

GAINING MD BUY-IN: PHYSICIAN ORDER ENTRY

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ABSTRACT

Computerized physician order entry (CPOE) eliminates illegible handwriting, reduces medical errors, and improves patient care. The administration, medical staff, nursing, and health information systems departments of a community teaching hospital cooperated to achieve organization-wide use of its CPOE system.

KEYWORDS

*Computerized physician order entry
Patient safety
Clinical information system
Physician training
Physician acceptance
Institute of Medicine report
Multidisciplinary collaboration
Medication errors*

The Institute of Medicine's (IOM) 1999 report, "To Err Is Human: Building a Safer Health System," has been a catalyst for health care organizations to reexamine their care delivery and system processes. The IOM report attributes approximately 7,000 patient deaths annually to the administration of the wrong medicine or the wrong dosage. Further, the study links half of these errors to the prescription ordering process. Mistakes typically occur when a nurse or pharmacist misreads a medication order.¹

Abington Memorial Hospital (AMH) is a fully accredited, not-for-profit, 508-bed, 600-physician community teaching hospital in Abington, Pennsylvania. AMH has always been committed to providing a safe environment for patients. The recent Institute of Medicine reports were

a call to action for renewal of this fundamental pledge.

AMH realized that a computerized physician order entry (CPOE) system was a significant step in improving patient safety. Previously, the physician's use of the clinical information system was voluntary. The medical staff and administration set January 2, 2001, for universal CPOE. The administration, medical staff, nursing and health information systems (HIS) departments were all dedicated to accomplishing this challenging objective.

The administration demonstrated its commitment to this goal by providing the funding necessary for additional workstations and resources. The medical and nursing staff pulled together to teach those physicians unfamiliar with the system. The HIS department trained over half of the medical staff. Also, they added functionality to facilitate physician buy-in to the system.

CPOE eliminates illegible handwriting, reduces medical errors, and improves patient care. This is the first step in a never-ending journey to improve patient safety. Information technology will continue to play a major role in AMH's patient safety initiative.

The Clarion Call for CPOE

Computer physician order entry (CPOE) was cited by the IOM as a fundamental way to reduce clinical errors.² CPOE accomplishes this by ensuring order legibility and minimizing transcription errors. Other benefits associated with the CPOE are increased timeliness and coordination of care, enhanced preventive care, and cost control. Despite the impressive safety gains that can be realized with CPOE, only one-third of hospitals nationwide have installed computerized systems and only 1 percent of these institutions require their physicians to use them.³

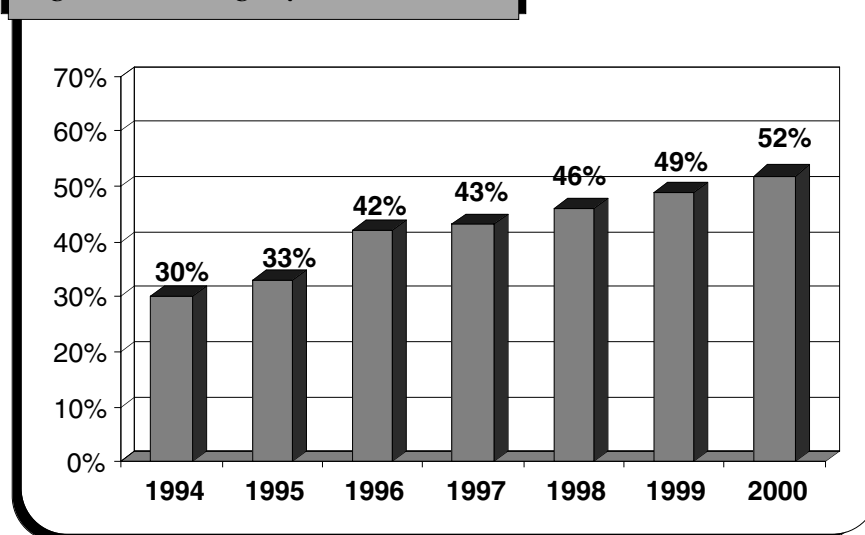
Today, the Leapfrog Group has emerged as another compelling force behind CPOE. Leapfrog is a coalition of 78 corporate giants such as 3M, Eastman Kodak, and PepsiCo who have mobilized their purchasing power to promote major changes in the healthcare system. They do this by channeling patients to hospitals that meet specific safety standards including CPOE, volume thresholds for complex procedures (such as coronary arterial bypass grafting), and the maintenance of intensivist-staffed intensive care units.

