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INSIDE IE EDGE

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CPOE Snapshot

EXECUTIVE SUMMARY

We've been talking about CPOE for what seems like a long time, however, it's clear as an industry we're still in the early adopter phase. Fewer than one in five of hospitals over 200 beds have implemented CPOE in a meaningful way and the number shrinks to one in 10 when you consider all hospitals. But, oh, those early adopters, many of whom are member organizations of Scottsdale Institute. We've learned much from them—and, thankfully, so have the HIT vendors.

This issue of IE captures our traditional snapshot of CPOE as a work in progress and we do it with the help of some keen insight. None is keener, of course, than David Bates, MD, the guru of quality and patient safety from Partners Healthcare in Boston, who discusses his latest study which projects the benefits of CPOE for community hospitals. We also talk to Robert Mandel, MD, of pioneering health plan Blue Cross Blue Shield of Massachusetts, which has said hospitals must have CPOE by 2012 if they want to participate in its incentive programs.

David Classen, MD, of consultancy CSC, a long-time expert source for us, describes the CPOE evaluator tool, which the Leapfrog Group released in April. The CPOE Simulator, which is the first tool of its kind to certify software *after* implementation in the hospital, was used by Northwestern Memorial Hospital in a test by David Liebovitz, MD, who sheds light on the experience as an organization that has always been an early, early adopter, in the best sense of the word. Rounding out our insightful panel is Kent Gale of KLAS, which has conducted studies of CPOE since 2003, and Glenn Crotty, MD, of Charleston Area Medical Center, who is about to flip the switch on CPOE after a two-year delay as the vendor stabilized the product.

Consider this a snapshot of CPOE as it grows up.

Wrangling ROI for Massachusetts community hospitals

A groundbreaking study conducted earlier this year of Massachusetts community hospitals found that CPOE could prevent more than 80 percent of adverse drug events (ADEs) and could achieve an ROI in only two years. The study, sponsored by the Cambridge, Mass.-based New England Healthcare Institute (NEHI) and Westborough-based Massachusetts Technology Collaborative (MTC), evaluated six community hospi-

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Spring Conference 2009
April 29-May 1, 2009
Camelback Inn,
Scottsdale, Ariz.

Fall Conference 2009
Hosted by Texas Health Resources
Sept. 24-25, 2009
Fort Worth, Texas

Spring Conference 2010
April 14-16
Camelback Inn,
Scottsdale, Ariz.

Fall Conference 2010
Hosted by Intermountain Healthcare, Salt Lake City, Utah

SCOTTSDALE INSTITUTE

Membership Services Office:
1660 Highway 100 South
Suite 306
Minneapolis, MN 55416
T. 952.545.5880
F. 952.545.6116
E. scottsdale@scottsdaleinstitute.org
W. www.scottsdaleinstitute.org

tals in the commonwealth and projected the impact of CPOE adoption at those institutions.

David Bates, MD, Chief, General Medicine, Brigham and Women's Hospital, Boston

"The relevance of this study is that community hospitals can reap clinical and financial returns from CPOE," says study leader David Bates, MD, chief of the division of general medicine at Brigham and Women's Hospital (Partners HealthCare) in Boston and professor of medicine at Harvard Medical School. In a previous study Bates found that a large academic medical center can achieve an ROI with CPOE, however until now the same case couldn't be made for CPOE at community hospitals because the latter face a very different set of issues, he says.

For one thing, the rate of errors is higher in community hospitals compared to a rate of six to seven per 100 in academic medical centers. (No one knows what the national average is, Bates says.) Also, the proportion of preventable errors is higher: whereas a third of errors were preventable in academic medical centers, two thirds were preventable in community hospitals, he says. (The figure jumps to 81 percent when you include kidney patients.)

"Community hospitals tend to be smaller—ranging in this study between 100 and 300 beds—and not have house staff. Also, the vendor applications they use are different. The vendors that target community hospitals typically have less functionality and flexibility," says Bates.

