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Pharmacist Interventions After Implementation of Computerized Prescriber Order Entry

Computerized prescriber order entry (CPOE) has been promoted as a means to eliminate many of the problems inherent in manual order writing (e.g., illegible handwriting, incomplete orders, wrong dosage). With implementation of CPOE at Thomas Jefferson University Hospital (TJUH) on a 25-bed medical unit in November 2001, the pharmacy department undertook a study of pharmacy interventions to determine whether implementation of CPOE would address the known problems with manual orders and to identify new issues that might be raised by CPOE that could be addressed before implementation on subsequent units.[1]

The study evaluated interventions that resulted from a written order received by the pharmacy. Orders were evaluated for two six-week periods before and after implementation of CPOE on the study unit and for two six-week periods on the control unit. The two units were similar in patient type, bed capacity, and house staff and were served by the same pharmacy personnel. On the control unit, there were 80 interventions in the study period before implementation of CPOE and 84 after implementation. On the study unit, there were 76 interventions before implementation of CPOE and 109 afterward. Compared with the control unit, there was a significant increase in the number of interventions on the study unit after CPOE was implemented ($p<0.01$).

On the study unit, reductions were seen in the number of incomplete orders and the number of orders in which the wrong dosage, route, or frequency was ordered. Incomplete orders were reduced with CPOE by requiring completion of data fields for dosage, route, and frequency. Wrong-dosage, -route, and -frequency errors were reduced by building common orders into the system that specified commonly used dosages, routes, and frequencies at TJUH. These can be changed by the physician during the order-entry process, but they provide an appropriate reference point.

Two categories of interventions increased as a result of CPOE: those related to inconsistent orders and those involving duplicate orders. Inconsistent orders were likely the result of the prescribers trying to take the path of least resistance. For example, when presented with a list of "diphenhydramine" options, the prescriber may have chosen the first one seen and altered the order to match the intended order. In a number of cases, this resulted in a particular dosage form being ordered by an inappropriate route. Also, if the prescriber did not find a common order that matched his or her intent exactly, a similar order may have been chosen, and a comment attached to the order indicating what the prescriber actually wanted. Since CPOE orders cross to the on-line nursing medication administration record, such orders would present conflicting information to the nurse.

Efforts have been made to avoid the problem of inconsistent dosage form or route by creating clearly labeled order tables that separate the various dosage forms. The issue of inconsistent comments is addressed during orientation to the system and through feedback to the prescriber. Duplicate orders resulted when the prescriber failed to heed the duplicate therapy warning screen. The duplicate therapy warning (as well as all other warnings) initially showed in the lower left hand side of the screen in small letters, where it was easily overlooked. As a result, a revision was

made to the system to provide a pop-up window in the middle of the screen on which the prescriber must click "OK" to continue.

It should be noted that we did not see a significant reduction in the number of illegible orders (a known advantage of CPOE) due to the fact that we had a very small number of such orders on the study unit in the pre-implementation phase. Also note that CPOE does not eliminate the problem of ordering the wrong drug. In a recent situation at our institution, a physician chose a similarly sounding drug on the order table (donepezil instead of doxepin), despite the drugs not being next to each other on the order table. The system has since been modified to allow order entry by brand as well as generic name.

A recent revision to policy allows pharmacists to make certain changes in the CPOE system. This saves time for both the pharmacist (who would previously have had to contact the prescriber) and the prescriber (who would have to reenter the order). Pharmacists may change orders entered for a product that has a therapeutic interchange on the TJUH Formulary (e.g., an order for omeprazole [Prilosec] may be changed to pantoprazole [Protonix]). In addition, duplicate orders may be discontinued by the pharmacist, and pharmacists may make conversions from intravenous to oral therapy for certain drugs and drug classes if the patient meets criteria approved by the P&T committee.

In conclusion, the study demonstrated that CPOE was effective at addressing many of the problems associated with manual order writing. However, it does not solve all such problems and may actually create issues of its own. There was an increase in the overall number of pharmacist interventions related to medication orders after implementation of CPOE, and the types of interventions were notably different.

References

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