



Pharmacist's Perspective: Examining CPOE Future Challenges and Current Benefits

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Executive Summary

A [well-managed pharmacy](#) needs a robust information technology foundation, and computerized provider order entry (CPOE) has increasingly become an essential component of that foundation. At a high level, CPOE allows prescriptions to be transmitted instantaneously from the physician to the pharmacy. It also incorporates clinical decision support functionality, which checks prescriptions against allergies, interactions, dosage ranges, and the patient's medical history to help ensure the patient receives the right dose of the right drug at the right time. Although it is imperative that the pharmacist continues to validate prescriptions orders, CPOE workflow has enabled the pharmacist to shift to a patient-facing member of the health care team.

Using a CPOE system helps prevent errors previously associated with handwritten orders. By providing physicians with clinical decision support, mistakes can be reduced when the prescription is ordered. Computerized entry also eliminates the problems in transcription that sometimes resulted from illegible handwriting.

CPOE serves as part of an integrated electronic health care model that incorporates electronic health records (EHR) to unify patient data from medical history to procedures, lab results, home medications, allergies, and much more. Proper CPOE (and EHR) implementation and careful optimization, results in better overall patient care, the limiting of harmful errors, and a system that can aid with compliance. By using CPOE, a healthcare organization is able to produce better patient outcomes, reallocate resources, become more efficient, and save money.

These potential benefits of CPOE are only achievable with a combination of effective system design, high quality data capture during patient intake, and physician and pharmacist buy-in. Furthermore, the long-term goal of CPOE as a universal system (that works across institutions and leads to the seamless and instantaneous transfer of secure patient data) depends on the development of systems that promote both internal and external interoperability. Without this, the full potential of CPOE – having data persist throughout all interactions and the elimination of redundant data capture – will not be realized.

1 million annual serious medication mistakes

Nearly 20% are life threatening

Each mistake adds more than \$2,000 to hospital stay cost

CPOE: A Brief Overview

More than 1 million serious medication mistakes occur every year in U.S. hospitals and nearly 20% of these can be life threatening. Historically, a large percentage of these medication mistakes were attributable to human error, ranging from the prescribing of the wrong medicine to incorrect transcription of a handwritten prescription and administration of the wrong dosage. Medication errors have significant consequences and costs, with each adverse event adding more than \$2,000 to the cost of hospitalization. On top of this, such errors lead to reduced efficiency.

In the past 10 years pharmacies have been moving toward [CPOE](#) as a means of addressing this issue. Electronic orders can go a long way toward eliminating these errors and, with effective system and process design, preventing new ones from taking their place. CPOE also helps achieve long-term cost savings through increased efficiency.

So how exactly does CPOE work in a hospital setting? A physician or other provider (such as a physician assistant and nurse practitioner) use clinical decision support to determine the correct medication. The CPOE clinical decision support will also indicate if there is a problem with a potential medication order, such as a drug interaction, dosage mistake, or relevant patient allergy. Once this process is completed, the provider places the order directly through the system. The pharmacy receives the order in seconds and it ends up in a work queue. The pharmacist reviews these orders and validates to ensure the order is for the correct medication at the right dose and clinical decision support alerts are reviewed and resolved. Once validated, the order is transmitted to nursing for administration.

Challenges

While CPOE can lead to a significant increase in efficiency, the way the software is implemented and managed is directly related to how effective it is at improving patient outcomes, reducing errors, and

saving money.. The benefits of CPOE can only be realized if the system is developed in a way to meet the needs of the organization that uses it.

To achieve success, patient data must be accurately captured, while physicians and pharmacists must be fully on board with the workflow changes that CPOE brings. All of this is tied together by how CPOE interacts with other health software, as inoperability presents the most significant obstacle to realizing the upside of the system. Here are the key challenges of CPOE:

Ensuring Accurate Patient Data

One of the key features of CPOE is clinical decision support, which helps to prevent prescribing errors. Since this function is reliant on the quality of information about the patient, the admission process is vital. A patient's medical history and home medication must be correct in order for CPOE to alert the physician and pharmacists to any interactions or other red flags. Having detailed patient electronic health records can go a long way, but a thorough medication remediation upon intake is the most important step. Relying on an e-prescription feed like [Surescripts](#) may not capture all medications, while having a non-pharmacy professional review medications with a patient may result in inadequate accuracy.