One in every 10

The clinical study found that one in every 10 patients admitted to a Massachusetts community hospital suffered a preventable ADE. Each ADE can result in an average 4.6 days of additional hospitalization. Only 19 percent of ADEs would not be preventable by the adoption of a robust CPOE program.

The financial analysis determined that the average one-time cost for buying and installing a CPOE system is $2.1 million and the annual operating costs amount to $435,914. However, the average hospital could receive payback on the cost of installing a CPOE system in 26 months. With a fully implemented CPOE, the average community hospital could reduce annual operating costs by $2.7 million with an annual net payer benefit of $900,000.

The report concluded that Massachusetts hospitals could prevent 55,000 ADEs per year and save $170 million annually if they all had fully implemented CPOE systems.

Bates breaks ADEs into two basic categories: overall ADEs and those associated with renal insufficiency. The first group includes cases in which patients have reactions to penicillin, for example, unaware they had such an allergy. In the future, he says, we'll be able to prevent

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October 15
Identity Theft Red Flag Rules
- Rebecca L. Williams RN, JD, Davis Wright Tremaine, Seattle
- Brent R. Eller, partner, Davis Wright Tremaine, Seattle

October 16
Closed-Loop Processes to Facilitate Transparency and Enhance Patient Safety
- Donna Willeumier, administrator, Safety and Regulatory Compliance, Advocate Health Care, Oak Brook, Ill.
- Kate Kovich, director, Patient Safety and Regulatory Compliance, Advocate Health Care, Oak Brook, Ill.

October 22
The Legal EHR: Definitions and Beyond
- Barry S. Herrin, FACHE, Smith Moore Leatherwood, LLP, Atlanta

October 23
Making Inroads with Speech Recognition
- Ben Brown, research director, KLAS Enterprises, Orem, Utah

more events on next page

such events by incorporating genetic-testing results into CPOE and therefore predict who will benefit from certain drugs and who will not.

Community hospitals should go CPOE

The study established cost savings mostly from reduced length of stay. "There are more costs than that, but that's the bulk," says Bates, adding that the analysis found that most of the savings—70 percent—go to hospitals. He says the average community hospital has access to CPOE and can benefit from it. "All the vendors in this space have developed CPOE and it's reasonably robust. The ROI analysis suggests all hospitals will benefit. The exception might be very small—less than 100 beds."

Bates cautions that CPOE results occur over time. "We didn't assume you'd get all the benefit in year one. It's very challenging. You have to have a good implementation and also monitor how you're doing. Nobody gets them all right out of the box. One thing the NEHI/MTC collaborative is doing is bringing together hospitals across the state to share best practices in this area. It's a good model."

He says the biggest impediment to CPOE implementation is that hospitals lack access to capital; the second, the complex issue of sorting out what clinical decision support (CDS) is required. A third obstacle is the shortage of IT-trained personnel: All organizations need a group of clinicians—physicians, nurses and pharmacists—who understand CPOE. Again, collaborative approaches—like that of the American Medical Informatics Association's 10X10 program (whose goal is to train 10,000 informatics professionals by 2010)—are helpful in assisting hospitals achieve that goal, Bates says.

Nick King, VP, Communications, NEHI, Cambridge, Mass.

NEHI
New England Healthcare Institute

CPOE has become a focus of NEHI, a five-year old non-profit created by local healthcare leaders to facilitate dialogue among all the disparate players in the healthcare industry and drive change through evidence-based research. "CPOE is the poster child for what we do," says Nick King, NEHI's VP of communications. A NEHI-sponsored report in 2003 identified seven key technologies that could advance quality and reduce medical errors. "CPOE rose to the top of the list," he says.

The study has already contributed to policy change. Shortly after publication, Blue Cross and Blue Shield of Massachusetts and Tufts Health Plan announced they'd require hospitals to have CPOE by 2012 in order to participate in their quality incentive programs. Subsequently the Massachusetts legislature passed a law requiring hospitals to have CPOE as a condition of licensure. "It's a carrot and stick approach in one state," says King. [The report, "Saving Lives, Saving Money," is available at www.nehi.net.]

