

# Computerized physician order entry Identifying risks and internal audit focus areas





# Introduction

One solution to help reduce the number of medication errors is for hospitals to implement a Computerized Physician Order Entry (CPOE) system.



The Institute of Medicine estimates that, on average, hospitalized patients are subject to at least one medication error per day.<sup>1</sup> Examples of medication errors include: not giving the medication (omission), wrong dose, prescribing error, unordered drug, administration of the wrong drug, and missing drug interaction. One solution to help reduce the number of medication errors is for hospitals to implement a Computerized Physician Order Entry (CPOE) system. CPOE is an electronic system that is used by medical practitioners to directly enter diagnostic, therapeutic, and other instructions for the treatment of patients. These orders are then filled by other medical staff such as nurses, pharmacists, radiologists, therapists and laboratory staff.

In 2012, the Journal of American Medical Information Association performed a retrospective review of hospitals that had implemented CPOE systems and compared that to the percentage of medication related adverse events reported. The results of this study show that there was a 48% decrease in medication errors when a hospital processes the order through a CPOE system.<sup>2</sup> Centers for Medicare & Medicaid Services (CMS) also views CPOE as a key component to improving delivery of healthcare, so much so that CPOE is one of the core measures in meaningful use attestation.

<sup>1</sup> Aspden P, Wolcott J, Bootman J, et al. *Preventing medication errors*. Washington, DC: National Academic Press, 2007.

<sup>2</sup> Radley DC et al. Reduction in medication errors in hospitals due to adoption of computerized provider order entry systems. *J Am Med Inform Assoc* 2013.

# Opportunities and challenges

Many opportunities and benefits exist for hospitals to implement CPOE. Some of the advantages of replacing a paper-based ordering system include:

- Reduction of errors relating to poor handwriting (see table 1);
- Standardization of order sets and drug formulary;

Although there are many benefits to CPOE, organizations also need to consider certain challenges their organization may face:

- High capital investment
- System customization may be needed (including interfaces with legacy systems and manual workarounds) that may create new not readily understood risks
- User resistance to change: computer skills are required and the resistance by some key physicians can lead to administrative decisions that may create other risks (e.g., physicians being permitted to attach scan of notes instead of typing notes into the system)
- Impact on productivity: additional time is needed to learn and understand the system
- Computer downtime issues including most notably the proper provision of patient care when the electronic medical information is not available
- Change management issues
- Transition from paper-based to electronic ordering can lead to broad systematic ordering errors and charge capture errors that were not as typical in the paper-based systems.

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## Many opportunities and benefits exist for hospitals to implement CPOE.

- Reduction in delays in order completion;
- Reduction in patient harm through alerts to warn the provider and pharmacist against the possibility of drug interaction, allergy and/or overdose (see table 2);
- Access to an online medical record by multiple individuals and locations involved in providing care;
- Support of efficiency by streamlining workflow;
- Management of the provider's ordering privileges; and
- Support of clinical effectiveness through real-time clinical decision support such as dosage and alternative medication suggestions<sup>3</sup>

<sup>3</sup> Osheroff JA, Pifer EA, Teich JM, Sittig DF, Jenders RA. Improving Outcomes with Clinical Decision Support: An Implementer's Guide, Health Information Management and Systems Society (HIMSS), 2005.

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**Table 2** — Alerts/notifications in CPOE\*

The screenshot displays a medical information system interface. On the left, a navigation pane lists various functions: 'Write Orders', 'View Orders', 'Print Orders', 'Cancel', 'Documentation', 'Lab Result', 'Radiology Results', 'New Results', 'Diagnosis', and 'Signatures'. The main window shows a patient's profile for 'Cistest, Tst01Q' (DOB: 2/29/2006, Sex: M, Admin ID: R2929095, Loc: G81, XBT010, MRN: 01142245). Below the profile, a 'New Order' form is visible for 'POTASSIUM CHLORIDE'. The form includes fields for 'Dose' (BU, MG), 'Route' (INTRAVENOUS), 'Frequency' (TID), and 'Concentration' (1000 MG/100 ML). A 'Print' button is located at the bottom right of the form. A red arrow points from the 'Print' button to a separate window titled 'Print Orders', which shows a list of orders and a 'Print' button. Another red arrow points from the 'Print' button in the 'New Order' form to a separate window titled 'Print Orders', which shows a list of orders and a 'Print' button.

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# Considerations when conducting an internal audit

As with any new system, an organization should consider having their internal audit function review CPOE on both a pre- and post-implementation basis. The following are some example activities to consider when conducting an internal audit:

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## Pre-implementation internal audit activities:

### A. Project planning

- Perform business process walkthroughs to assess whether procedures and internal controls are being considered and documented in the business use requirements.
- Review and assess the project plan for all required elements, resource loading, and key milestones including communication and training plans.
- Determine if project has a steering committee with a charter and an engaged executive sponsor(s).
- Assess if the project team includes appropriate experience through cross-functional representation from all affected areas (department level, IT, clinical staff, etc.)
- Assess and determine if a comprehensive evaluation of required system features has been performed.
- Determine if the project team has obtained appropriate input during the system design phase (end users, information technology, etc.)

- Assess the issue tracking, project risk register, and resolution process.
- Determine if management defined metrics to capture and measure pre- and post-implementation processes/success.
- Determine that formal user training is sufficiently designed and tailored to specific user groups.

### B. System Access and Functionality

- Assess that the access controls have been properly configured.
- Assess the procedures for granting, terminating and periodically reviewing access.
- Assess if the design/build order sets included input and approval from clinical staff.
- Assess the design of clinical decision support rules including establishment of edit checks and alerts.
- Assess if management developed adequate business continuity planning and disaster recovery plans.
- Determine if management considered HIPAA privacy and security regulations in creating the plans/designs.

### C. Testing

- Assess and determine if management established and properly utilized a test environment.
- Assess the adequacy of test plan and ensure there is an adequate level of user acceptance testing (active user involvement in development of test scenarios).
- Assess the integration testing.
- Perform independent review of test results.



### Post-Implementation Internal Audit Activities:

- Perform data analytics to determine and test the volume of usage and errors relative to expectations.
- Perform data analytics to determine and test system performance (e.g., response times, system down times, appends, error rates, etc.) was at management's acceptable level.
- Assess and test a sample of users to determine compliance for granting, terminating and periodically reviewing user access for entering orders.
- Assess and test the procedures and controls over the review, update, and approval to order sets.
- Perform data analytics to determine and test the usage volume for all edits and alerts and ensure there is a process to monitor override rates and add/delete/change edits and alerts.
- Test to determine if management is in compliance with the business continuity and disaster recovery plans, including the accessibility of medical information for existing patients, the ability to capture information for new patients and the ability to include medical information with patients who may be transferred while the system is down
- Compare pre- and post-implementation metrics for unintended consequences (medication error rates, mortality rates, length of stay, etc.)
- Test a sample of patients to determine that the proper medication dose and duration time were entered timely, accurately, and completely. Also, determine that if a patient is transferred to another location, the medications included in the system are accurate,
- Compare a sample of orders with patient charges and a sample of patient charges with orders, and determine root cause for any differences.

When CPOE is properly deployed, it can work very well for organizations. However, in order to realize the stated advantages, it is critical to include key hospital stakeholders — including clinical pharmacy, nursing staff, and ordering providers — in its deployment. A properly designed and deployed CPOE solution integrates with the hospital's clinical procedures and aligns with provider behaviors. CPOE should not fundamentally change the way a hospital manages patient care but integrate seamlessly and in a constructive way in order to achieve effective compliance.



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