order sets at the department level. Thus far, we have created 350 disease-specific order sets for illnesses such as congestive heart failure, acute coronary syndrome,

Hospital emergency departments across the board are exceeding the limits of what they can do, as 10 percent of the 1 billion medical care visits made annually in the United States are to the ED. This makes it necessary for EDs to streamline operations with efficient and automated systems such as CPOE.

Percentage of Hospitals At/Over Emergency Department Capacity in 2004



Source: American Hospital Association 2004 Survey of Hospital Leaders

hip replacement and emergency chest pain. We created another 600 more common order sets that link together similar items such as CT scans and X-rays.

"Proof of concept" was critical to electronic order entry acceptance and was established approximately halfway through order-set development. This allowed department leaders to create specific cases and scenarios around order sets and to present their concept of the clinical information system and ask the end-users to verify it. For the ED, that meant simulating how a particular ED situation, such as a patient admission, stay-and-discharge, would appear on the computer.

I walked faculty and staff through the clinical process of placing orders electronically and demonstrating how the order would appear for the nurse and as it moved to the pharmacy.

I showed positively and negatively what would happen if the patient being admitted had an allergy or specific dietary orders, medications and radiology tests, and how this would interact with ancillaries. This was a large production we shared with faculty, staff and the leadership. We went through this five or six times for different audiences. After the first one, there was a buzz. People could touch it, feel it and see how it might impact their workflow. We made adjustments based on feedback from physicians and that continued throughout the system design. It was essential to our adoption process.

Dr. Christopher DeFlitch

Vice Chairman and Director, Department of Emergency Medicine
Penn State Milton S. Hershey Medical Center

Dr. Christopher DeFlitch is vice chairman and director, department of emergency medicine at Penn State Milton S. Hershey Medical Center. He also serves as physician champion for the clinical information system and CPOE.

DeFlitch was the creator and former residency director for the new Penn State Emergency Medicine residency and has served in numerous other leadership roles throughout Penn State. He has been honored with several teaching awards and was named in *Who's Who in Medical Sciences Education*. DeFlitch received specialized training in emergency medicine billing and coding, observation medicine, clinical information systems, process improvement, observation medicine and as an aero-medical flight physician.

DeFlitch is a peer reviewer for the *Annals of Emergency Medicine* and *American Family Physician*; on the oral board review faculty for the Pennsylvania American College of Emergency Physicians (PaACEP); a member of the Society for Academic Emergency Medicine and a member of the American College of Emergency Physicians.

Former chairman of the medical economics committee for the PaACEP, DeFlitch currently serves as chair of the organization's emergency medicine practice committee. He is also a Fellow of the American College of Emergency Medicine and has been published extensively. His current research includes application of new technology in process improvement.

Mandatory training

Training across the institution was key and mandatory because levels of computer competency varied dramatically. Physicians had dedicated trainers, who drove their sessions. Training was most successful when physicians from the same department and/or division were taught at the same time. Non-advertised, "just-in-time" training continues, as does monthly training for residents who rotate through a department.

The *Connected* pilot project took place in the ED and on a surgical floor, where the patients were easily defined according to services, such as otolaryngology, neurosurgery and trauma. Nursing staffing was enhanced for the pilot, and super-users—wearing blue shirts emblazoned with the *Connected* symbol—were plentiful. One reason May was selected for the rollout was so fourth-year medical students could assist as super-users. The students were trained and paid, and capable of handling simple navigation problems. For more difficult questions, they had a direct path to physician leaders. The two groups met in the mornings and evenings in the 24-hour command center to discuss issues as they arose.

The pilot, scheduled to last two weeks, was so successful after just four days that the roll-out at Penn State Children's Hospital began early. There were system adjustments that were relevant to pediatric care, and two weeks later CPOE was introduced throughout the remainder of the medical center.

Few verbal orders

From that moment on, all orders have been placed electronically. We have very few verbal orders—essentially it's 100 percent electronic order entry. We have a policy around verbal orders that if you don't have access to high-speed Internet, for example, when you're driving in the car, then we accept verbal orders.

We place 12,000 orders a day throughout the facility. Within the ED, half of the orders are placed through order sets. The rate of verbal orders is approximately 1 percent. The only way patients can get care is through order entry. We don't accept written orders, unless the physician does not have access to high-speed Internet, is performing a procedure or the patient is in a critical-code situation.

