

Percentage of Orders Entered by Authorized Providers Using CPOE

Monitoring who uses computerized provider order entry (CPOE) allows organizations to measure CPOE use by providers versus their proxies over time and is one way to evaluate the success of their implementation.

Measure Category: Provider Adoption and Attitudes

Quality Domain: Patient Safety

Current Findings in the Literature: CPOE is an application that allows providers to use information and communication technology to directly enter medical orders, e.g., medication, laboratory, or radiology orders, electronically, in either inpatient or ambulatory settings. It is often described as a key solution to improve the quality of care and decrease healthcare costs. Despite its promise, it has not been widely adopted; estimates for order entry in inpatient and outpatient settings are approximately 5 to 10 percent^{1,2} and 25 to 30 percent,^{3,4} respectively. Although there are several known factors that influence adoption,^{5,6,7} measuring its benefits is difficult. Recent work by Sittig and colleagues^{8,9} has addressed the lack of easily accessible measures and the need for establishing reliable benchmarks to help organizations more effectively measure and monitor the impact of their CPOE implementations.

The success of CPOE implementations rests on whether providers use the system for medication, laboratory, or radiology ordering; adoption thus

impacts the potential benefit of the system. Low adoption of a newly implemented application may be indicative of a poorly designed system or one for which providers do not perceive its benefits. Thus, accurate identification of electronic ordering rates can help organizations determine where improvements are needed—be it the tool's design or its usability. One useful measurement is the percentage of all orders entered by a provider versus a proxy, such as a nurse or clerk. This measure is relatively easy to measure and well-defined.^{8,9}

Source of Data for the Measure: CPOE usage logs—including radiology and laboratory orders—as well as pharmacy logs. Data such as total number of medications ordered by a physician versus a unit clerk may be obtained from these logs.

Methodology for Measurement

Definitions

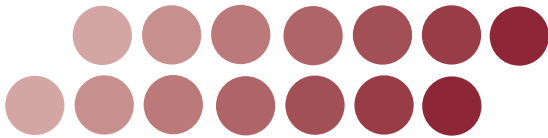
Sittig and colleagues¹⁰ suggest monitoring the three most common computer-based ordering methods when evaluating CPOE usage:

- A. *The user entering the order is the same as the authorizing provider.* This is the prototypical example for CPOE. Other than physicians, authorizing providers can include registered nurses (RNs), advanced practice nurse practitioners (NPs), and physician assistants (PAs).
- B. *The user entering the order does so based on communication with the authorizing provider.* This mode of communication includes verbal (e.g., face-to-face or via telephone) and written methods. These are the



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orders that CPOE tries to eliminate because of the potential for information loss in the communication mode (e.g., poor handwriting, misinterpreted verbal order, or erroneous transcription). These orders potentially remove the provider from any system-generated, real-time clinical warnings or alerts (depending on an institution's read back or alert followup procedure).

- C. *A user other than the authorizing provider enters the order without communicating with the authorizing provider.* The authorization is based on a predefined clinical or administrative event using a set of standard, predefined orders. These orders may be called standing or protocol orders depending on the institution. Additionally, they may or may not require cosigning by an authorizing provider.

Thus, Sittig and colleagues propose the following when evaluating CPOE use: the percentage of CPOE use equals all CPOE orders plus all protocol, or standing orders divided by all orders placed OR:

$$\% \text{ CPOE} = \frac{A+C}{A+B+C}$$

Study Design

Measure the percentage of electronic order entry use by providers at set points over a specified time period, such as weekly or monthly, and use this information to see changes in CPOE use over time. Evaluators should define a target percentage as a goal to achieve and then benchmark their adoption rate against this goal periodically to monitor their organization's progress. For example, to meet the inpatient CPOE standard of the Leapfrog Group, hospital-based providers must enter at least 75 percent of medication orders through an electronic system that includes prescribing error prevention software.¹³

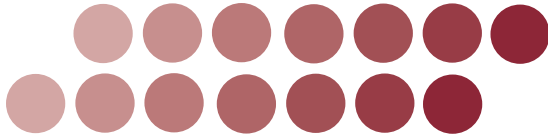
Analysis Consideration

Several issues should be considered and addressed before proceeding with an analysis plan:

1. Your plan should evaluate whether differences exist in the way providers use CPOE (e.g., seasonal variability, age/gender differences, days of week differences, new providers not familiar with the system, problems with the system crashing on certain days) that may impact variability between providers to gain further insight in to how users are interacting with the system and to create solutions and target strategies to raise adoption.
2. A simple chart or graph that visually displays CPOE adoption over time is an effective way to communicate this information to stakeholders.
3. Your data collection and analysis plan should be based on sound methodology. To achieve valid, robust results, you should consider planning your analysis with the input of a trained statistician to determine sample size and appropriate statistical techniques. It is not uncommon to begin analyzing data, only to find the original statistical plan was flawed, leaving you with data that is inadequate for analysis.
4. Your plan should specify whether an unexecuted canceled order will be included in the analysis.

Relative cost: Low: if the medical records department or pharmacy is already collecting order data.

Potential risks: Might be impacted by local policies such as allowing a given category of orders to be entered by the nursing staff; for example, orders entered by nursing staff would be considered part of (A) in the CPOE use definitions listed above.



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