One of the ultimate benefits of using CPOE is that it can free up pharmacists or technicians to be part of this intake process. With their comprehensive knowledge of medications, they are more likely to accurately capture a patient's medication list. Multiple studies have shown that organizations that use CPOE have seen dramatic improvements in terms of [patient safety](#), [patient hospital stay length and cost](#), and [pharmacy turnaround times](#).

The more focus placed on obtaining accurate patient data, the more likely that the decision support tool will provide accurate advice to the providers who are doing the prescribing. In the pharmacy, a full medication profile gives pharmacists the information they need to validate orders with confidence.

Managing System Design, Alert Fatigue, and Staff Workflows

GOOD NEWS...



...BAD NEWS



System Design

Cost is an overriding challenge when it comes to CPOE implementation and improvement over time. Yet, getting the most out of CPOE requires effective integration with an EHR system and a CDS that is designed in a way that works well for clinical staff. Cumbersome UIs (user interfaces) that lead to slow ordering or validating can result in widespread frustration that impacts the effectiveness of the system. In fact, [a study by The LeapFrog Group](#) found that 96% of hospitals had implemented CPOE, but only 64% had met LeapFrog's implementation quality standards (at least 75% adoption and at least 50% system success rate in sending alerts of common, serious prescribing errors). That 32% gap demonstrates the struggles many hospitals are having in taking full advantage of CPOE. By using knowledgeable consultants to develop a nimble system that can be better inserted into physician and pharmacist workflows, the benefits of CPOE can be fully realized.

A significant component of this is ensuring that software meets the needs of a particular organization. Customization is important to this process, but in many cases, workarounds are built for needed functionality instead of a more large-scale re-design. In such cases, further updates may end up breaking the customized structure. Information services departments sometimes face institutional resistance to system redesign that largely replicates previous workarounds, even if such a redesign would significantly improve performance. In such cases, it's important to emphasize the long-term benefits of a well-designed system. A consultant can help build the business case for a system optimization by highlighting the significant improvements in patient safety provided by a highly-functioning CPOE system and also by showing the reduction in staff time and costs related to unnecessarily longer hospital stays.

Minimum Requirements for Successful CPOE Implementation

- Proper Training
- Physician Support
- System Adjustments Based on End User Feedback

Alert Fatigue

A well-designed system can make a large difference even as far as patient outcomes. When physicians feel comfortable with a system, they use it more effectively, which increases the quality of data captured in the EHR and improves how they work with CPOE. One of the biggest concerns is alert fatigue. Many physicians find that, when trying to prescribe a drug, they receive excessive and potentially irrelevant alerts. The time-consuming process of reviewing these can lead to the physician merely ignoring them. In these cases, an important alert could be missed. While a pharmacist will likely catch such oversights during validation, this still slows down the overall process.

Ideally, alerts should be proactive, providing an alternative course of action instead of just raising red flags. The pharmacists and physicians should collaboratively review the alert triggers and ensure that they are appropriate for their patient population. Minimizing the “nuisance” alerts and focusing on the critical alerts will streamline the order processing workflow. Solutions such as First Data Bank’s Alert Space provide guidance for the care team to review and adjust the alerts appropriately. Delivering relevant alerts and information at the right time in the process makes them more effective, improving both efficiency and safety.

Workflows

Related to the above issues is the overall level of CPOE acceptance by clinicians. An electronic system can result in less autonomy for physicians as well as increased time spent on the prescribing process. This change of culture has to be justified; otherwise, physicians may adopt an all-or-nothing attitude. In implementing or expanding the use of CPOE, an organization must explain the benefits and be willing to understand the concerns of clinicians. Proper training, physician support, and incorporation of feedback all serve to make sure the system functions at the highest level. Simply put, if it’s difficult to use, it won’t be used correctly.

On the pharmacy side, one of the chief challenges is creating a system that prioritizes order validations. Finding a way to use data to develop risk-based prioritization of patients would greatly increase efficiency by eliminating the manual aspects of the current process. Examples could include, auto-validation and retrospective review of Emergency Department or Patient Anesthesia Care Unit prescription orders.