There are a few areas where CPOE is not being used, such as intra-procedure, surgery suites, cardiac catheterization laboratories and GI laboratories. With urgent clinical situations, such as code blue and near codes, orders are still hand-written. We do not let the computer get between the provider and the patient.

I am proud of the team and how much effort they put into this. Everyone from the chief operations officer to the physicians, nurses, lab techs and maintenance staff—all will be touched by this information system. That's why it's so important that you understand what they do and reach out to them before you begin improvement in workflow and processes by means of information systems. That takes time, effort and commitment. This is a work in progress—it's a marathon not a sprint.

One hospital at a time

Dr. J. Michael Kramer
Chief Medical Information Officer
Trinity Health System

Within Trinity Health System, we don't have to wait for a national health information technology infrastructure to see the benefits of electronic medical records. During a recent trip my medical records from my home hospital, St. Joseph Mercy Hospital in Ann Arbor, Mich., were readily available to physicians in the ED at Mercy Medical Center in Dubuque, Iowa. Nearly anywhere in the state of Michigan and across six other states, shared electronic medical records can be accessed within Trinity Health—the nation's fourth-largest Catholic health system, headquartered in Novi, Mich. I assist physicians in 24 community hospitals from California to Maryland as they implement CPOE.

PROJECT GENESIS
Systems for World-Class Patient Care and Safety

Project Genesis, our five-year CPOE initiative to create a system-wide common platform for clinical information, revenue cycle and supply chain management, began in 2003. Thus far, seven hospitals have implemented the new systems and associated improved workflows. At present, Trinity Health has one facility "going live" every two to three months, for about four per year.

The plan for physician engagement begins at least 18 months before any CPOE implementation. The comprehensive process includes a cultural assessment and a detailed 150-question survey that covers all of the tasks involved with deploying an EMR, from the electronic signature to efficiency management. We assign a readiness coordinator at each site along with clinician coaches who facilitate physician tasks and work with clinical liaisons. The idea is to build a diverse network of individuals who will be instrumental in the change-management process.

In turn, this network leads the hospital in developing committees to address current and future workflow issues for all impacted areas—from finance to human resources, and nursing to allied health. We create a physician advisory team one year before "go live," which is usually led by a physician hired specifically for the role. The advisory team focuses on the physicians who admit patients to the hospital. These providers receive multiple sessions of instruction on everything from remote-access devices to detailed problem-based scenarios to e-learning modules. During the course of installation, these teams will grow to be able to address issues ranging from workflow to conflict resolution.

Super-users critical to success

To assist the top-admitting physicians, the clinician super-users must be identified early. This step is critical because physicians who admit patients to community hospitals are not typically employees of the hospital and may have little information technology experience. Highly visible in the hospitals, super-users are comfortable dealing with the cultural issues that arise as physicians adapt to electronic orders. Physicians also have access to their own highly responsive help desk if they misstep or have questions. The hospitals also establish a "doc-ing station," which serves as the physician lounge, provides computer training and devices and is maintained in perpetuity.

The forethought we employ to assist physicians technologically is the same we use to deal with the nuances of our CPOE system. We have customized the system by creating a number of workflow and task-based views of data that required building extra tabs into the system. We created an encounter review—a single view of a collection of reports based on the number of physician-patient encounters—which helps the physician dictate discharge summaries. A rounding tab, which provides physicians making rounds with comprehensive 24- and 36-hour patient updates, including all nursing documentation, laboratory procedures and pharmacy, also has been added. In addition, we have a list of 70 "pain points for physicians."

We acknowledge that we are addressing the limits of technology and are working to identify the gaps in workflow and data retrieval. We have built scenarios and established process-based learning and training so that when there are gaps in the tools, physicians will know how to work around them. They will know where to go to find what they are looking for. You must communicate these gaps and the workarounds before you go live.

Measuring progress

We monitor progress through a combination of process and outcome measures. Since the patient-safety benefits of CPOE can only be realized to the extent that the system is fully used by physicians, we have carefully defined measures of utilization that we observe. Saturation measures the percentage of total orders that are entered into the computer by a physician. At Saint Mary's Health Care in Grand Rapids, Mich., saturation currently ranges from 72 percent to 74 percent. Participation measures the percentage of staff physicians who are logging in and using the system for any purpose—even if only for viewing results rather than entering orders. In November 2005, those figures ranged from about 20 percent to 80 percent among the seven Trinity Health hospitals that have implemented CPOE.