According to Leapfrog, these three criteria constitute minimum safety standards for hospitals with the potential to reduce serious prescribing errors by 50 percent.⁴ In summary, proponents of CPOE claim that these systems can:

- Enable organizations to streamline the ordering process
- Expedite patient care
- Eliminate transcription errors
- Reduce study duplications
- Lower the incidence of adverse drug reactions
- Reduce costs by suggesting lower-priced or more effective medications

During the 1999-2000 year, AMH had 26,914 admissions, 4,476 births, 54,137 ER visits, 283,510 outpatient visits and 16,554 short procedure visits. The hospital is configured as a private practice vs. employee model, with only 100 physicians practicing as employees of the hospital. Although AMH has long been committed to ensuring patients the highest level of clinical safety, the IOM report prompted AMH administrators and medical staff to renew this fundamental pledge.

Figure 1. Attending Physician Utilization



Today, AMH is one of a few hospitals that meet most of the Leapfrog Group's criteria with 100 percent of physicians entering orders into the clinical information system. In addition to computerized order entry, the hospital has historically employed 10 board-certified intensivists on its staff, issued a bi-monthly patient safety newsletter, and conducted pharmacy rounds in the ICU.

TDS, a clinical information system, has been in place at AMH since 1992 with functionality including registration, order entry, results reporting, and ancillary documentation. In 1998, a Permanent Patient Record (PPR) module was added to TDS for "life to death" documentation of care. At present, TDS supports the work of 600 AMH attending physicians, 120 residents, 1,900 nursing staff, and 2,000 ancillary staff members. TDS order entry remained voluntary until January 2001. In the year prior to this, only 40 percent of attending physicians opted to use the system. These physicians entered over 50 percent of all medical orders (see figure 1).

From the outset, TDS was designed for maximum usability. The HIS staff subscribes to the maxim that 80 percent of a physician's work uses 20 percent of all possible orders. Using this as a guide, we determined that 80 percent of a physician's orders should be available within two clicks of the Physician Master Guide. To accomplish this, the HIS staff collaborated with the hospital's Physician Advisory Group to conduct a medical

record chart review. This analysis enabled us to determine what orders were common for various diagnoses and led to the development of departmental and personal order sets.

In February 2000, the Patient Safety Oversight Committee set January 2, 2001, as the date for universal CPOE at the hospital in order to realize the substantial safety gains associated with CPOE. This article will discuss measures used to achieve this goal, barriers encountered along the way, and plans to enhance the future of CPOE at AMH.

Hospital-wide Support: A Foundation for Success

Successful implementation of CPOE is contingent upon steadfast administrative support.⁵ Fortunately, AMH's initiative enjoyed the full endorsement of the hospital's two leadership groups: the Patient Safety Oversight Committee and the Physician Advisory Group. These active working groups collaborated to achieve the following goals:

- Spearhead education to promote a culture of safety fostering a blame-free environment and an understanding that all humans are fallible
- Adopt universal CPOE by January 2, 2001
- Reinforce communication among the healthcare team, patients, and families
- Engage patients in the safety of their care

The Patient Safety Oversight Committee includes the executive vice president, vice president of nursing, and vice president for professional services, as well as representatives from the medical staff, health information systems, pharmacy, medical records, and risk management.