Embracing a New Role Outside the Pharmacy

One of the chief benefits of a well-designed and effective CPOE system is that it can free up pharmacists to be more involved with patient care. They can help with medication reconciliation at both admission and discharge. They can also consult with the physician and patient about the effectiveness of a particular drug regime.

Some pharmacists, though, might prefer their traditional routine versus a more patient-facing role. Getting past this resistance and expanding a pharmacist's role and mission within a hospital is an important challenge to realizing the full benefit of the freed-up resources that come from digitized and automatized pharmacy operations. If the goal is improved patient outcomes, it's important for pharmacists to take a more active role on the patient care team.

Disparate Systems and Lack of Interoperability

The ability of CPOE to work with legacy systems is essential. The degree of effectiveness of this integration largely determines the overall effectiveness of the CPOE system. Systems don't always match up and having [pharmacy IT consultants](#) on hand to ensure that interoperability between systems occurs is essential. A pharmacy consultant well versed in the CPOE/Pharmacy application, ADCs, and BCMA data structure and interoperability will help to identify and resolve system data inconsistencies. Implementations and improvements need to be highly guided in a standardized way. The better the system is, the more likely it is to identify errors.

Interoperability provides the most significant challenge for CPOE. The benefits of using CPOE increase in positive correlation with the degree to which it is integrated with internal organizational systems, regional systems, and even statewide systems. The ability to exchange complete data between all electronic systems is essential to the future of healthcare.

In many cases, transferring patients to a new hospital necessitates sending them a continuity care document, which in some cases is as simple as a PDF that must be manually re-entered into the new institution's system. Additionally, the use of different vendors can often be difficult to bridge. Possible

solutions include better data communication between [disparate systems](#) (through intermediary software or APIs), greater standardization in data fields and nomenclature, and the use of the same vendors across healthcare systems.

Benefits

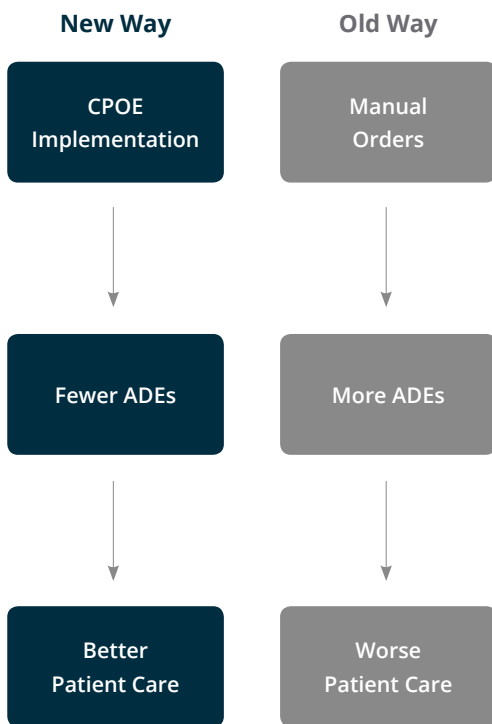
CPOE has also changed the expectations of what's possible in an institutional setting, especially when system design and integration are done effectively. Here are the main areas where CPOE provides advantages:

A Reduction in Errors that Increases Patient Safety and Lowers Costs

One of the patient care-based goals of developing CPOE was to decrease the rate of errors. Historically, most adverse drug events (ADEs) were related to either physician error (prescribing the wrong drug or dose) or a mistake in pharmacy interpretation (an illegible prescription incorrectly transcribed). Medication errors that lead to ADEs can result in tens of thousands of negative patient outcomes. The use of CPOE lowers ADE incidence by incorporating greater accuracy and automated checks into the prescription process. Legibility is no longer a concern when using CPOE, because the physician either types in the medication or chooses it from a list.

Many studies have found significant reductions in errors using these systems, and individual hospitals have found similar results.