To capture the full impact of the system on patient safety, we also track an alternative measure of saturation that includes orders entered by non-physician caregivers who are licensed to enter pre-approved standard orders. The sites that implemented in 2005 range from 50 percent to more than 70 percent order entry.

Streamlining the process

With CPOE implementations planned through February 2008, we are looking ahead to streamlining the process of keeping order sets up to date with the latest

medical evidence. We have 2,900 order sets in production and currently build them at each organization through consensus and collaboration. In addition to our own evidence-based, order-set process, we are hopeful that a partnership with Zynx will largely automate the updating of order sets and reduce the labor involved in maintenance. The involvement of a third party that constantly reviews the medical literature, as Zynx does, will increase our capacity to implement standardized order sets and help promote the concept of CPOE to physicians who don't have time to keep up with all of the medical literature.

Trinity Health also tracks a battery of outcome indicators across all of its hospitals and can see the impact of CPOE from that perspective as well. Among the four sites that have been live for more than six months, Trinity Health has shown significant improvements in several core clinical indicators.

Credibility is key

Credibility is a critical factor in gaining physician adoption of CPOE. Even though seven Trinity Health hospitals have implemented the system, there remain groups of providers at every hospital that are unwilling to proceed. Their reasons are varied: some were early champions or adopters who changed their minds when they realized the significance of the conversion; others had unrealistic expectations of the system and became dissatisfied. Without strong leadership and system credibility, hospitals will have a harder time. It's easier for us, going into our eighth hospital. We can say, "If it works at seven other hospitals, it surely can work here." That momentum and competition have been helpful.

Physician champions keep it going, and by having ED physician champions, our adoption has benefited. Most patient visits start in the ED, and with that data in the system, we have approximately 65 percent of our electronic medical record available. We've tried to lower hurdles by making the system provide contiguous information.

I think we have strength because we have a single database across seven sites. We are building our own infrastructure within the healthcare system and can say "stay within the Trinity Health family when you travel." I think about that as I travel to all these sites imagining that I could get hurt en route.

This has been a positive experience and Trinity Health is very excited. We're very optimistic about opportunities for the future.

Dr. J. Michael Kramer
Chief Medical Information Officer
Trinity Health System

Dr. J. Michael Kramer is chief medical information officer at Trinity Health, responsible for supporting clinical applications and processes of care. He also oversees developing corporate physician engagement plans for Project Genesis, the organization's HIT system; strategic planning for the complete electronic medical record; support of clinical process transformation and improvement; evaluation of emerging technology; and adoption of informatics standards. Kramer is also the lead for implementing systems to assist clinicians measuring quality and leveraging data-driven tools to inform and guide patient care.

Kramer earned his medical degree from Case Western Reserve University School of Medicine and an MBA from the University of Michigan. He is board certified in internal medicine and pediatrics. He has more than a decade of information systems experience, having provided leadership and expertise to clinical groups at the University of Michigan when CareWeb, the primary clinical system at the university, was developed and deployed. He also was involved in the implementation of the inpatient order entry system at the university, as well as a similar deployment at the Ann Arbor Veterans' Administration Medical Center, where he was the physician lead for electronic medical records management, mobile computing, inpatient order entry and clinical systems integration.

Transforming vision into reality

Dr. George Saleh
Creekwood Women's Care LLC

It has been a long road, but the desire to implement an EMR into my gynecology practice became a reality in September 2005. A practitioner in Kansas City since 1981, I could see the value of an EMR years ago, when I was president of a larger obstetrics and gynecology clinic. Unfortunately, I was in the minority when it came to making the decision on whether to automate that multi-physician practice.

I am now a solo practitioner, and the EMR makes my practice more efficient and more responsive to our patients. I believe that many physicians initially may be confused with the array of EMRs available. Some unfortunately have been "burned" by bad decision making in the past, and some also may be intimidated by the whole process of EMRs.