The Physician Advisory Group was charged with reviewing and prioritizing user requests for system changes, monitoring physician training and utilization, and acting as a liaison to areas with CPOE concerns. Composed of the chairs of the departments of medicine and emergency medicine, the chiefs of internal medicine and pulmonary medicine, as well as representatives from urology, surgery, nursing, and health information systems, the committee met every two weeks during initial implementation and now convenes monthly.

With the formidable base of support provided by these working groups, the health information systems (HIS) staff forged ahead to support the implementation of universal CPOE.

At the same time, medical staff leaders and administration worked to integrate universal CPOE into an overall culture of safety that permeated the entire hospital. To this end, patient safety training programs were offered to new and existing staff, and regular communication, in the form of a monthly patient safety newsletter, was issued.

'Don't Let the Perfect Be the Enemy of the Good'

The HIS staff understood that the perfect clinical information system did not exist. Instead, by soliciting the input of administration and clinical users throughout the hospital, we endeavored to develop one that would be accessible, user-friendly, and responsive to user needs. Although our goal was to eliminate handwritten physician orders, the HIS staff also realized that 100 percent attainment of this objective would be impossible due to emergency situations and the need to submit orders from off-campus locations. As a result, allowable exceptions were established. They are:

- Emergencies when physicians cannot use the TDS system, particularly during OR procedures
- Telephone orders issued from outside the hospital
- TDS system downtime

The TDS patient care applications are designed to support physicians in delivering quality patient care in an efficient manner. Capabilities include order entry, retrieval of lab results, generation of patient lists, and the development of personal order sets. The system also stores registration information pertaining to patient admission, insurance data, and charges. In addition, nursing documentation, such as the nursing admission assessment, intake and output, and vital signs, can be entered in the system.

A robust clinical information system is the foundation for CPOE. However, other key enablers support the CPOE initiative. These included the following:

- Physician training
- System performance
- Devices
- User support
- System enhancements

Physician Training. Physician training was one of the most critical steps in achieving universal CPOE. First, a baseline of physicians' current usage patterns was established with reports indicating the number of computer-entered, handwritten, telephone, and verbal orders generated by each medical staff member. Physicians who hand-wrote over 200 orders each month were targeted for phase one of training. Our secondary training target consisted of physicians who wrote 100 or more orders monthly. The remaining physicians comprised the final group targeted for training.

Targeting physicians for training was simple; getting these busy clinicians to attend a training program was not. The chair of the Patient Safety Committee sent a letter to all division chiefs. Concurrently, letters were sent to all targeted physicians. The HIS trainers followed up with non-respondents with three personal calls. Often, however, physicians employed very effective gatekeepers who would not permit us to speak with them. If these follow-up calls did not result in the completion of training, the chair of the Patient Safety Committee was notified. This highly credible and persuasive physician leader then made a personal phone call. Division chiefs were also notified and proved very willing to become personally involved.

This strategy was very effective in getting physicians to training sessions. Members of the Physician Advisory

Group met one-on-one to train the few remaining resistant physicians. In addition, several physicians indicated that they would begin using the system, but did not want to attend refresher training. These physicians were able to successfully use the system in the absence of structured training.

Some physicians who were reluctant to come to training shared their objections with us. Most commonly mentioned were a fear of using the system, an assertion that their handwriting was impeccable, and claims that handwritten orders were faster to execute than computerized ones. A key element in the program's success was informal peer-to-peer communication where users related how CPOE helped them to make efficiency and timesaving gains.

Physician order entry training sessions were offered beginning in April 2000. Initially, training sessions were offered by division. This strategy was not effective for our physicians. Open sessions, offered at a rate of 10 per month, were preferred by our physicians, who typically opted to attend with a colleague. The third and most popular training option offered was a one-on-one training session that physicians could schedule at their convenience. HIS staff theorize that because physicians came to training with various computer literacy skills, they preferred to learn in privacy. Scheduling for these one-to-one sessions was flexible, with many sessions taking place in the early morning, late evening, and on Saturdays.