CPOE software can check for dose limitations and interactions, to prevent overdoses and other negative events. To enjoy the full benefit of CPOE's error-reducing function, it should be integrated



with an EHR system and include robust clinical decision support (CDS). Working together, these systems cross-reference the patient's medical history, current medication, allergies, and risk factors to ensure that the patient is receiving the appropriate medication. In addition to alerts, CDS provides access to clinical reference information, research, substitute medications, and test recommendations.

By reducing the rate of errors, CPOE helps to improve patient care and reduce the likelihood of additional costs that result from these errors, including additional procedures, wasted drugs, and hospital readmissions. Ultimately, these benefits in patient safety come down to how well CPOE is implemented and customized, how widespread it is used, and how effectively it is integrated with existing systems, from EHR to ADC to barcode administration systems. This ensures that the right drug gets issued at the right time to the right patient.

Better Care Coordination

The use of a CPOE system saves time by eliminating redundant processes, providing easier access to patient data (when effectively integrated with EHR), and allowing the physician to prescribe from anywhere at anytime. All of this has the effect of increasing coordination across all areas of care and speeding patient need response time.

CPOE provides the physician with an order set, which is the protocol to treat a condition or disease; this includes everything that the patient will need as part of their treatment in the hospital. CPOE drives physicians toward evidence-based care, while readily accessible patient data reduces the likelihood of mistakes by providing better visibility into everything related to the patient, from lab orders and results, upcoming surgeries, medical history, patient diet and activity level to current prescriptions.

All of this is in one place so the physicians can be guided by best practice evidence. It also gives pharmacists greater visibility into the patient's overall health. As part of a system designed to increase overall patient care visibility, CPOE provides better care coordination across all areas of the hospital.

Improved Compliance

Using CPOE in coordination with an EHR system helps lay the groundwork for better compliance at the institutional level. Medicaid and Medicare patients comprise a significant portion of medication orders and those programs have considerable compliance requirements. Additionally, when using CPOE for outpatients, 340B program compliance may also come into play. In both cases, managing

prescriptions electronically helps with the reporting requirements for these programs, establishing an auditable trail of information connected to the patient and provider.

A well-designed system makes it easy to access and compile these records when needed, while the use of digital as opposed to handwritten records provides greater clarity. The overall success of such a system, though, depends on how well it is designed, highlighting the need for qualified professionals working in this area. With the inclusion of automatic dispensing cabinets (ADC) and barcode medication administration, the full chain can be captured and regulatory concerns like drug diversion can be prevented.



Shifting Pharmacy Toward A Patient Care Model

The pharmacy profession at large has increasingly been pushing pharmacists toward patient engagement. Traditionally, pharmacies were narrowly focused on their core concern: checking to make sure that the correct drugs were administered. CPOE improves data transmission and overall pharmacy efficiency. Although pharmacist prescription validation is still required with CPOE, the order validation process has become more efficient thus giving pharmacists the opportunity to work closer with patients themselves.

A pharmacist can directly communicate with the patient and physician about the best medication regime and how this relates to other patient care. Additionally, a pharmacist or pharmacy technician may be involved with the intake of a patient's current home medication list to ensure accurate data capture. (For example, As pharmacy professionals, pharmacists and pharmacy technicians would be more likely to notice an incorrect dose or drug name than possibly a nurse would.) By incorporating pharmacy staff more closely into overall patient care, CPOE can become more effective, errors can be reduced, and patient outcomes can be improved.

Outlook

CPOE reduces medication errors and provides greater visibility into patient data. It leads to better care coordination, improved compliance, and frees up pharmacy staff to move toward a more patient-facing role.

To reach these markers of success, though, organizations must focus on their unique needs and develop systems that are supported by all who use them. Training can go a long way, but software design is just as important. Improvements in CPOE should be based on user feedback and performed with the goal of a more responsive system in mind. Consultants have been a valuable part of this process by translating the needs of a healthcare organization into concrete changes to software and processes that improve end-user support.

With an optimized CPOE system, physicians make less mistakes and pharmacy staff is able to work with patients on ensuring accurate medication reconciliation. With interoperability, patient data can be shared whenever it is needed, leading to faster responses. The ultimate result of meeting these challenges is better patient outcomes.

In need of pharmacy consultants to aid your organization with this evolution? Healthcare IS is here to help. [Contact us to request a consultation](#) or simply call 707-410-8829.

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