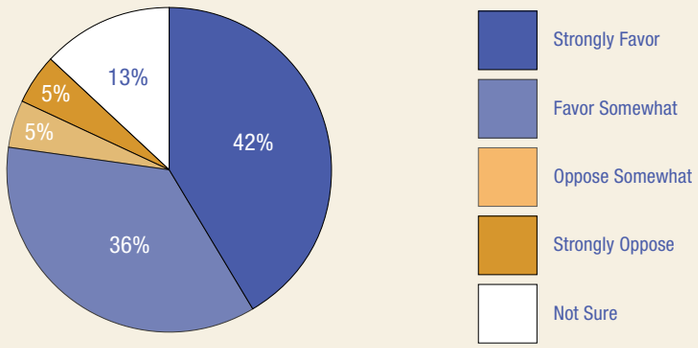
I did my homework before deciding to adopt an EMR. I served on a number of information technology planning committees for different hospitals and visited several sites that had successfully implemented HIT, such as Truman Medical Center in Kansas City.

Because my staff is small—an office manager, nurse and medical assistant—it was imperative to involve them early on.

Benefits of EMRs at Creekwood Women's Care LLC

- Paper-free office
- Electronic access to laboratory and other ancillary medical services
- Immediate authorizations for procedures from insurance companies
- Swift claim submission and rapid reimbursement

Majority of Patients Favor EMRs



Base: All Adults
Note: Percentages may not add up to 100 percent due to rounding
Source: Harris Interactive Poll, Sept. 30 and Oct. 4, 2005

It was critical for the morale of the office, and it was the best decision I made. I discussed with the staff what it would take to do a total EMR, and we did it gradually so that the shock would not threaten the overall practice. I truly believe this gradual shift contributed to the successful implementation of the system we are now using. We are still learning and making changes to it every day. Our comfort level increases daily as well.

The benefits of the EMR have been numerous. Foremost, the whole office is now geared to being paper-free. We can interface with the patient's labs and other ancillary sources of medical care and digitize them into their chart. We can interface with the patient's insurance company and obtain authorization to do a procedure within minutes instead of days. Lastly, when we submit a claim, we can obtain reimbursement within a week, whereas with snail mail, it would take six to eight weeks.

My patients have also taken note. Not only does the EMR increase the quality of care I provide and reduce possible medical errors, my patients are interested in the advancing technological aspects of the office. When they see the electronic notepad and docking stations, they always ask if I'm going high-tech. They see the difference and their reaction has been nothing but positive.

Initially the EMR increased my workload. But, the opportunity the EMR provides to reduce medical errors and guard against potential drug interactions outweighed the extra time I expended in the beginning. I am always looking for ways to reduce the potential for medical errors, and that is one of the main reasons for the EMR.

Despite the benefits, it's estimated that less than one-quarter of physician practices in the United States have invested in EMRs. As our office has been automated only six months, I have had few opportunities to discuss the changes with my colleagues. Those with whom I have spoken have been positive and expressed interest in an EMR at some point in the future.

I believe the challenge for other medical practices that do not currently use an EMR will be time. Like anything, there will be a leveling factor. Physicians who want to implement an EMR will be given the opportunity to do so, and it will become cost effective for many at that point. Unfortunately, as medical students, we were never taught to treat our practice as a business. But if we fail as a business, we fail our patients in being able to stay in practice for them. TCQ

Dr. George Saleh

Creekwood Women's Care LLC

Dr. George A. Saleh is a solo practitioner and founder of Creekwood Women's Care in Kansas City, Mo.

Saleh was chairman of the obstetrics department at North Kansas City Hospital in 1985 and 1986 and currently has hospital appointments at North Kansas City Hospital, St. Luke's Northland Hospital and Creekwood Surgery Center. He served on the information technology committees for North Kansas City Hospital and St. Luke's Northland Hospital from 2000 to 2002.

He established Heartland Women's Healthcare in 1981 and practiced there through 2002.

Saleh is a 1972 graduate of the University of Missouri, Kansas City. He received his doctor of osteopathic medicine degree from the Kansas City College of Osteopathic Medicine in 1977, and completed his internship there in 1978. He completed a residency in obstetrics and gynecology at the University of Kansas Medical Center in 1981 and was chief resident in 1979 and 1980.

Among his professional affiliations, Saleh is a member of the American Medical Association, American Osteopathic Association, Arab American Medical Association, Metropolitan Medical Society, West District Osteopathic Association, Missouri Osteopathic Association and a board member of the Metropolitan Medical Health Foundation.

