ABSTRACT

Objective: To decrease the number of near-miss wrong-patient orders in a computerized physician order entry (CPOE) system.

Methods: A CPOE alert was built that prompted the ordering clinician to reaffirm the identity of the patient by entering the patient's initials and year of birth prior to placing an order. We used a retract and reorder tool to measure the frequency of near-miss wrong-patient order errors before and after implementation of the alert.

Results: The ID reentry function decreased near-miss wrong-patient orders in the ED by 35% during the 8-week pilot period. The system was also successful in helping to decrease the percentage of all CPOE near-miss events by 49%.

Conclusion: An alert that requires the prescriber to enter the patient's initials and birth year is effective in decreasing wrong-patient orders in the CPOE system.

Key words: CPOE, near miss, patient safety, medical errors, wrong-patient errors.

Computerized provider order entry (CPOE) systems are commonly used to place orders. CPOE has been shown to reduce errors [1–4]. However, medication errors also can be caused or exacerbated by the CPOE system [5–7]. One type of error that can occur is placing orders on the wrong patient [8]. Wrong-patient CPOE errors can lead to significant morbidity and mortality [8–11]. To reduce wrong-patient CPOE errors in our health system, we developed an alert that required the ordering clinician to verify the identity of the patient. In this paper, we describe our project and outcomes attained.

METHODS

Setting

SBH Health System is a not for profit health system located in Bronx, New York. The SBH Health System also has academic affiliations, and AOA and ACGME residency and fellowship programs. St. Barnabas Hospital, SBH Health System’s acute care facility, is a safety net hospital, Level 1 trauma center, primary stroke center, and STEMI receiving center. St. Barnabas Hospital has 422 licensed beds and had a total of 91,476 emergency department visits in 2015. The electronic health record in use at the time of the project was Allscripts 6.1. The Allscripts product, including its CPOE functions, has been in use in the SBH emergency department (ED) since 2011.

Review of Current Process

A team of multidisciplinary stakeholders was assembled comprised of hospital senior leadership, ED leadership, and front-line staff. Representatives from all disciplines involved in the CPOE process were invited, including nursing, pharmacy, radiology, clinical laboratory, and information technology.

A review was conducted of the CPOE ordering process. First, a fishbone diagram was created that identified contributing factors to the problem of CPOE patient identification error (Figure 1). Interruptions, multiple log-ins into the EHR, and the lack of an active patient identification process were found to be repeated contributing factors leading to CPOE ID/wrong-patient errors.

Next, we assessed our current error rate using a “retract and reorder” tool, which flags orders that have been placed for one patient, then erased and added to another patient’s file by the same clinician within a 10-minute time frame [8]. This tool, developed by Adelman et al, picks up near-miss errors, self-caught by the provider before causing harm [8]. Safety research has demonstrated that near-miss errors share the same causal
pathway; therefore, measuring and preventing near-miss wrong-patient errors should reduce related errors that reach the patient.

For the period October–December 2014, we tabulated 231 near-miss wrong-patient orders that occurred throughout the health system, of which 37% occurred in the ED. This translated to about 1 near-miss event per day in the ED. Given this data, the ED was the location for our quality improvement project.

**Intervention**

We implemented an ID reentry function in the CPOE system that prompts the prescriber to enter the patient’s initials and year of birth at the beginning of the order entry session (Figure 2A). This active double identification system is in line with the Joint Commission’s National Patient Safety Goal of using at least 2 patient identifiers when providing care, treatment and services. If the prescriber correctly inputs this data, then the ordering process can proceed. If the data is incorrect, then a second alert is activated (Figure 2B), allowing for correction of typographical errors that may not be related to an actual patient ID error. If at this point the prescriber enters the correct patient identifier, then he or she can proceed normally with the order. However, if the prescriber enters the wrong patient information again, a third and final alert is generated (Figure 2C). The EHR system recognizes this 2nd patient ID error as a true error and will not allow the prescriber to proceed with the order.

**Outcomes**

After a beta testing period of 1 week, the system was implemented on 3 November 2015. To assess the effectiveness of the alert system to prevent ordering errors, we used the retract and reorder tool to measure the rate of wrong-patient order entries for the 8-week period November–December 2015 and compared this with the preimplementation rate. Prior to the intervention, the average number of wrong patient order entries in the ED was 6.125 events per week. After implementation, the average number decreased to 4 events per week,
a 35% decrease, and the proportion of near-miss ID errors in the ED relative to all such errors within the health system decreased from 37% to 19%.