Training was made relevant to each physician with specialty-specific materials and instruction in the development of personal order sets. In addition, training facilitators asked physicians to enter orders, medications, and dosages that they would use in their daily practice. Learning was also facilitated by the TDS system functionality, which is menu-driven, mouse selectable, and not highly dependent upon keyboard skills.

System Performance. In preparation for universal CPOE, the HIS Department took several steps to optimize system performance. To ensure maximum system uptime, a critical upgrade of the CPU took place, as well as an upgrade to the network infrastructure. This step ensured redundancy in the user's connection to the system. System message prompts were automated in the data center, minimizing the need for human

interaction. Also, since patient listings are typically requested immediately upon a physician's arrival on the patient care unit, these lists were assigned a high priority in the printing queue.

Devices. In March 2000, physician users indicated a lack of available personal computers during the peak hours of 7 a.m. to 9 a.m. To resolve this shortage, HIS added 110 additional personal computers to its stock of 1,000. These additional devices consisted of 50 personal computers, 20 wireless devices on the medical surgical, critical care, rehabilitation, and medical oncology unit, as well as 40 bedside units in the Emergency Trauma Center. Physicians and nurses provided key input to place these devices in convenient locations on each unit. A wireless device is shown in figure 2.



Figure 2. Wireless Device

User Support. Intensive user support began six months in advance of the January 2001 activation. In July, "Super Users" — nurses, physicians, unit secretaries, and other clinical staff with demonstrated proficiency on the TDS system — were designated on each unit and wore identifying buttons that read, "TDS Super User-May I Help You?" Often, these Super Users approached target physicians and asked if they could help them learn the TDS system. In the event that a Super User was not readily available, each personal computer bore a sticker with the cell phone number of the clinical leader/charge nurse of the unit for immediate service. Numbers for the TDS Help Desk were readily posted and a TDS User Tips Booklet was also placed at each personal computer for fast, easy reference.

One of the roadblocks to successful CPOE implementation occurred when nursing staff, in an effort to be helpful, entered orders for physicians. In doing so, these physicians did not become acclimated to the clinical information system. The HIS staff conducted education that encouraged nurses to offer help to physicians rather than complete the task of order entry.

In January 2001, Health Information Systems augmented the support offered to users. Clinical systems personnel and technical personnel were stationed at the hospital for training and hardware support 12 hours a day for the first three days of universal implementation. In addition, the TDS Help Desk was manned by clinical staff during this time.

By the fall of 2000, the vast majority of physicians had come to accept the new system. However, a very few remained steadfast non-users. Because patient care continuity and safety remained our highest priority, any orders that were handwritten after January 2, 2001, were implemented as usual. The written orders were then forwarded to the nursing coordinator who then notified the chair of the Patient Safety Committee. His intervention was successful in gaining the compliance of the physician. This approach ensured compliance and freed the nursing staff from having to become involved in the issue.

System Enhancements. The HIS staff believe that ease of use and system accessibility are important components of successful CPOE implementation. An important priority was to solicit feedback from current and new users. In addition to a hotline for technical support, a second phone line was established for system enhancement requests, such as changes to screen content. Physicians could also submit their requests on-line via e-mail.

As the number of new users grew, HIS received numerous system-related requests. One of the major benefits of the TDS system is that it may be readily customized by the hospital. Various tools were used to implement enhancements based upon these user requests. As a result of these requests, new ordering pathways, department order sets, and personal order sets were created.

Many of the modifications pertained to medication orders. For example, every time a physician initiated a medication order, patient allergies would appear on-

screen. Coumadin orders were accompanied by the last five laboratory values related to coumadin dosage, facilitating the physician's decision to increase or decrease the dosage of this medication.

