option care health™

Improving the Effectiveness and Implementation of DUR Screening to Improve Patient Safety

KIERSTEN SCHREIBER, PharmD; Christine Krahulik, BS Pharm, PharmD; Don Filibeck, PharmD, MBA, CSP, IgCP, FASHP, FNHIA; Jerry Bliss, RPh, PharmD
Option Care Health - Newark, DE

Background

Previous studies have demonstrated the importance of pharmacist-led medication reconciliation and drug-utilization review (DUR) for the prevention of adverse drug reactions (ADRs) and drug-drug interactions (DDIs). Clinical interventions, such as these, during transitions of care may reduce the risk of clinically significant drug interactions[1], which in turn may reduce the risk of increased morbidity and mortality with ADRs.[3]

Many healthcare facilities use electronic drug information resources and software that produce alerts to potential drug interactions but can cause alert fatigue to providers.[1] Alert fatigue is a widely used term with multiple meanings. BioMed Central Medical Informatics and Decision Making defined alert fatigue as "cognitive overload associated with amount of work, complexity of work, and effort distinguishing informative from uninformative alerts, and desensitization from repeated exposure to the same alert over time."[4] The electronic drug information software needs to be able to determine which DDIs are significant and preventable to prevent alert fatigue and therefore, improve patient safety in the long term.[3] An effective drug screening program should be highly sensitive (detect relevant interactions) and highly specific (ignore irrelevant interactions).[2]

The organizations internal policy states a DUR will be performed after entry of any new medication and during the refill process for an existing medication. This policy is used to determine if there is a necessity for a clinical intervention which may result in communication with a provider to update the patient's care plan. Since there are many different areas of a pharmacist workflow which involve a DUR screening, it will be important to determine the types of interactions that are triggering alerts and which alerts are clinically relevant to improve the sensitivity of the organization's DUR screening program and improve patient safety.

Purpose

To determine the effect of DUR screening for drug interaction on clinical interventions completed by pharmacists in the home infusion setting. We hypothesize that results of clinical interventions will allow us to adjust DUR alert sensitivities based drug interaction severity.

Methods

This project is a retrospective case series study analyzing the amount of DUR alerts classified as drug interactions compared to the number of clinical intervention assessments completed by pharmacists. Data reports were collected through the organization's main pharmacy dispensing software from January 2020 through December 2020. Drug interaction DUR alerts were classified by severity for moderate and major interactions. Clinical intervention assessments were analyzed from each quarter to include interventions classified as "drug therapy problem detected – DDI".

The organization used for this study includes over 100 home infusion pharmacies across 48 states. There were approximately 4.8 million moderate and 1.2 million major drug interaction DUR alerts generated over 2020 in the organization. Duplicate alerts were removed and filtered to focus on the majority of therapies: anti-infective, parenteral nutrition, inotropes, and immune globulins. The remaining alerts were compared to the clinical intervention assessments from each yearly quarter. Also, a review of clinical intervention assessments was completed to determine the types of clinical interventions pharmacists are completing.

References

[1] Berry H, Pelletier AL. Clinically Relevant Drug-Drug Interactions in Primary Care. American Family Physicians. 2019;99(9):558-565
[2] Namazi S, Kheshti R, Aalipour M. A comparison of five common drug–drug interaction software programs regarding accuracy and comprehensiveness. Journal of Research in Pharmacy Practice. 2016;5(4):257.
[3] Yeh, M., Chang, Y., Wang, P., Li, Y. (., & Hsu, C. (2013). Physicians' responses to computerized drug–drug interaction alerts for outpatients. Computer Methods and Programs in Biomedicine. 2013;111(1), 17-25.
[4] Ancker, J, Edwards, A, Nosal, S, Hauser, D, Mauer,E, Kaushal, R. Effects of workload, work complexity, and repeated alerts on alert fatigue in a clinical decision support system. BMC Medical Informatics and Decision Making.2017. DOI 10.1186/s12911-017-0430-8
[5] Mcgreevy et al. White Paper, Safe Practices to Reduce CPOE Alert Fatigue through Monitoring, Analysis, and Optimization. Partnership for Health IT Patient Safety. 2021.

Disclosures

Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation: Kiersten Schreiber, Christine Krahulik, Don Filibeck, Jerry Bliss: Nothing to disclose.

