You've Led the Horse to Water, Now How Do You Get Him to Drink: Managing Change and Increasing Utilization of Computerized Provider Order Entry

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ABSTRACT

Community hospitals served by predominately private-practice physicians face difficult challenges in implementing computerized provider order entry (CPOE), but there are techniques and incentives that can be employed to change physician behavior. Various techniques were used to increase CPOE utilization at Lehigh Valley Hospital, a three-campus, 750-bed tertiary community hospital in eastern Pennsylvania. Those techniques included presenting studies supporting CPOE as a way to improve patient care, recognizing support with small trinkets, providing individual access to computers, adding clinical decision support, and bringing peer pressure to bear. Ultimately, financial compensation for the educational time required to learn to use and become proficient with the system was employed and had the greatest impact on behavior. Measuring utilization of the CPOE system with data extracted from the hospital's clinical information system, CPOE utilization by physicians increased to 57 percent from 35 percent after a financial compensation program was initiated. Utilization declined to 42 percent several months after completing the first phase of the program and increased to 54 percent after a second phase was initiated.

KEYWORDS

■ Computerized provider order entry (CPOE) ■ Change management ■ Implementation ■ Incentives ■ Patient safety ■ Physician behavior ■ Physician utilization

Introduction

In the wake of the groundbreaking report, To Err is Human, by the Institute of Medicine,[1] hospitals are struggling to find ways to improve the safety of our healthcare delivery system. Documenting as many as 98,000 deaths every year from avoidable medical errors, the report cites information technology as an important tool to reach the goal of decreasing medical errors by 50 percent by 2005. When implemented effectively, computerized provider order entry (CPOE) can enhance the quality and efficiency of patient care and help prevent harm.[2]

The President's Information Technology Advisory Committee released a report to the President, entitled, "Revolutionizing Health Care Through Information Technology,"[3] in June 2004. One of the four essential elements of the framework for a 21st century healthcare

information infrastructure includes, "computerized provider order entry, such as for tests, medicine, and procedures." It is clear that the impetus for CPOE now is coming from both the private sector and the government.

Efforts to implement information systems in clinical settings are not always successful.[4,5,6,7] Dr. Reed Gardner, a prominent researcher in the use of information technology in healthcare, believes that the success of a healthcare IT project "is perhaps 80 percent dependent on the development of the social and political interaction skills of the developer and 20 percent or less on the implementation of the hardware and software technology."[8] CPOE implementation faces additional challenges because it requires that the physician must actually interact with the system; technology alone cannot drive the change in the organization.[9]

Lehigh Valley Hospital, a 750-bed academic community hospital in Pennsylvania, began implementing CPOE in June 2001. Since then, the facility has implemented CPOE on all medical-surgical units and several critical care units across three sites. More than 370 physicians and 260 residents have been trained and are using the system. The facility believes that its experiences in implementing CPOE in a community hospital with a private-practice environment and limited housestaff coverage are unique and should be shared. They might provide learning for similar hospitals considering CPOE implementation.

Critical Success Factors

Despite published evidence of the benefits of CPOE, it is estimated that less than 5 percent of U.S. hospitals have successfully implemented CPOE, and the majority of those hospitals are academic teaching hospitals that are staffed predominately by residents and employed physicians.[10] Obtaining buy-in from an employed physician force presents less of a challenge than that faced in a community hospital setting, where most of the physicians are independent contractors and many are on staff at several hospitals. These physicians have the leverage to "take their patients elsewhere" if a hospital presents them with an unfriendly or inefficient environment.

There are many models of change management that address the various aspects of behavior and environment that must be managed for successful change to occur. A model that seemed appropriate to the case at Lehigh Valley Hospital comes from the work of Greg Shea, PhD., of Shea and Associates Inc.[11] In this model, there are eight spheres of influence or work systems that drive change in individuals and their organization. These include the organization, decision allocation, information distribution, measurement, rewards, people, tasks, and workplace design. According to Shea, at least four of these areas must be addressed for change to occur, and the likelihood of success increases as more areas are addressed. Five or six of these work systems were addressed at Lehigh Valley in efforts to change physician behavior.

Commitment and Awareness

The commitment to CPOE at Lehigh Valley Hospital Health Network (LVHHN) originated at the highest level of the organization. In response to the IOM report, its board of trustees asked the CEO and administrative leadership to explore the use of CPOE as a mechanism for expansion of the existing patient safety programs leading to further reduction of medical errors.

