Optimizing Clinical Decision Support for Pharmacists

Abstract

Purpose: Clinical decision support enhances the quality of care by presenting the most pertinent evidence-based information to the physician at the point of care. Many studies demonstrate the effectiveness of implementing clinical decision support systems, but there is little research in the optimization of clinical decision support rules after the initial go-live. Without significant study of workflow processes and alert usability, clinical decision support performance and reliability by end-users wane over time. The purpose of this study is to collect clinical decision support system alert and intervention data and examine the potential for identifying suboptimal rule logic and methods for optimization.

Methods: Clinical decision support data from the prospective pharmacy clinical surveillance system was harvested for the month of July 2020 from 70 hospitals in a large national health-system. The data included the facility, alert, alert priority, total number of patients, number of patients assessed by a pharmacist, number of interventions documented by a pharmacist, median response time of the interventions, time from alert firing to intervention, duration that each alert was true, and number of alert firings per patient for each rule. Local decision support rules not shared by the entire health-system were excluded from the evaluation. The data was used to calculate the mean, interquartile range, and standard deviation of the percentage of patients assessed per rule, number of interventions, mean number of alerts, percentage of alerts that were less than 60 minutes, the longest mean time between firing and unfiring, the longest median response times, and the number of sites with custom rules. Rules that fired less than 1,000 times were excluded from results reported for mean percentage of patients assessed and percentage of alerts lasting less than 60 minutes to resolve. The data points were used to identify trends that indicated instances where performance of alerts was suboptimal.

Results: There was a grand total of 553 rules and 156,656 interventions in the month of July. The rules associated with the highest frequency of alerts included Vancomycin Monitoring, IV to PO (n=6,635), Famotidine (n=4,856), COVID-19 Positive Test (n=4,763), IV to PO Pantoprazole (n=3,993). The intervention categories associated with the highest amount of activity included Pharmacokinetic Monitoring (n=27,332), Anticoagulation Management (n=23,267), and Antimicrobial Stewardship (n=13,456). The rules associated with the highest mean percentage of patients assessed included Warfarin (n=87.24%), Vancomycin Monitoring (n=80.72%), Positive Cultures at 72 hours in sterile sites (n=71.37%). Rules associated with the highest mean number of alerts per patient included Heart Failure Identification with NT-proBNP (n=12.87), Enoxaparin Monitoring – Treatment doses (n=6.15), and Targeted Surveillance – Ganciclovir (n=4.32). The rules associated with the highest percentage of alerts lasting less than 60 minutes to resolve included Renal Dosing - Piperacillin/Tazobactam (n=74.04%), Renal Dosing – Ketorolac (n=63.33%), and Renal Dosing - Ampicillin/Sulbactam (n=60.66%).