The Adoption Gap: Health Information Technology in Small Physician Practices*

Understanding office workflow can help realize the promise of technology

By Jason Lee, Ph.D.
Director, Research and Policy
National Institute for Health Care Management Foundation

HIT can promote higher quality, lower costs and increased patient and clinician satisfaction. Yet small-practice settings (where the vast majority of patient care is provided) have been slow to adopt HIT products and services. Successful adoption requires close attention to office workflow, or how tasks are organized and resources used to achieve outcomes. HIT improvements in the small physician-office setting are achieved through strong leadership, strategic planning, process re-engineering, change management and customizing IT systems to match and support desired office workflows and healthcare outcomes.

HIT can help reduce medication errors and improve the quality of patient care.[1] It can support increased efficiency in care delivery and cost reductions.[2] There is, however, a sizable adoption gap. Hospitals and large physician practices have adopted HIT at much higher rates than small practices.[3] Only 11.3 percent of practices with 10 or fewer physicians have fully implemented EHRs.[4] This difference in adoption has a practical impact on most Americans. Four-fifths of physicians work in small practices; they account for 88 percent of all outpatient visits.[5] To fully realize the promise of HIT, we must understand and overcome barriers to its adoption in small practices.

On April 5, 2005, the National Institute of Health Care Management (NIHCM) Foundation in Washington D.C., convened a panel of leading national experts—practitioners, consumer advocates, researchers, consultants, vendors and policymakers—to gain insight into HIT adoption in small practices.[6]

Although NIHCM acknowledged the importance of financing and interoperability issues, we chose to focus on the critical but neglected topic of office workflow and how it is facilitated or hindered by IT.

We defined workflow as the interaction patterns among a practice's staff as they fulfill tasks and produce outcomes using available resources.[7] This brief report summarizes key themes arising from expert panelists' HIT experiences and identifies open issues.

Lessons from the field

The universe of small physician practices encompasses diverse delivery systems with complex workflows that are poorly addressed by standardized HIT systems. Classifications of practices by clinical specialization or size may need to be expanded to include such factors as the patient population served, dynamic reimbursement models, whether the practice belongs to a managed care plan, and staffing. These sources of heterogeneity highlight workflow differences in small practices and have important implications for the widespread integration of HIT systems. Small-practice heterogeneity also renders it difficult to make standardized recommendations about optimal system design of HIT products and services.

Tough questions

Customization vs. mass production.
Given the large number and variety of practices, panelists noted a tension between the need for inexpensive, mass-retail systems and the need to tailor HIT products to meet the needs of individual practices. "Stripped-down" hospital IT systems were not seen as the answer. Opinions differed widely regarding systems implementation strategies: should HIT be implemented in small practices all at once or piecemeal; should clinicians be allowed to participate on their own schedules; should financial incentives be used to encourage timely adoption; should training be on or off site, and are dedicated technologists necessary for success. (Relative to large settings, small practices have far fewer technology-support resources.) Panelists agreed that HIT must match and support the desired workflow.

Automation vs. transformation.
Some panelists were particularly concerned about the widespread perception that IT integration is merely a matter of automating current practices. They advised system redesign to fulfill goals such as using HIT to simplify processes for patients, providers and clinical staff; encouraging HIT adoption by adapting systems to current workflows; and solving primary concerns. Panelists warned that quality improvement was not an automatic consequence but needed to be explicitly considered. They emphasized the need for "future visioning" as a precursor to adopting new technology: "I don't think it can be overstated, how important it is to focus on the vision, not of universal IT adoption, but of healthcare delivery transformation. If we put a computer on every physician's desktop and digitize our current health system now, we will have failed miserably," said Peter Basch of MedStar Health.

Robert Wah of TRICARE put it this way: "Make sure you know what you need to do your job better, to make your clinic run better, before you go and embrace a technology. Oftentimes we see … this showroom syndrome: Providers go to a big meeting, and they come back with the biggest, brightest, shiniest box … and they think this is going to solve all of their problems, without really thinking about what they need. And then they open the box and find out that it doesn't do what they want it to because they haven't really thought about what they needed."