Upcoming Events continued

October 28
Maximizing Service Response and Nursing Efficiency through Family Involvement
- Aliza Koenigsberg, administrative director, Children's Service Line, Morgan Stanley Children's Hospital of NewYork-Presbyterian, Komansky Center for Children's Health
- Joseph McTernan, director of operations, Morgan Stanley Children's Hospital of NewYork Presbyterian/ Columbia University Medical Center

November 5
Clinical Systems Benefits Measurement and Realization
- Doug Thompson, director, Navigant Consulting, Chicago

November 12
Are Integrated ED Solutions Overtaking Best of Breed Products?
- Jason Hess, research director, KLAS Enterprises, Orem, Utah

November 14
Impact of Patient Involvement in their Care
- Kathy Pereira-Ogan, RN, director, Service Excellence and Patient Satisfaction, Christiana Care Health System, Wilmington, Del.
- Kristen Lindsey, project leader, Department of Information Services, Christiana Care Health System, Wilmington, Del.

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Progressive plan

Blue Cross Blue Shield of Massachusetts has a history of pushing the envelope when it comes to quality and efficiency and seems to have been given a near-perfect playing field to do that, given its culturally progressive culture, geographically small area and powerful academic medical centers in Boston. Also, about 2.5 million of its three-million members live in the commonwealth, a hefty portion of its 6.5 million total population. That's why it seized on the "Saving Lives, Saving Money" study as a reasoned basis for requiring hospitals to have CPOE by 2012 before they can participate in incentive programs.

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MASSACHUSETTS

Robert Mandel, MD, VP, Healthcare Services, Blue Cross Blue Shield Massachusetts, Boston

"We've been very supportive of HIT in general," says Robert Mandel, MD, VP of healthcare services for Blue Cross Blue Shield of Massachusetts, by providing incentives under P4P for both hospitals and physicians and donating $50 million to the Mass eHealth Collaborative to fund EHRs and build a health information exchange among physicians in three communities in the commonwealth. "We believe HIT is essential to successfully transforming the healthcare system," he says.

"We can probably get to 75 percent of the way there with existing technology, but to get all the way there we need an EHR or comprehensive medical record and CPOE," says Mandel. "When that study came out we thought it was a very compelling case for CPOE. It was hard for us to think about why we wouldn't encourage adoption of CPOE. We decided not to make it, at least initially, a requirement for network participation. But given the focus of our incentive programs on improving quality, it seemed only appropriate to make CPOE a requirement for participation in these programs. Our incentive programs can have a significant impact on an institution's financial well-being, considering that hospitals' margins in Massachusetts are so low."

The Mass Blues' incentive programs focus on a variety of quality measures supported by the Institute for Healthcare Improvement's (IHI) *100,000 Lives* and *Five Million Lives* campaigns as well as CMS core measures. Mandel says the health plan, which typically engages hospitals in three-year contracts, has found that those hospitals can garner 3 to 4 percent and sometimes up to 9 percent of their revenue from incentives. "We account for about 25 percent of a hospital's patients, but more than that of their revenue. Our incentives amount to a significant amount of money," he says. Mass Blues contracts with all 72 of the commonwealth's acute-care hospitals, about 55 of which have not yet implemented CPOE.

Mass Blues has delegated certification of CPOE capabilities and implementation criteria to the Massachusetts Hospital CPOE Initiative, a coalition sponsored by NEHI, MTC, the Massachusetts Hospital Association and the Massachusetts Council of Community Hospitals. "If they want to direct hospitals of fewer than 50 beds to adopt a CPOE lite, for example, we'd follow that directive," says Mandel.