DISCUSSION

The original aim of the project was to decrease “wrong patient, right order” near-miss events by 30% in 3 months in the ED using an order-based patient ID reentry function. The goal was rapid improvement using a hard-wired EHR process, which is why a 3-month time frame was chosen. During our 8-week project, we surpassed this goal, documenting a 35% decrease in near-miss wrong-patient orders in the ED. This rate was similar to that achieved by Adelman et al [8] and Green et al [10]. Adelman et al found a 41% error reduction, while Green et al found a short-term 30% reduction in CPOE wrong-patient orders utilizing a 2.5-second mandatory delay before continuing the order entry for the purposes of patient verification.

Resident and attending staff conveyed to us anecdotally during both beta testing and implementation that the ID reentry function made them aware of incorrect patient selection even before entering the required initials and birth year. They then cancelled the order session on the wrong patient and chose the correct patient. This is consistent with the findings of Green’s study, which noted that ED practitioners backed out of appropriately 1 in 200 order entry sessions due to wrong patient selection [10].

We also assessed the additional time added to each order entry session. Initially, using observational data, the CPOE ID reentry function added 6.2 seconds to each order entry session. However, providers that were more familiar with the system took an average of 4.0 seconds. While this added time per order entry session
does not seem like much of an issue or delay, in a busy 12-hour shift in the ED it could be seen as significant. Adelman reported 6.6 seconds additional time required in for the ID reentry function used in his study [8], while Green’s study was designed using a 2.5-second mandatory delay before users could close the verification dialogue box [10].

The biggest challenges in implementing our project were unforeseen IT issues. The “go-live” date for ICD-10 was the same as the date we were to start the ID reentry requirement. IT personnel were needed to help in the EHR ICD-10 development and support, which delayed our start date. Additionally, other IT issues were identified. For example, the initial implementation of this project was to begin in the ED involving active ED patients only. At the project’s onset, the ID reentry function erroneously became active in all hospital locations. To fix this error, the entire double ID system alert, including the ED location, had to be removed and adjusted.

In addition to the above challenges, the team discovered errors that needed to be addressed during beta testing. For example, some clinicians would enter an order but no alert asking for the identifying data appeared. The order was entered and completed without the use of the double ID. Once discovered, IT was able to identify and correct the error. Beta testing also revealed an error in the system where providers who incorrectly identified a patient were “locking-out” of the CPOE system for that particular patient during the patient’s entire encounter. This issue was also quickly identified and resolved.

Despite the effectiveness of this system in reducing the rate of near-miss wrong-patient orders in the ED, errors still occur. It is possible that providers are entering the patient’s initials and year of birth without carefully verifying the patient’s identity [9]. The CPOE double ID system alert is about three-quarters the size of the monitor screen. Thus, the clinician is able to verify the patient’s initials and year of birth using the patient’s header on the screen behind the patient identification alert. If the provider simply types the initials and year of birth on the patient’s header, then an identification error can occur.

More work is needed to decrease CPOE-related patient identification errors. Possible improvements may include single sign-ons and a no-interruption policy when writing orders. During our investigation, it was found that some clinicians would have multiple EHR sign-on sessions open at one computer terminal. These multiple EHR sign-on sessions were sometimes the root cause of a wrong patient error. With multiple sign-on sessions open, clinicians could toggle back and forth between patients on the same computer terminal and mistakenly complete an order on the wrong patient.

No-interruption zones and policies have been proven to be an effective way of decreasing interruptions and enhancing safety during medication preparation [13,14]. Utilization of no-interruption zones for CPOE may also be effective. Potentially, the EHR background color could change when a clinician selects the “enter order” tab within the EHR. The new background color would signify to those around the clinician that he/she is not to be interrupted during that time.

After the success of this initial quality improvement project in the ED, the intensive care unit has been added as a location for the CPOE double identification system. The data and results for this phase of the project are being tabulated and seem promising. In addition, SBH Health System is exploring single sign-on software to both help clinicians provide service and enhance patient safety.

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References