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Early in the planning, a physician champion was recruited to lead the project. This physician had a dual reporting relationship to the CIO and senior vice president for quality and care management. The physician champion had strong clinical skills, a good reputation among the medical staff, and experience in leading physicians through difficult change processes. He also had a strong background in computer science, strong interpersonal skills, and a good grasp of organizational behavior principles.

A CPOE coordinating group was established to provide project oversight and to support the physician champion, with particular focus on identifying and managing areas of resistance and building physician support. The committee included the physician champion, the CIO, chief medical officer, the senior vice presidents of care management and nursing, the past president of the medical staff, the president of the LVHHN Physician Hospital Organization, and other key physician leaders.

Creating the Burning Platform

The case for the value of CPOE was presented to the physician community in written and verbal format early and often in the process. This included published studies from other institutions that documented reduction of errors through the use of CPOE. The goals of the CPOE project at LVH, to improve the quality and efficiency of patient care, were emphasized in all discussions.

Additional incentives for physicians to enhance their acceptance of CPOE included:

- Remote access for reviewing results and ordering.
- Just-in-time decision support, such as alerts for duplicate orders, drug-allergy alerts, drug-drug interaction, maximum single and total dose alerts.

- Fewer callbacks to physicians for clarification of ambiguous, incomplete, or illegible handwritten orders.
- Alerts for physicians about unsigned orders, matched by the capability of online electronic signature.
- Alerts for physicians on abnormal test results and expediting order transmission to ancillary departments.

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In addition, the hospital expected that physicians would increase efficiency through the use of order sets for specific diagnoses and treatment regimens.

End user involvement is a critical factor for success during the design and implementation of CPOE. A CPOE design team was created that was responsible for customization, development of order sets, and creation of graphical user interfaces. This team included physicians from most specialties as well as broad representation from nursing, pharmacy, and ancillary departments. Members of this team were carefully chosen to ensure a wide range of backgrounds, varying degrees of computer literacy, credibility with their peers, ability to work as a team, and a willingness to act as champions of the project throughout the organization.

Consistent, Positive Communication

It is important to maintain communication about the project to the medical and support staff. The message must be consistent and remain positive. The physician champion and CPOE team presented this message multiple times in different venues, including departmental and medical staff committee meetings.

The project's progress also was summarized in written publications such as internal newsletters and the hospital's intranet. The team attempted to build awareness of the system through periodic live demonstrations in high-traffic areas, such as those outside the cafeteria or in the medical staff lounge. These demonstrations were used to solicit feedback and to familiarize the medical staff with the screen design and workflow.

As resistance was encountered, there was a consistent response. The physician champion and the CPOE team were clear that there was no turning back and that the process of using paper for all ordering eventually would be eliminated. When problems were encountered, they were resolved so the project could move forward.

Recognizing that the change process is slow, LVHHN chose not to implement CPOE throughout the entire organization simultaneously. Instead, it decided to use a phased-in approach, rolling out CPOE unit by unit so only a small number of users would be learning the system at any one time and the project team could respond rapidly to questions and make adjustments as needed. Phased implementation also ensured that there would be enough IS staff available to provide one-on-one support for physicians as they learned the system.

The first area selected was the trauma step-down unit. A limited number of physicians, physician assistants, and house staff work on this unit, and some pre-printed order sets were already available and could be easily adapted. The healthcare team on the unit was comfortable with using computers.

In the first phase of the rollout, nursing documentation—medication administration, vital signs, intake and outputs, and other information—was entered into the system, and physicians could view it online. After physicians were comfortable interacting with the computer, CPOE became the next logical step. This unit provided the "learning laboratory" environment that guided rollout in subsequent areas of the hospital. As the project team moved from unit to unit, it was able to evaluate the experience in each unit and incorporate those results into successive phases.

Training and Support

Gaining physician buy-in for a CPOE project is difficult and poses many challenges. Resistant physicians will attempt to find any "cracks in the armor" of the project and capitalize on those issues to build resistance. Thus, providing appropriate and convenient training and ongoing support are important to maintain momentum.

It quickly became apparent that physicians would not tolerate class-based training. Therefore, training was done one-on-one for all physicians and scheduled at the convenience of the physician. This ensured that physicians could not use the lack of training as an excuse to not use the system.