CPOE Simulator

CPOE has become a key objective in employers' demand for quality, standards and accountability across the healthcare delivery system. That's why the Leapfrog Group in April released its long-awaited CPOE Simulator tool, which certifies that CPOE meets its standards *after* it has been implemented in a hospital setting. Hospitals must have at least one unit actively using CPOE to qualify to take the online survey and will be able to get detailed performance scores back before Leapfrog will begin making the overall test scores public April of next year.

David Classen, MD, Senior Partner, CSC, Falls Church, Va.

"They'll get credit, Leapfrog will acknowledge they have taken the test," says David Classen, MD, senior partner at consultancy CSC and CMO of its healthcare sector practice who helped develop the simulator tool. "They get very detailed results."

Classen says the web-enabled (downloadable from the Leapfrog Group website), self-assessment tool is based on the principles of a flight simulator. "You enter scripted test cases and test orders. It sees how well your system picks up the problematic scenarios. It's focused on CPOE and decision-support capability," he says, adding that there are 13 separate categories for assessment. The survey is free of charge and takes no more than eight hours total to complete. Institutions will be able to retake the test every six months and have scores updated every year, so they'll have the opportunity to apply lessons from simulator feedback and enhance their CPOE system.

The significance of the simulator, says Classen, is that it recognizes how software systems change once applied to the real medical environment. "What we've learned by studying implementation of EMRs is that there's a huge difference between what a product looks like on the shelf and what ends up after being implemented. This is the first test anywhere in the world that tests actual medical software after implementation and evaluates its safety. We searched the globe," he says.

For example, how well a system performs drug/diagnosis contraindications for pregnant women can vary widely depending on the particular hospital environment. Other examples: how well a system dose-adjusts medications for children; pick up cross-allergies with a drug; or reminders to give aspirins to AMI patients.

"What we've learned by studying implementation of EMRs is that there's a huge difference between what a product looks like on the shelf and what ends up after being implemented. This is the first test anywhere in the world that tests actual medical software after implementation and evaluates its safety. We searched the globe."

Classen says the Leapfrog Group is pleased with the response. "More than 100 hospitals have actually used this tool, about triple what we expected in its pilot year. We'll be publicizing how effective hospitals find it."

Northwestern passage

"Nothing happens to the patient without going through the filters of CPOE and decision support, except for our ER and intra-operative orders."

When you're testing a new tool like the CPOE evaluator, it's nice to have a powerhouse tester like Northwestern Memorial Hospital in Chicago, which has been using CPOE enterprise-wide for four years. "Nothing happens to the patient without going through the filters of CPOE and decision support, except for our ER (pending implementation in November) and intra-operative orders," says David Liebovitz, MD, chief medical information officer for the Northwestern Medical Faculty Foundation and medical director for IS for Northwestern Memorial Hospital.

Northwestern Memorial Hospital

David Liebovitz, MD, CMIO, Northwestern Medical Faculty Foundation, Chicago

In addition to 1,500 physicians and 625 residents, most of whom are not employees, Northwestern Memorial employs 6,747 people, including 2,281 nurses and 73 pharmacists who serve more than 43,000 inpatient admissions and nearly 440,000 outpatient visits a year, all with a whopping 83 percent of medication orders entered directly by providers.

[The benefits of Northwestern Memorial's CPOE and other IT-enabled initiatives are highlighted in presentations from SI's Fall Conference, hosted by Northwestern Memorial Health Sept. 25-26, and are available at www.scottsdaleinstitute.org. Click on "Conferences" under "Members Only."]

Northwestern Memorial tested the CPOE evaluation tool in mid-summer. "We did as we had expected in areas that we have robust decision support and we did well with avoiding nuisance alerts," says Liebovitz. "It was consistent with our philosophical approach, which is to achieve an effective signal-to-noise ratio for physicians—not overburdening them with alerts—while providing other guidance that makes doing the right thing the easy thing."

It took an IT team to build the technical content to populate the test-patient sections of the CPOE test, a clinician to submit the answers and an observer to record everything that was done. While the planning and preparation for the test took about a day, Liebovitz says it took him only about 40 minutes to enter the data. Once the tool is downloaded a time limit is imposed for inputting patient demographics, problem list, lab results, medications and allergies for multiple patients. Scripts must be followed and different decision-support interactions are measured.