Organizational change management.
HIT adoption requires more than structuring, designing or buying a system. It involves organizational change, which requires strong leadership, clear formation of objectives, solving existing organization and interpersonal problems, and establishing psychological ownership from all staff. According to Nancy Lorenzi of Vanderbilt University, sabotage rates on hospital information systems are as high as 35 percent. Communication and active change management are keys to cultural

* *Reprinted with permission from* Health Affairs, September/October 2005, Vol.24, No. 5

change. Panelists noted that organizational change must be motivated, for instance, by a "killer application" that all clinicians will want to use and by creating appropriate and effective incentives that help move small practices toward higher quality and efficiency.

Benefits to diverse stakeholders. Well-integrated HIT has the potential to greatly improve patient care. Panelists who successfully made the leap to HIT described immediate and long-term gains for their clinicians, consumers and the public health system. In the short term, patients and clinicians appreciated the greater flexibility and efficiency in scheduling, communication, prescribing, disease management, chart review and education. Practices that redesigned their workflows discovered fewer interruptions and a natural ability to deliver comprehensive care, including preventive services. Clinicians who had successfully integrated HIT systems stressed their ability to better address patient concerns.

According to Richard Baron, a Pennsylvania internist, "We don't know the answers to the questions [patients] ask, and patients, I think, increasingly expect us to know, because of their experience [with] technology in every other aspect of their lives … I think the goal is being able to meet visions and expectations, competently."

Before the long-term benefits of HIT in the small practice can be realized, panelists believed that additional central issues must be addressed. For example: What is the role of medical specialty organizations in promoting HIT adoption? How can small practices be supported, in a scalable fashion, as they make the transition to HIT? How will data stewardship concerns be addressed? Ultimately, the panel looked toward a transformed healthcare system in which consumers participate in health self-management through their personal health record; clinicians experience greater work satisfaction because they can access the knowledge they need; and the public health system, through regional integration, is able to facilitate higher quality care. TCQ

1 Institute of Medicine, *Crossing the Quality Chasm: A New Health System for the Twenty-first Century* (Washington: National Academies Press, 2001).

2 U.S. Government Accountability Office, *HHS National Health IT Strategy*, Pub. No. GAO-05-628 (Washington: GAO, May 2005), 16.

3 A.M. Audet et al., "Information Technologist: When Will They Make It into Physicians' Black Bags?" *Medscape General Medicine* 6, no. 4 (2004), www.medscape.com/viewarticle/493210 (29 June 2005; registration required).

4 D. Gans et al., "Medical Groups' Adoption of Electronic Health Records and Information Systems," *Health Affairs* 24, no. 5 (2005): 1323-1333.

5 D.A. Woodwell and D.K. Cherry, "National Ambulatory Medical Care Survey: 2002 Summary," Advance Data from Vital and Health Statistics no. 346 (Hyattsville, Md.: National Center for Health Statistics, 2004); and American Medical Association, *Physician Socioeconomic Statistics, 2000-2002 Edition* (Chicago: AMA, 2001).

6 Conference participants, in addition to the authors, included Clay Ackerly, Centers for Medicare and Medicaid Services; Peter Basch, MedStar Health; David J. Brailer, U.S. Department of Health and Human Services; Carolyn Clancy, Agency for Healthcare Research and Quality; Carol Cronin, consultant; Michael Fleming, Family Doctors; Melinda Jenkins, Columbia University; David Kates, WebMD Practice Services; Charles Kennedy, WellPoint Inc.; Nancy Lorenzi, Vanderbilt University School of Medicine; Robert H. Miller, University of California, San Francisco; Simon Samaha, Copper Health System; Warner Slack, Harvard Medical School; Joseph Smith, Arkansas Blue Cross and Blue Shield; Susan Thomas, GE Healthcare Technologies; Robert Wah, Office of the Secretary of Defense/Health Affairs; and Robert Williams; Deloitte Consulting.

7 J. Lee and A. Shartzer, "Health IT and Workflow in Small Physicians' Practices," April 2005, www.nihcm.org/AHRQ-QandA.pdf (2 August 2005).

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Lee has served as principal investigator on grants for Robert Wood Johnson Foundation, Agency for Healthcare Research and Quality, the National Library of Medicine, Kaiser Permanente and AcademyHealth. He has extensive work experience on Medicare, Medicaid and public health issues, and is a nationally recognized expert on managed care, health insurance, healthcare quality and healthcare reform.

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