

## Prescription Errors with Use of Computerized Physician Order Entry Pose Safety Risk

Singh H, Mani S, Espadas D, et al. Prescription errors and outcomes related to inconsistent information transmitted through computerized order entry: a prospective study. *Arch Intern Med* 2009;169:982–9.

### Study Overview

**Objective.** To quantify prescription errors in a computerized physician order entry (CPOE) system that allows for free text entry to accompany the medication order.

**Design.** Observational cohort study.

**Setting and participants.** Prescriptions written in the inpatient and outpatient settings by physicians practicing in a large, urban Veterans Affairs (VA) hospital between 1 October 2007 and 31 January 2008 were evaluated for inconsistent communication through pharmacist report and electronic search and random review. 33 of 45 pharmacists agreed to report errors. For the electronic review, prescriptions containing information in the free-text field were retrieved, and 500 were randomly chosen for manual review to determine if there were inconsistencies between the free-text and structured fields.

**Main outcome measures.** Prescription errors and the potential for harm. Ordering provider characteristics (specialty, type of provider), setting (inpatient vs. outpatient), medication class, and other predictive variables were compared for prescriptions with and without inconsistent communication. Potential harm was categorized as no error, very minor harm, minor harm, and moderate to severe harm.

**Main results.** Of 55,992 prescriptions, 532 (0.95%) had an associated inconsistent communication prescription error. Orders placed in the inpatient setting were nearly 3 times more likely to have an error (odds ratio [OR], 3.30 [95% confidence interval {CI}, 2.18–5.00]) as were prescriptions written by nonprimary care physicians (OR, 2.45 [95% CI, 1.57–3.82]). Certain medications were far more likely to be associated with a prescription error (OR for glucocorticoids, 7.62 [95% CI, 3.11–18.63]). Approximately 20% of errors could have been associated with significant harm had they not been identified.

**Conclusion.** Prescription errors due to inconsistent informa-

tion in the free text entry field of CPOE systems are common and potentially very dangerous.

### Commentary

Medical errors and adverse events contribute to the deaths of approximately 100,000 Americans annually and are a major public health challenge [1]. President Obama and other policy makers have increasingly cited the ability of electronic health records, specifically CPOE, to reduce medical errors [2] and to improve the quality of health care for all Americans. Although there is overwhelming evidence that CPOE can reduce medication errors, there are growing concerns that it has the potential to introduce errors as well [3]. The current understanding of such ill effects of CPOE systems is quite rudimentary.

The Department of Veterans Affairs runs the largest integrated health care system in the United States, and VA hospitals adopted electronic health record systems with CPOE nearly 10 years ago. Although there is evidence that health care quality has improved after the adoption of such a system [4], its impact on patient safety is far less clear. Given its widespread use, the VA's CPOE system is an important and natural choice to examine the frequency with which prescription errors are introduced by electronic prescribing. Singh et al examined 500 prescriptions by manual chart review, and hundreds of errors were found by pharmacists. For the purposes of this study, prescription error was defined as a prescription in which the structured order (ie, the physician orders a 10-mg dose of a medication to be taken daily) and the accompanying free text (ie, a physician writes that the patient should take that medication twice daily) contradict each other. This very specific type of CPOE-induced medication error was common, occurring in nearly 1% of all orders, and many could have been potentially very harmful if not flagged and corrected by the pharmacist.

Why would such errors occur? If the physician ordering the medication does not see the specific dose, frequency, or route of delivery in the ordering template, he/she might be tempted to pick a random dose or frequency and write the intended dose, frequency, or route in free text with the hope that

the pharmacist would decipher the prescriber's true intent. This dangerous assumption likely leads to patients receiving the wrong medicine and suffering from an adverse drug event with some frequency. The high rate at which this type of error occurs within the system suggests that either clinicians are not trained adequately in the use of the CPOE system or, more likely, that the system is not designed to facilitate correct medication ordering by prescribers. Prescription error via CPOE seems particularly common in the inpatient setting and for physicians other than primary care providers.

Important limitations affect the interpretation of this study. First, it was conducted in a single institution, and the VA may be atypical of health care providers broadly. Therefore, it is unclear whether this frequency of prescription errors is present in other systems, and the high rates here may reflect issues in the VA CPOE system specifically. Second, this type of error may reflect inadequate training of resident physicians who are new to the system (given that the study was done in a large academic center). Therefore, one might expect that the rates of errors would decline as physicians became accustomed to the CPOE system. Finally, the authors failed to report on whether any of the errors did in fact lead to harm, suggesting that current safeguards adequately protect patients from harm.

### Applications for Clinical Practice

Singh et al have shed light on an important mechanism

for CPOE-induced prescription errors. This study suggests that this problem is common in VA hospitals and likely has implications for other CPOE systems as well. The frequency of the problem should provide an impetus for leaders of health information technology to monitor for such errors and ensure that systems are optimized to reduce errors and improve patient safety.

—Review by Ashish K. Jha, MD, MPH

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