

# Integration of an advanced clinical decision support system into an existing transitions of care model had a tendency to identify more medication safety-related problems compared to usual care.

## Assessing the Impact of Medication Safety Reviews Using an Advanced Clinical Decision Support System on an Existing Pharmacist- and Nurse-Led Transitions of Care Model

Jennifer M. Bingham<sup>1,2</sup> PharmD, BCACP; Lindsey Baugham<sup>2</sup> PharmD Candidate; Andriana Hilaneh<sup>2</sup> PharmD Candidate; Karley Tranchina<sup>2</sup> PharmD; Jacques Turgeon<sup>3</sup> BPharm, PhD

Office of Translational Research and Residency Programs, Tabula Rasa HealthCare, Moorestown, NJ <sup>1</sup>; College of Pharmacy, University of Arizona, Tucson, AZ <sup>2</sup>; Precision Pharmacotherapy Research and Development Institute, Tabula Rasa HealthCare, Moorestown, NJ <sup>3</sup>

**Contact** Jacques Turgeon, BPharm, PhD; [jturgeon@trhc.com](mailto:jturgeon@trhc.com)

### Objective

The primary objective was to evaluate the use of the MedWise Risk Score™ to identify medication safety-related problems in the Discharge Companion Program model.

### Abstract

**Background:** Adverse drug events (ADEs) and inappropriate use of medications lead to hospitalizations and medication-related morbidity. Pharmacist interventions reduce readmission rates and improve medication safety. This study aimed to evaluate use of a novel medication safety review system to identify medication safety-related problems (MRPs) and reduce readmissions in an existing transitions of care (TOC) model. **Methods:** This retrospective comparator group study assessed MRPs and readmission rates for patients discharged from a hospital between January and December 2020. Participants were included in the study if they were 18 years of age or older, referred to the pharmacist for TOC services, and received a consultation within one-week post discharge. Patients were categorized into two groups: participation in the novel service using an advanced clinical decision support system (CDSS) (intervention); or traditional service [usual care (UC)]. **Results:** Of 164 participants, most were male (57%) and were between 70 - 79 years of age. The medication safety review system helped identify more drug-drug interactions compared to usual care [3.7±1.5 (readmitted) vs 0.9±0.6 (not-readmitted), p<0.001]. However, the number of readmitted patients was not statistically different between intervention and usual care, although a tendency was observed for less patients (30%) readmitted in the intervention group. Other outcomes (e.g., drug-disease interactions, adverse drug events, dose-related concerns, and high-risk medications) were analyzed, but did not reach pre-determined statistical level (most likely due a limited number of observations and limited power), although a favorable tendency was observed (9% vs 13%; p=0.767). Usual care had more readmissions for medication-related ADE (17%), renal failure/injury (17%), and angina (12%). **Conclusion:** Integration of a medication risk prediction score and use of an advanced CDSS into this existing TOC model had a tendency to identify more MRPs and compared to usual care.

### Background

- ADEs from inappropriate medication use are associated with an increased risk of hospital readmission.<sup>1, 2</sup>
- Many ADEs can be predicted and prevented through either a TOC service or medication risk prediction tool.<sup>3-5</sup>
- The Discharge Companion Program (DCP) is an interprofessional TOC service designed to mitigate 30-day all-cause readmissions by addressing gaps in care through consultation services.<sup>3</sup>
- The MedWise™ Risk Score (MRS) is a novel medication risk prediction tool that identifies patients at risk of hospital readmission from an ADE.<sup>5, 6</sup>
- There is a lack of literature about the impact of a medication safety review on the existing DCP model.

### Methods

- This study was a retrospective comparator group study that included patients discharged from a local hospital in southern Arizona between January and December 2020.
- Inclusion criteria:** 18 years of age or older, referred to the pharmacist for TOC services, and received a pharmacist consultation within one-week post-discharge.
- Patients participated either in the novel advanced CDSS MRS-TOC service (intervention) or the traditional TOC service (usual care).
- This project was approved by the University of Arizona Institutional Review Board.

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### Results

**Table 1. Medication Safety-Related Problems Identified by the Pharmacist per Patient**

Variable	Total N = 164 Mean ± SD	Intervention N = 33 Mean ± SD	Usual Care N = 132 Mean ± SD	P-value
<b>Readmitted (N=20)</b>				
Drug-Disease Interactions	0.4 ± 0.6	1 ± 1	0.2 ± 0.4	0.3153
Drug-Drug Interactions	1.3 ± 1.3	3.7 ± 1.5	0.9 ± 0.6	<0.001
Dose-Related Concerns	0.2 ± 0.4	0	0.2 ± 0.4	0.0826
Adverse Drug Reactions	0.3 ± 0.5	0.3 ± 0.6	0.3 ± 0.5	0.9197
High-Risk Medications	1 ± 0.9	1.3 ± 0.6	0.9 ± 1	0.3282
<b>Not Readmitted (N=144)</b>				
Drug-Disease Interactions	0.5 ± 0.6	0.5 ± 0.7	0.4 ± 0.6	0.5570
Drug-Drug Interactions	1.4 ± 1.3	2 ± 1.3	1.3 ± 1.2	0.0120
Dose-Related Concerns	0.4 ± 0.6	0.2 ± 0.6	0.4 ± 0.7	0.2304
Adverse Drug Reactions	0.2 ± 0.5	0.4 ± 0.7	0.2 ± 0.4	0.0807
High-Risk Medications	0.8 ± 0.8	0.9 ± 0.7	0.8 ± 0.9	0.6420

**Table 2. Characteristics and Readmission Status**

Variable	Intervention N = 32 N (%)	Usual Care N = 132 N (%)
<b>Readmission Status</b>		
Readmitted	3 (9)	17 (13)
Not readmitted	29 (91)	115 (87)
<b>Readmission Diagnosis</b>		
Angina	0	2 (12)
Atrial fibrillation	0	1 (6)
Congestive heart failure	1 (33)	1 (6)
Coronary angioplasty	0	1 (6)
Inflammatory disease	0	1 (6)
Medication-related ADE	0	3 (17)
Pneumothorax	0	1 (6)
Post-surgical related infection	1 (33)	0
Renal failure/injury	0	3 (17)
Respiratory	1 (33)	2 (12)

### Discussion

- Our results support a role for the use of an advanced CDSS, such as MedWise™, into an existing TOC model.
- Pharmacists who use novel approaches were more likely to identify medication safety-related problems compared to traditional DDI assessments.
- The design of the MedWise™ CDSS allowed pharmacists to both identify and predict the relative odds of medication safety-related problems for a patients' drug regimens.
- The study was limited by a small sample size in only one state. Patients were only followed by the pharmacist for two weeks after initial consultation; hence, longitudinal impact beyond 30-days post discharge cannot be generalized.

### Conclusions

- Integration of an advanced CDSS and a medication risk prediction score into an existing pharmacist- and nurse- coordinated TOC model identified more medication safety-related concerns and was more likely to reduce readmissions compared to usual care.
- Further research is needed to demonstrate the impact of the integration of an advanced CDSS and a medication risk predictive score into an existing TOC model on hospital readmissions.
- These findings support the value of further research to demonstrate the same impact on a larger sample size.