Figure 1: Drug Interaction Alerts

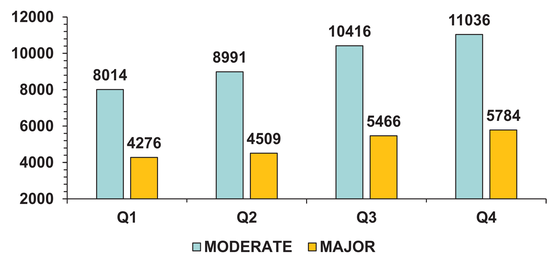


Figure 2: Clinical Intervention Types

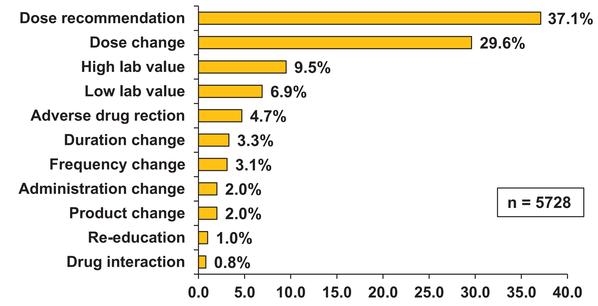
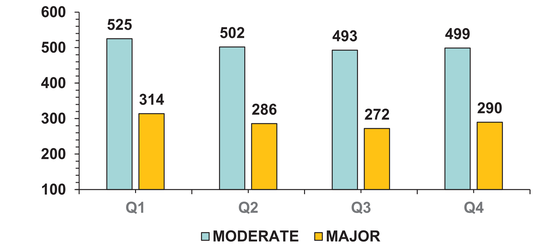


Figure 3: Drug Interaction Alerts with Clinical Interventions



Results

20,035 major and 38,457 moderate drug interaction alerts remained after filtering the initial data report as described in methods. Figure 1 represents the drug interaction alerts per quarter. There is a statistical difference in the number of moderate compared to major severity drug interaction alerts ($p = 0.001$).

5,728 clinical intervention assessments were completed from all quarters of 2020. Specifically, 64 of these clinical intervention assessments classified as "drug therapy problem detected – DDI". Figure 2 shows the distribution of the types of clinical intervention assessments completed by pharmacists in quarter one.

An analysis of the DUR alerts compared to the clinical intervention assessments per quarter was completed to determine the effect on one another in pharmacist workflow. There was a statistical significant difference in moderate and major drug interaction alerts that resulted in clinical interventions ($p < 0.001$) (Figure 3).

Discussion

Over 7 million DUR alerts were prompted over the entire organization over the year 2020. Examining the amount of DUR alerts showed more moderate compared to major severity drug interactions which was anticipated. This statistical difference represents the amount of drug interaction alerts that may be missed if the organization was to change the alert sensitivity based on drug interaction severity.

By considering all of the clinical interventions made by pharmacists in 2020, the data shows that drug interactions are only approximately 0.6% of these interventions. Therefore, there are a lot of clinical interventions such as dose recommendations and dose changes that are not initiated by an alert. This data is useful to see the clinical decision making the pharmacists are producing to increase patient care, but proves that many of these decisions are from the pharmacist's own clinical judgement and not the result of a DUR alert.

A statistical significant difference was seen between the clinical interventions for moderate versus major drug interactions but this data showed there were more clinical interventions completed for moderate than major severity alerts. However, there are more clinical interventions since there are more moderate alerts, but this data still shows the amount of clinical interventions that may be missed if DUR alert sensitivity is changed.

This study provided a lot of data and some probing questions that can be further investigated within the organization to improve the DUR screening process. Some weaknesses of this study include the differences in quality of assessments based on pharmacists and the place of clinical intervention in pharmacist's daily workflow. Strengths of this study include the large amount of data available and the multiple different approaches to examine the DUR process.

A recent study published by the Partnership for Health IT Patient safety, noted that while many clinical decision support technologies aim to "promote efficient, informed, and relevant decision-making, the tools are frequently ineffective".[5] The study focused on the types of alerts that related to burden on the healthcare professional but noted there is no set metric such as the number of alerts or the effect on the recipient to help quantitate the burden of alert fatigue. Respondents in this study, reported monitoring drug-interactions as one of the top medication related alerts.

The conclusion of this study was that the practices to reduce alert fatigue demonstrate a challenge to balance effectiveness, efficiency, safety and clinical concerns when adapting pharmacy software programs.[3] Our study resonates with this determination and shows a need for continued research and development in this field.

Conclusion

While our study showed both a statistical difference between drug interactions alone and drug interactions with clinical interventions between moderate and major severity alerts, the results show that more interventions occurred with moderate interactions than major.

This conclusion may be confounded by the quantity difference between alert severities, but overall demonstrates that our hypothesis is incorrect. We are unable to change DUR alert sensitivities based on clinical intervention and drug interaction severity. Due to the amount of data within the organization, this will be an area for continued research and future analysis to improve the DUR alert process within the pharmacy software.

www.optioncarehealth.com