Multi-Method Approach for Medication Safety Event Detection in Community Hospitals

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Background. Sharp HealthCare, in partnership with the University of Arizona College of Nursing, is conducting a study to evaluate the impact of a community hospital computerized provider order entry (CPOE) system on adverse drug event (ADE) outcomes. The medication safety arm of the study uses an observation methodology to detect medication safety events (MSE) that are subsequently evaluated to assess the study’s composite primary indicator: preventable ADEs plus non-intercepted potential ADEs (PADE), i.e., “near misses.” We report our preliminary findings for one of three study hospitals to illustrate the efficacy of our multi-method approach to MSE detection.

Method. Baseline MSE data were collected on 5 critical care, intermediate care and medical surgical units for a 4-week period prior to the implementation of a commercial order entry system (IDX Carecast). MSEs are those events that suggest that an actual or potential medication error may have occurred. Once detected, MSEs are investigated to assess medication error occurrence. The primary MSE detection approaches used in the study included: 1) chart review; 2) written incident reports; 3) alerting lab values surveillance; 4) Pyxis reports; 5) medication safety hotline; and 6) pharmacist surveillance. The Pyxis report was an automated list of selected medications dispensed to all patients within the previous 24 hours. Reported use of any trigger medication was investigated. Trigger medications included: flumazenil and naloxone; dextrose 50%, glucose gel/tabs, and glucagon; phytonadione and protamine sulfate; diphenoxylate/atropine and loperamide; sodium polystyrene sulfate; and diphenhydramine.

MSEs were identified and classified using tools and techniques adapted from the Bates, et al. ADE Prevention Study Group. Modified classification criteria from the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) were used to classify MSE severity.

Results. Using MSE detection approaches, a total of 201 MSEs were detected. Of these 201 MSEs, 13 (6%) were ADEs, 57 (29%) were PADEs, 25 (12%) were lab abnormalities that were harmless and non-preventable, and 106 (53%) were excluded events. A total of 3 (23%) of the 13 ADEs were classified as preventable, while 45 (79%) of the 57 PADEs were classified as non-intercepted resulting in a total of 48 (24%) primary indicator events among all MSEs. MSE incidence by patient days for the 4-week data collection period was: ADEs (0.43%); PADEs (1.9%); lab abnormalities (0.83%); and excluded events (3.53%).

The majority (86%) of preventable ADEs were categorized as NCCMERP Class E: events that may have contributed to or resulted in temporary harm and required an intervention. Among preventable ADEs, insulin and oral hypoglycemic agents were the most common medication class (60%). The majority (73%) of non-intercepted PADEs were categorized as NCCMERP Class C: events that reached the patient but did not cause harm. Antibiotics were the most common medication class (43%) for non-intercepted PDAEs. Pyxis reports led to identification of the majority (57%) of all preventable ADEs, while pharmacists found the majority (51%) of non-intercepted PADEs.

Discussion. Findings indicated that Pyxis reports are the most effective method for detecting preventable ADEs. However, these triggers were less effective for finding non-intercepted PADEs or “near misses.” Findings are consistent with previous research that emphasized a multi-method MSE detection approach.

Supported by AHRQ grant RO1 HS13131.