Even after training, physicians continued to have questions. Support was provided on-site 24 hours a day, seven days a week for the first two weeks a unit was brought live and was later reduced based on the rounding patterns of the physicians on the unit. Telephone support, staffed by the CPOE team, remained available around the clock on an ongoing basis. This personalized support was essential for the project to gain momentum and remain credible.

Motivating Physicians to Change

However, flexible training, ever-present support, and customization were insufficient for physicians to change their behavior and totally embrace CPOE. Several other

steps proved to be important in gaining physician support.

Acknowledgment and Recognition. It was anticipated that providing recognition to those physicians who embraced and used the system might have some value. Peer pressure is very strong among physicians, and, in many instances such as adopting best practices and making productivity comparisons, it can significantly affect behavior. However, early in the process, it was discovered that using CPOE was an unpopular position among some of the medical staff. As a result, there was negative reinforcement by the physicians toward those who were known to be advocates of the system. The more popular position for some physicians to take in the medical staff lounge was to criticize the system and boast about not using it.

Tangible Incentives. A combination pen and stylus with the CPOE tag line "CPOE—Pointing Toward Better Patient Care," was given to physicians and residents after they completed training. While the hospital did not encounter any physicians who refused to be trained, the novelty of the pen quickly wore off, and this incentive had no impact on utilization.

Increased Access to Computers. During the introduction of CPOE, a frequent concern raised by physicians was the possibility that there would not be enough computers for their use. Although there are many desktop workstations on each unit, the physicians were concerned that access to computers would be inadequate after the introduction of CPOE. To counter this concern, the number of computers was increased. Four wireless laptop computers on carts were placed on each unit, to be used primarily by technical partners for entering vital signs and by the physicians. In addition, physicians were given access to wireless subnotebook computers, distributed to each physician group based on the number of physicians who did rounds each day in the hospital. The subnotebooks were configured to operate only within the hospital and are stored in individual lockers in the medical staff lounge. They can be used for data retrieval as well as order entry. The subnotebooks are very popular with the physicians, and demand has been high.

Leveraging Clinical Decision Support. Clinical decision support tools are embedded and linked to the system. During an ordering session, the physician will typically be presented with decision support in the form of drug interaction and allergy alerts, including the option to read the appropriate drug monograph, and expert rules, such as Digitalis-potassium interaction and creatinine clearance calculations. The physician also is one click away from access to Web-based data, including Up-To-Date, Micromedix, MD Consult, and links to evidence-based medicine sites. Because CPOE provided education through the physician's reading online information presented through the various CDS tools, it was felt that this could be recognized with continuing medical education credits. Through efforts of the education department, CME now is awarded for training time, attendance at user meetings, and use of the system. The response to this effort was mixed. Many physicians gained the required amount of CME from hospital-sponsored grand rounds and from reading CME-associated journals. However, some physicians appreciated the CME credits and believed it to be a worthwhile effort.

Resident and Peer Pressure. LVH has residency programs in internal medicine, surgery, and family medicine. The residents have been trained with the expectation that they would enter all orders in the CPOE system, and many believed this would generate pressure on the attending physicians. Instead, it became apparent that the residents reacted to cues from the attending physicians; if an attending physician supported CPOE, the residents would be encouraged to enter their orders into the system. However, if an attending physician did not support it, residents would be discouraged from using CPOE. At times, attending physicians would be observed verbally discouraging residents from accessing the system. Thus, without the majority of attending physicians on board, it became more difficult to maintain a critical mass of support among residents.

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Getting Past Inertia

Twenty months after implementation, 80 percent of the active medical staff had been trained, 10 medical-surgical units were live with CPOE, and more than 200 subnotebook computers had been deployed. However, physician utilization of CPOE remained at 30 percent.

One option to increase utilization was to mandate the use of the CPOE system. This had been successful in a very limited number of hospitals and only after the system had been in place for several years. The idea of mandating CPOE was discussed by the oversight group, but it was felt that this was not the most attractive option.

Because of the difficulty in increasing the utilization of CPOE, LVH adopted a radical approach to stimulating support. The Recognition of Effort (ROE) program paid the physicians over a four-month period as recognition for the time and inefficiency involved in learning to use the system. The program was based on the physician achieving specified utilization goals that increased each month of the program. For physicians who employ allied health professionals or have resident coverage, the data used to calculate utilization was a combination of the physicians' with their AHP or assigned residents.

