

Computerized Physician Order Entry

Key Facts about Medication Errors

More than one million serious medication errors occur every year in U.S. hospitals.¹ Such errors include administration of the wrong drug, drug overdoses, and overlooked drug interactions and allergies. They occur for many reasons, including illegible handwritten prescriptions and decimal point errors.

Medication errors often have tragic consequences for patients. Many serious medication errors result in preventable adverse drug events (ADEs), approximately 20% of which are life-threatening.^{2,3} According to the 1999 Institute of Medicine report, *To Err is Human*, medication errors alone contribute to 7,000 deaths annually.⁴

Medication errors also result in tremendous financial costs. One ADE adds more than \$2,000 on average to the costs of hospitalization.⁵ This translates to \$2 billion per year nationwide in hospital costs alone.⁶ Furthermore, this figure excludes other important costs of medication errors, such as malpractice insurance premiums and losses in worker productivity.

What is Computerized Physician Order Entry?

Computerized physician order entry (CPOE) systems are electronic prescribing systems that intercept errors when they most commonly occur — at the time medications are ordered. With CPOE, physicians enter orders into a computer rather than on paper. Orders are integrated with patient information, including laboratory and prescription data. The order is then automatically checked for potential errors or problems. Specific benefits of CPOE include:

- Prompts that warn against the possibility of drug interaction, allergy or overdose;
- Accurate, current information that helps physicians keep up with new drugs as they are introduced into the market;
- Drug-specific information that eliminates confusion among drug names that sound alike;
- Improved communication between physicians and pharmacists; and
- Reduced healthcare costs due to improved efficiencies.

Effectiveness of CPOE in Reducing Errors

CPOE systems can be remarkably effective in reducing the rate of serious medication errors. A study led by David Bates MD, Chief of General Medicine at Boston's Brigham and Women's Hospital, demonstrated that CPOE reduced error rates by 55% — from 10.7 to 4.9 per 1000 patient-days.² Rates of serious medication errors fell by 88% in a subsequent study by the same group.³ The prevention of errors was attributed to the CPOE system's structured orders and medication checks.^{2,3} Another study conducted at LDS Hospital in Salt Lake City by David Classen MD demonstrated a 70% reduction in antibiotic-related ADEs after implementation of decision support for these drugs.⁷

CPOE has paid other dividends. Length of stay at Wishard Memorial Hospital in Indianapolis fell by 0.9 days, and hospital charges fell by 13% after implementation of CPOE.⁸ A recent study at Ohio State University also identified substantial reductions in pharmacy, radiology and laboratory turn-around times, and there was a reduction in length of stay in one of the two hospitals studied.⁹

John Birkmeyer MD, professor of surgery and a health services researcher at University of Michigan Medical School, estimates that implementation of CPOE systems at all non-rural U.S. hospitals could prevent between 570,000 and 907,000 serious medication errors each year.¹

The Leapfrog CPOE Standard

Given the potential benefits for both patients and payers, national experts in health care quality and patient safety advised The Leapfrog Group to select CPOE as one of its Safety Standards. Leapfrog's original CPOE Standard was based on extensive review of published research and consultation with leading experts in medication errors and CPOE. This standard has since been reviewed and revised, incorporating even more current data and input from the hospital and physician communities.

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In order to fully meet Leapfrog's CPOE Standard, hospitals must:

1. Assure that physicians enter at least 75% of medication orders via a computer system that includes prescribing-error prevention software; and
2. Demonstrate that their inpatient CPOE system can alert physicians to at least 50% of common, serious prescribing errors, using Leapfrog's CPOE Evaluation Tool. For the 2008 Survey, the scored results from the CPOE Evaluation Tool will not be used in the publicly reported survey results, only the fact that the hospital tested its system. However, in 2009, scores from the tool will be used.

The Leapfrog Group, working in partnership with Thomson Healthcare, invites hospitals to respond to the Leapfrog Group voluntary online survey (<https://leapfrog.medstat.com>) and share their progress toward meeting Leapfrog's standard for this practice. Hospitals that have implemented CPOE in at least one of their units will earn partial credit for their progress.

Leapfrog's CPOE Evaluation Tool

Developed by First Consulting Group and the Institute for Safe Medication Practices, Leapfrog's CPOE Evaluation Tool provides hospitals with an assessment of the adequacy of their CPOE system alerts for common, serious prescribing errors. The tool requires hospitals to download a series of simulated patients and medication orders, and to input those patient/medication combinations into the hospital's CPOE system. Hospitals submit a report on the alerts received at point of order-entry. The reported alerts are compared against the expected alerts identified by a national research & development panel. A hospital's score on the tool is the percentage of correct alerts they received in specific categories. For the 2008 survey, hospitals will be required to test their CPOE system utilizing the tool in order to be considered fully implemented for the CPOE Leap.

Challenges to CPOE Implementation

Despite the considerable benefits, fewer than 5% of U.S. hospitals have fully implemented CPOE systems.¹⁰ Why?

The upfront cost of implementing CPOE is one major obstacle for hospitals. At Brigham and Women's Hospital, the cost of developing and implementing CPOE was approximately \$1.9 million, with \$500,000 maintenance costs per year since. Installation of even "off the shelf" CPOE packages requires a significant amount of customization for each hospital and can be very expensive.²

Finally, there may be cultural obstacles to CPOE implementation. For example, some physicians resist utilizing computerized decision-support tools, relying instead on practice experience.

Why Purchasers Need to Get Involved

Given these obstacles, hospitals may need encouragement from purchasers to implement CPOE. Leapfrog purchasers can help make the business case for CPOE and make hospitals aware of the potential savings from improved efficiencies. At Brigham and Women's Hospital, for example, the return on its initial investment has been between \$5 and \$10 million in annual savings.²

By recognizing and rewarding hospitals, Leapfrog purchasers can create the appropriate incentives for hospitals to invest in CPOE. They can accelerate the process by helping to make consumers more aware of the importance of seeking care at hospitals with CPOE systems in place. Finally, Leapfrog purchaser attention to this safety issue may stimulate CPOE vendors to hasten product improvements and reduce the burden and cost of CPOE implementation.

By getting hospitals to implement CPOE, Leapfrog purchasers can leverage major improvements in hospital safety for their employees and other patients.

References

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