It's within those complex interplays that the CPOE tool is likely to improve over time as more and more organizations use it. "It's difficult for any single tool to reflect all the different levels of clinical

decision support each organization has developed. We may chart a course for a particular drug dosage, for example, for which we may or may not provide an alert because we've mitigated the risk in other ways," but the Leapfrog test may look for an alert at that point, he says.

Despite the gaps, the CPOE evaluation tool fills an important need. "This is an enormously valuable tool and it will evolve. I absolutely encourage this for organizations to use in their own internal development and to also have a baseline assessment based on other organizations' CPOE evaluations," says Liebovitz.

Not yet a tipping point

KLAS, an Orem, Utah-based firm that researches HIT-vendor performance, released a study of CPOE in February which found that 17.5 percent of hospitals with more than 200 beds were doing some level of CPOE in 2007. "For all hospitals, the number is much smaller—less than 10 percent," as only 6 percent of hospitals under 200 beds use CPOE, says Kent Gale, chairman and founding partner of KLAS. "However, the overall number of hospitals is steadily climbing," as the report found that the 9.6 percent of hospitals doing CPOE was a jump from 6.8 percent the previous year and a leap from the 3.5 percent in a study published in 2003.

Whether that steady progress will reach a tipping point any time soon is anybody's guess. "Some people say the only way to get CPOE implemented throughout the hospital industry is to mandate it. Teaching hospitals are much higher in their rate of CPOE use," he says. Of the nearly 500 hospitals across the United States and Canada that have implemented CPOE in the KLAS study, 303 were teaching hospitals and 183 were non-teaching hospitals. There was a 7 percent rise in the number of hospitals making it mandatory for physicians as part of their credentialing. "It's becoming more common to make CPOE mandatory," says Gale, noting that 62 percent of the most active CPOE users require CPOE use by their physicians, something that is nearly always sponsored jointly by the hospital and its medical staff—so it's a requirement rarely if ever foisted by the hospital onto doctors.

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Kent Gale, Chairman, KLAS, Orem, Utah

According to KLAS, of the 472 U.S. hospitals live with CPOE, 229 reported "deep" physician use—meaning more than 85 percent of their physicians were using CPOE—295 had more than 50 percent of potential orders entered by physicians, and 97 percent were entering at least some medication orders electronically.

CPOE is still a work in progress even for those hospitals that have it live: 21 percent of hospitals doing CPOE reenter the physicians' medication orders in phar-

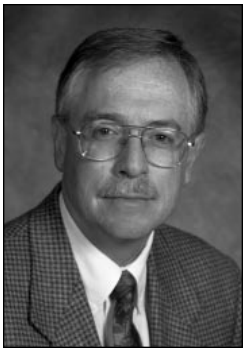
Nearly 18 percent of hospitals with more than 200 beds were doing some level of CPOE in 2007. For all hospitals the figure was only 6 percent.

macy, meaning that the nurse prints out the electronic order from the physician and then reenters it into the pharmacy information system. "That's due to the challenge of solid interfaces and integration with pharmacy. We're still not perfect," says Gale. Still, that's progress: nearly half were reentering pharmacy orders the year before.

CPOE does the Charleston

After five years of preparing for CPOE, including engagement of formal physician and resident committees, Charleston Area Medical Center (CAMC) in Charleston, W.Va., will finally begin installing its clinical orders module in 2009. "Siemens switched to the Soarian suite, which has slowed us up," says Glenn Crotty, MD, executive VP and COO at CAMC. "We were waiting for the Soarian system rather than migrate over from the vendor's previous system. We told Siemens last fall, 'Get us a platform due to our hospital size and complexity that's stable enough to do CPOE.'"