The program was introduced at a general medical staff meeting and later explained in a letter to each trained physician. The support team also was educated about the program and was able to answer questions from the physicians.

Results

As shown in Figure 1 (CPOE Compliance by Month), utilization increased significantly after the ROE program was initiated.

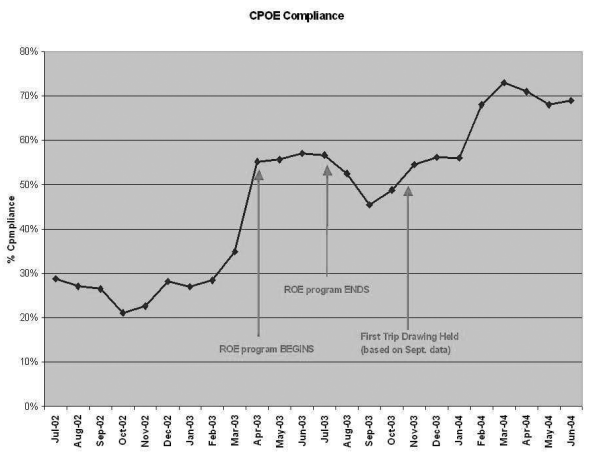

Figure 1. CPOE compliance by month.

It was clear that the ROE program had significant impact on physician behavior, but it is unclear if it was the major stimulus for change or merely represented the tipping point. Several mechanisms were implemented to give physicians incentives for using the CPOE system, and the ROE program was the last one implemented.

The sustainability of utilization provides interesting insights. It is clear that during the first ROE program, utilization increased. There was a statistically significant increase in utilization of $p<.01$ by Fleiss Independent Proportions Test between the months before and after the ROE program was initiated—March and April 2003. There also was a statistically significant decrease in utilization ($p<.01$) between the last month of the ROE program, in July, and the next month, when the physicians were not offered incentives to use the system.

When this became apparent, another program to increase utilization was initiated. Beginning with September utilization data, all physicians who reached a designated threshold of utilization were eligible to win a voucher to attend a CME conference at a destination of their choice. The first drawing was held in late October, based on September data.

After this program was recognized by the medical staff, utilization again began to increase. There was a statistically significant increase in utilization between August and September, the first month when utilization data was measured to allow participation in the drawing. Other factors that may have contributed to this increase included increased pressure on the residents to fully utilize the system, an increase in the number of live units, and the growing number of trained physicians.

The coordinating group has discussed at great length at what point it would be culturally "acceptable" to require CPOE use on medical-surgical floors. The key to mandating use is to identify when utilization of CPOE has become part of the natural work process of the physician. When this has occurred, the decision to mandate the use of CPOE should not meet with any significant resistance.

At the time this article was written, it appears that the tipping point has occurred, and CPOE compliance has achieved stability. The only incentive still in force is the monthly drawing. Despite this, CPOE utilization remains around 70 percent, and discussions regarding mandatory CPOE have begun with the leadership and medical staff. It is likely that mandatory use of CPOE will occur in approximately twelve months. This deadline will give all physicians adequate time to be fully acclimated to the system, and it will provide time to create numerous online orders sets to facilitate use.

Conclusion

Implementing CPOE at a community hospital is an enormous undertaking. It is clearly a large-scale change effort in which the technology plays a small part, and the change in work process is the most significant issue.

Large-scale change efforts require that multiple issues be successfully managed, including organizational support, clear and constant communication, involvement of the appropriate people early and throughout the process, sensitivity to the impact on work process, and the use of reward and recognition commensurate with the degree of change being sought. The PITAC report, "Revolutionizing Health Care Through Information Technology," recommends an approach that considers economic incentives. "One approach that should be studied is that of adopting reimbursement incentive structures that reward the use—rather than merely the installation—of electronic order entry," the report noted.

Lehigh Valley Hospital addressed all these issues, using multiple strategies to overcome resistance and successfully implement a CPOE system in a community setting with private practitioners.

Changing physician behavior requires addressing many areas of work systems and process. Physicians respond on an individual basis to various efforts. One of the strongest incentives to change behavior is recognition of and compensation for the time involved in learning the new system. Once behavior is modified and a critical mass of

users is achieved, incentives no longer are necessary to maintain the behavior.

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