A Dashboard Model for Monitoring Alert Effectiveness and Bandwidth

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Abstract

With the implementation of a new clinical provider order entry system (CPOE) at the University of Michigan Health System (UMHS), a clinical decision support (CDS) dashboard was created to help monitor alert effectiveness and bandwidth. Data from the first 2 months following CPOE activation demonstrated usefulness of the dashboard format in identifying areas for follow-up and target removal of nuisance-type alerts.

Introduction

Alerts, as utilized in CPOE systems, are an effective clinical decision support tool to help improve patient safety and clinician efficiency.1 Use of excessive alerts, however, is associated with a cost of ‘alert fatigue’ (high bandwidth) which may thus render the alerts ineffective.1 A monitoring tool will better help judge effectiveness of alerts currently in place, assess for removing ineffective / nuisance alerts and judge bandwidth for implementation of further alerts.

Methods

In October 2006, the UMHS implemented a CPOE system (Eclipsys Sunrise Clinical Manager version 4.0). Activation of the system started in the obstetrics area and will roll-out across the Pediatrics and adult hospitals over the next 1.5 years. The CPOE rules and alerts committee identified alerts to be implemented with the system’s activation and developed a comprehensive plan for identifying and monitoring key outcome measures for each alert. The measures specify endpoints to assess the rule’s effectiveness and bandwidth components.

For example, for drug interaction alerts, the following outcome measures were identified: 1) percent that alert changed behavior (effectiveness-related) = number of times order not entered in response to an alert divided by number of alerts fired; 2) percent of nuisance alerts (bandwidth-related) = number of times order is entered in response to alert / divided by number of alerts fired; 3) impact by pharmacist = number of times order is entered and changed by pharmacist divided by number of alerts fired; 4) other descriptive characteristics including top override reasons and interacting drug pairs. A similar model was developed for other alerts. Based upon key effectiveness and bandwidth endpoints, a CDS dashboard model was then created. CDS dashboard data will be presented in a spreadsheet format using Microsoft Excel, and Queries to gather measurement endpoint data were developed using Microsoft SQL Query Analyzer (Microsoft Corporation, Redmond, WA).

Results

Following the first two months of CPOE implementation, queries were run and the dashboard spreadsheet was populated accordingly (Figure 1).

Figure 1. CDS dashboard

Conclusion

The dashboard format greatly facilitated presentation of alert data to better judge alert effectiveness and bandwidth. Based upon initial data, the committee developed an action plans to turn-off diet duplicate alerts and gather more detailed data on medication dosage alerts given large percentage of nuisance alerts and the high number of dosage and duplicate alerts out of total alerts generated. Data regarding the effectiveness of unsigned verbal orders led to changes in the alerting frequency (from every 24 to 12 hours) in an effort to further increase compliance above 45% for unsigned orders signed by the next day. Ongoing data will be generated and evaluated every 2 months. Updated data, CDS dashboard with action plans will be presented.

References