Once installed, select members of those clinical committees will begin work in a special CPOE test environment, evaluating order sets for conditions like sepsis and AMI that were designed with CPOE in mind. CAMC derived its order sets from a variety of sources. "Some of them we borrowed from folks in our network, IHI and Premier. The committees went through 10 or 14 revisions before they came to a reasonable agreement," says Crotty, who says he feels confident the university faculty and students are ready and willing to use it. "They keep asking, 'When are we going to start?'"



Glenn Crotty, MD, VP & COO, Charleston Area Medical Center, Charleston, W.Va.

CAMC has learned some valuable lessons in the last five years. For one, it's been critical to get the product to a point in the test environment that won't be too cumbersome to use and "won't crash when they're looking at a chart with labs and x-rays. Before, there just wasn't confidence. I said there's no reason to go off that ledge," he says. The vendor has since developed more mature versions of the software that allow single-sign-on for physicians. "It's now stable enough—there's enough scalability—to serve all 1,700 of our nurses and 1,000 physicians," says Crotty. That factor was validated in the test lab, where a subset of physicians and residents tested the system to see if they could stay on and that it flowed adequately. They also tested it to see that there were no glitches when they connected to other vendors' lab and radiology systems.

Crotty expects CAMC will move the CPOE system from the test lab to live production by next summer. "It's two or three years behind schedule and that's related to the stability of the system, a function

CAMC has learned some valuable lessons in the last five years. For one, it's been critical to get the product to a point in the test environment that won't be too cumbersome to use and "won't crash when they're looking at a chart with labs and x-rays. Before, there just wasn't confidence. I said there's no reason to go off that ledge."

of the vendor's product," he says, but CAMC has received discounts from the vendor because it's early in the adoption of the new product, which includes every module and will cost the health system $30 million over a 10-year period, which has another five years to go. Still, CAMC will save $500,000 compared to its previously projected spending on a best-of-breed strategy, Crotty says. (The Soarian product has been used in other hospitals, but prior to CAMC had not been tested on the scale of a 400-bed hospital.)

Conclusion

As CAMC stands on the threshold of its CPOE rollout, the issues of benefits measurement and physician adoption begin to stand out. For the first, health systems are increasingly confident that studies like the one by David Bates highlighted above validate their CPOE initiatives.

Crotty for one cites as a guide the experience of Vanderbilt Medical Center in Nashville, Tenn., which was able to use CPOE to cut duplicate lab and x-ray ordering by a whopping 40 percent. "In our system we have three or four ways to order hemoglobin and the charge is fairly equal," and CPOE's decision support tools will eliminate the confusion and duplication that results from that ordering complexity.

Physician-adoption strategies will likely vary depending on where an organization is in its CPOE journey and the type of physician model it employs. Says Crotty: "We have decided not to make this mandatory for all the medical staff. Not all staff are employed; some are consultants, some circuit riders. Older physicians don't want to touch it. So, we're thinking it through until we get the system acceptable for use, so they'll want to use it rather than having to force them to use it. Some places make it mandatory after awhile. I think you go further with carrots and incentives rather than sticks and tar."

"I think you go further with carrots and incentives rather than sticks and tar."

Advisors
Paul Browne, Trinity Health
David Classen, MD, CSC
George Conklin, CHRISTUS Health
Amy Ferretti, Carefx
Deborah Gash, Saint Luke's Health System
Tom Giella, Korn/Ferry
Steve Heck, Navigant Consulting
Nick Hilger, Ingenix
Marianne James, Cincinnati Children's Hospital Medical Center
Jim Jones, Hewlett Packard
Thanos Karros, Exogen
Gilad Kuperman, MD, New York Presbyterian Hospital
Adam McMullin, Hill-Rom
Mitch Morris, MD, Deloitte LLP
Patrick O'Hare, Spectrum Health
Jerry Osheroff, MD, Thomson Reuters
Brian Patty, MD, HealthEast
M. Michael Shabot, MD, Memorial Hermann Healthcare System
Joel Shoolin, DO, Advocate Health Care
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