The HIS staff also enhanced the TDS system to help physicians calculate dosages for cytotoxic chemotherapy drugs. Physicians entered the patient's height and weight for a computation of the patient's body surface area. This calculation was then attached to the order so that the pharmacist could double-check its accuracy. This pathway also gives the physician the ability to alter the order based on changes in the patient's weight.

The system was also modified to include features that enhanced continuity of care as the patient moved through the patient care process. An automatic transfer form was created, containing orders for follow-up care post-transfer to a rehabilitation facility or nursing home. Previously, this information was handwritten, requiring staff in the new facility to extract this information from a lengthy patient chart.

To date, some 85 requests, requiring more than 4,000 hours of staff time, have been processed. The most pertinent of these were:

- Coumadin order retrieval
- Emergency trauma center screens and reports
- Special care nursing oxygen weaning order
- Pediatric trauma order sets

In February of 2001, the HIS staff turned their attention to implementing CPOE in the Emergency Trauma Center (ETC) where some 30,000 patient orders were issued each month. This presented a particular challenge because ETC staff used Logicare to track patients and reduce turnaround time. For the HIS staff, the task was to interface information including physician orders, procedures, consults, nutrition, respiratory, protocols, and medications and IVs from TDS to Logicare. During phase two of the project in April 2001, radiology orders and statuses were also interfaced. Lab orders were interfaced during the third phase, completed in July 2001. The interface has also served to enhance continuity of care, particularly to patients who are admitted to the hospital from the ETC. Floor nurses benefit by having a complete record of care rendered in

the ETC since all information appears in the same record used on the floors. To date, the ETC is the highest user of the clinical information system with 92 percent of orders submitted via CPOE.

CPOE: Not a Patient Safety Panacea

The HIS staff recognizes that any new system has the potential to introduce new sources of error. A significant goal during the initial implementation period was to identify and eliminate these causes. Two potential errors did occur when orders were entered for a patient other than the intended patient. To prevent this from recurring, a highlighted patient confirmation screen was added to TDS. The additional screen displays the patient's name, diagnosis, room number, attending physician, admission date, gender, date of birth, and medical record number. The screen then asks, "Is this the correct patient?" The physician may respond "yes-continue" or "wrong name-erase."

A Collaborative Effort

Implementation of universal CPOE at AMH is an accomplishment shared by administration, the medical staff, nursing, and the HIS Department. Administration

demonstrated its commitment by providing the necessary funding and impetus for the program. The medical, nursing, and HIS staffs collaborated to train physicians. HIS also worked to add functionality to the system, which facilitated physician acceptance.

One hundred percent of our physicians use the clinical information system, and the percentage of orders entered into it continues to increase. In January 2001, 81 percent of all orders were entered by computer, with the balance submitted verbally or by telephone. In February, this number rose to 83 percent. To mark the success of the initiative, the AMH Board of Trustees presented special recognition mementos to the medical staff and the HIS Department.

The system is becoming a routine part of the physicians' daily practice. In April 2001, three months after universal CPOE, the TDS clinical information system was unavailable for three hours due to a software problem. A physician telephoned the HIS Department to ask, "How am I supposed to practice medicine without the clinical information system?"

Computerized physician order entry eliminates illegible handwriting, reduces medical errors, and improves patient

care. However, this is only the first step in AMH's continuing effort to improve patient safety. Other initiatives at the hospital include the use of handheld drug dosage checking devices by our residents. In addition, the HIS staff is planning the implementation of the Eclipsys Sunrise Clinical Manager System, a knowledge-based clinical information system.

This system supports clinical decision-making with reminders and alerts made real time at the clinical workstation or via pager or e-mail. Clinical pathways, founded on evidence-based medicine, help to standardize care, avert duplication of services, increase productivity, and enhance patient outcomes.

The hospital's ability to effectively implement CPOE was multifaceted: a sound organizational commitment, system functionality, customization to user work patterns, and the availability of timely technical support were all integral to the program's success.

About the Author

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