

# Impact of Pharmacy Staff Performing Medication History in High-Risk Patients and Reducing Potential Medication Errors

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## BACKGROUND

- Senate Bill 1254, enacted in January 2019, requires pharmacy staff to obtain accurate medication profiles or lists for each high-risk patient upon admission to a hospital with 100 or more beds in California.
- Studies have shown up to 70% of patients have errors on their medication lists upon admission to the hospital and 59% of these errors have the potential to cause moderate to severe harm.<sup>1</sup>
- Studies showed that trained pharmacy staff obtaining medication lists resulted in an 80% reduction in medication errors compared to standard of care (medication lists obtained by nurses or physicians).<sup>2,3,4</sup>
- Previously estimated costs per preventable adverse drug events (ADEs) range from \$3,700 to \$4,700 which can increase length of hospitalization.<sup>7</sup>
- A significant portion of medication errors could be prevented by utilizing trained pharmacy staff to obtain accurate medication profiles, reducing length of hospitalization and health care costs.

## STUDY OBJECTIVES

**OBJECTIVES:** This was an IRB-approved quality improvement study to determine the impact of pharmacy staff obtaining medication histories on reducing the number of medication errors and potential harm for high-risk patients at Olive View-UCLA Medical Center (OVMC).

- Primary endpoints were to determine:
- The number of medication errors per patient
  - The number of patients with  $\geq 1$  error
  - Types and severity of potential harm avoided

## METHODS

- This was a retrospective chart review of patients admitted to Olive View-UCLA Medical Center between February 14, 2020 to March 17, 2020 who met the OVMC high-risk criteria.
- Inclusion Criteria:** Patients  $\geq 18$  years old who met the OVMC high-risk criteria: admitted for acute decompensated heart failure and/or have  $\geq 10$  medications on their prior-to-admission (PTA) medication list.
- Exclusion Criteria:** Admitted patients who did not meet the OVMC high-risk criteria.
- All patients  $\geq 18$  years were screened in the Emergency Department via the electronic medical record to determine if they met criteria.
- Medication histories (patients' prior-to-admission medication lists) were first obtained by nursing staff per institutional practice, and then re-collected by trained pharmacy staff.
- Subsequently, a trained intern pharmacist and/or pharmacist categorized discrepancies by therapeutic drug class, error type, and potential harm severity. Discrepancies that resulted in medication error orders on admission were documented.
- A second pharmacist then validated the data by independently categorizing the potential severity of harm for each error identified.
- In the event of incongruences between Pharmacist 1 and Pharmacist 2, a third pharmacist (arbitrator) categorized the potential severity.
- A physician reviewed and categorized all potentially life-threatening cases and at least 10% of all potentially serious cases. In unclear cases, the more severe category was used in the data analysis.
- Microsoft Excel was used to calculate descriptive statistics.

## DEFINITIONS

- Admission Medication History (AMH) Error:** Drug related problems identified during medication history performed and resulted in an error in the prior-to-admission medication list.
- Admission Medication Order (AMO) Error:** Drug related problems identified during medication history performed and resulted in an error in an admission/ inpatient order.
- Low Capacity:** Circumstances or events that have the capacity to cause error; an error could have occurred, but the error would not reach the patient (an "error of omission" does reach the patient); an error could have reached the patient but would not cause patient harm.
- Serious:** The identified and intercepted error could have reached the patient and would have required monitoring to confirm that it resulted in no harm to the patient and/or required intervention to preclude harm; the identified and intercepted error may have contributed to or resulted in temporary harm to the patient and required intervention; the identified and intercepted error may have contributed to or resulted in temporary harm to the patient and required initial or prolonged hospitalization.
- Life-Threatening:** The identified and intercepted error may have contributed to or resulted in permanent patient harm; the identified and intercepted error may have required intervention necessary to sustain life; the identified and intercepted error may have contributed to or resulted in the patient's death.

## RESULTS

Table 1. Baseline Demographics

Total Number of Patients	62
Patients with Acute Decompensated Heart Failure	18
Patients with $\geq 10$ Medications	44
Age (years), average $\pm$ SD	59.0 $\pm$ 13.4
Male, n (%)	36 (58.1%)

Table 3. Classification of Error Type

Error Type	% of Errors (n=335)
Not Indicated	29.9
Adherence/Patient – Other Wrong	23.3
Dose/Rate/Frequency	20.9
Therapy Omission	17.3
Adherence – Literacy	3.5
Other	2.4
Incomplete Order	1.5
Duplicate Therapy	0.6
History of ADR	0.6
Allergy	0
Adherence – Cost	0
Adherence – Transportation	0
Drug-Disease Interaction	0
Drug-Drug Interaction	0
Drug-Lab Interaction	0
Wrong Concentration	0
Wrong Duration	0
Wrong Medication	0
Wrong Patient	0
Wrong Route/Dosage Form	0
Wrong Timing	0

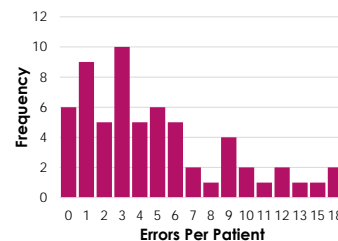


Figure 1. Number of Errors Identified After Pharmacy Staff Obtained Medication Profiles

Table 2. Primary Outcomes

Median # of Errors, IQR	4, 2.75-7.25
Patients with $\geq 1$ Error, n (%)	56 (90.3%)
Admission Medication History Error, n	335
Admission Medication Order Error, n (%)	48 (14.3%)

Table 4. Errors by Therapeutic Drug Class

Therapeutic Drug Class	% of Errors (n=335)
Cardiovascular	22.4
Electrolyte, Caloric, and Water Balance	9.9
Gastrointestinal	8.7
Non-opioid Analgesic	7.5
Vitamins	6.9
Antihyperglycemics	6.3
CNS Agents	6.3
Miscellaneous	6.3
Eye, Ear, Nose and Throat	5.3
Blood Formation, Coagulation, Thrombosis	4.1
Anti-Infectives	3.0
Hormone and Synthetic Substitutes	2.7
Respiratory Agents	2.1
Skin and Mucous Membrane	2.1
Local Anesthetics	1.7
Immunosuppressants	1.5
Opioid Analgesics	1.1
Antihistamines	0.9
Genitourinary	0.9
Antineoplastics	0.3
Autonomic Drugs	0
Biologics	0

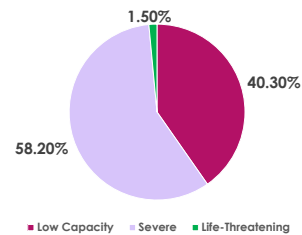


Figure 2. Classification of Potential Harm Severity for Each Error

## DISCUSSION

- This study demonstrated that pharmacy staff can help reduce medication errors when involved in obtaining prior-to-admission medication histories.
- In this study, discrepancies between nurse-acquired medication histories and pharmacy-acquired medication histories were common, in which at least one error was identified in 90.3% of patients.
- Almost 60% of the errors had the potential to cause severe harm (58.2%) or be life-threatening (1.5%). Notably, 80% of the life-threatening errors were related to anticoagulation.
- Excluding patient adherence, the top three common error types were medications not indicated (29.9%), wrong dose/rate/frequency (20.9%), and therapy omission (17.3%).
- Overall, these findings were consistent with other studies.
- Pevnick et al. found an 80% reduction in medication errors when a medication history was obtained by a trained pharmacy staff.<sup>2</sup> Similarly, it was determined that 60% of errors identified in this study were serious and 1% of errors were life-threatening.<sup>2</sup>
- Gleason et al. and Markovic et al. found that in nurse obtained medication histories, the most frequent error types were medication omission, 48.9% and 21.7%, respectively.<sup>4,5</sup>
- Pharmacy staff performing medication histories at OVMC may decrease the number of adverse drug events which will result in increased patient safety and reduction in health care costs.

## LIMITATIONS

- These results were based on a small study population.
- These results were obtained over a duration of 4.5 weeks as opposed to the intended 6 weeks.
- There was non-congruent categorization in 24.2% of errors between pharmacists.
- Identification of patients with  $\geq 10$  medications on the prior-to-admission list relied on the nurse obtained list. As a result, all high-risk patients may not have been included.

## CONCLUSION

- Utilizing pharmacy staff to obtain an accurate medication history for high-risk patients admitted to the hospital is a promising strategy to reduce the number of medication errors and potential harm.
- Future studies conducted over a longer study duration with a large sample size are necessary to validate these findings.
- Future aims should include evaluating the total cost avoided by preventing medication-related errors.

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