

Background

The Joint Commission recognizes medication reconciliation (MedRec) as a critical process in the healthcare system to identify medication errors, resolve medication discrepancies, and prevent patient harm. It is a crucial and robust process during a patient's healthcare journey as they transition through different stages of their care. A report from the World Health Organization (2019) showed up to 97% of adult patients had at least one medication discrepancy upon admission to the hospital.

In 2018, the California Senate passed SB-1254, which requires hospitals with more than 100 beds to develop a program where pharmacy has to obtain an accurate medication list for high-risk patients upon admission to improve patient safety (California Society of Health-System Pharmacists, 2018). Salinas Valley Health Medical Center created the Medication Reconciliation Pharmacy Program in 2020 to comply with SB-1254. Within the first year, with just one MedRec technician, the wait times for obtaining medication histories were reduced, and 2,906 potential medication errors were prevented.

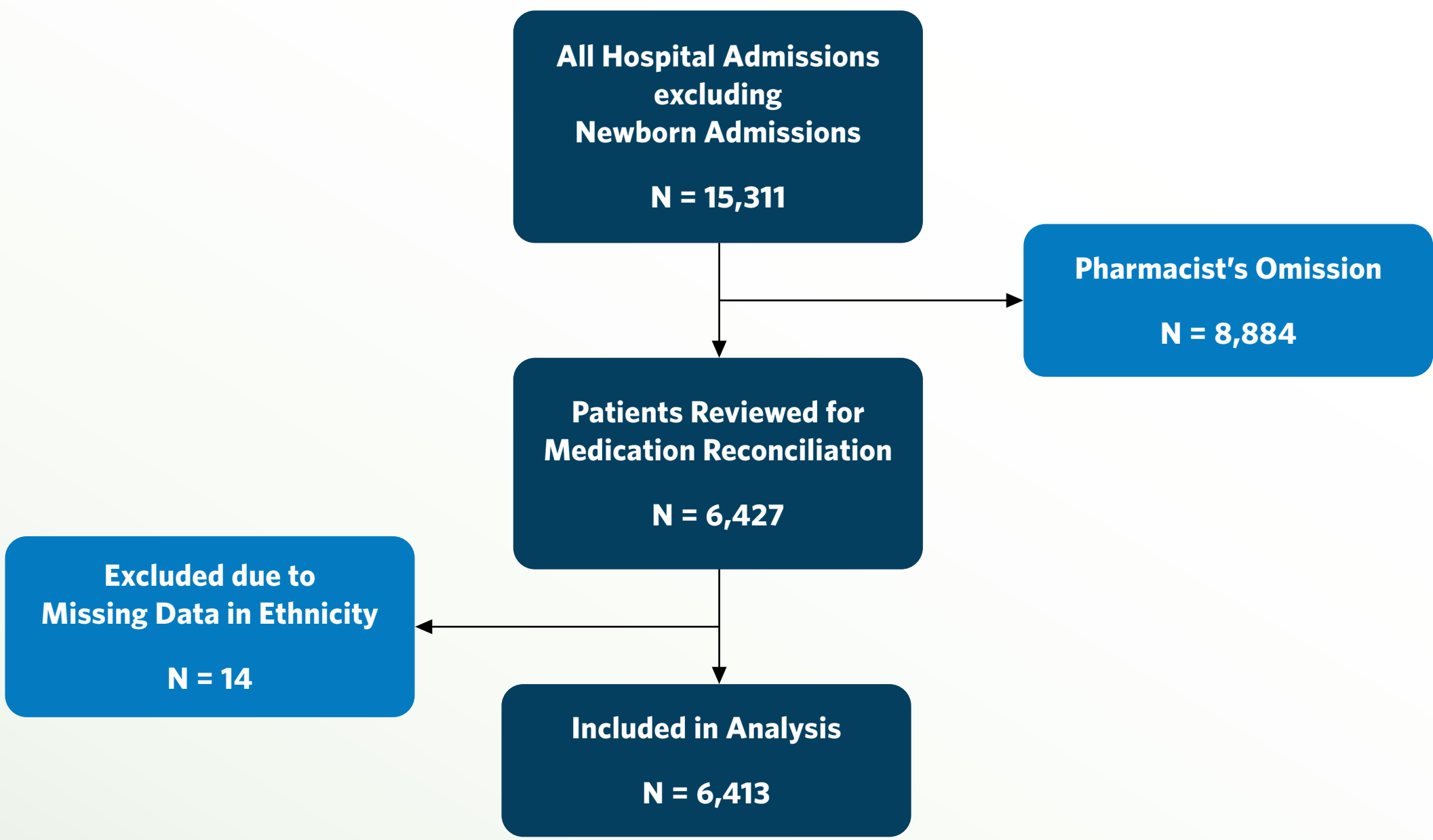
The aim of this quality improvement initiative was to evaluate how obtaining medication histories by a MedRec pharmacy technician affects patients' length of stay in the hospital compared to those who did not have a medication history obtained by a pharmacy technician.

Methods

We evaluated the medical records of adult patients admitted to the medical center from January 1, 2023, to December 31, 2023 (see Figure 1). Pharmacy technicians obtained the patient's medication history upon admission to the Emergency Department (ED) by gathering the medication history list from external sources such as Surescripts® or medication administration records from external care facilities, medication lists in the Epic® ambulatory care system, and patient interviews. If the home medication list was successfully completed, the pharmacy technician recorded "Yes" in the intervention; if not, they entered "No". Additionally, the pharmacy technician conducted audits on home medication lists completed by non-pharmacy staff and updated hospitalists of any discrepancies discovered.

Figure 1

Flowchart of Patient Records Evaluated with Inclusion and Exclusion Criteria



Statistical analyses were performed using multivariable linear regression and adjusted Kaplan-Meier curves, with the primary outcome being length of stay in hours and secondary outcome being the total patient charge from the visit. Primary and secondary outcomes for patients who received MedRec were compared to those who did not receive MedRec despite being reviewed. The analyses were adjusted for age (65 and over), sex, race, ethnicity, Charlson comorbidity index, and admission through the ED or Observation Care Unit (OCU).

Data were extracted from the medical center's electronic medical records using Microsoft® SQL Server® and statistical analyses were performed using Stata® version 15/IC.

Results

The baseline analysis indicated that the two groups were statistically similar with the exceptions of sex, ethnicity, and admission to OCU, which were all adjusted during the regression analysis. The MedRec group had 10.1 hr shorter length of stay per visit ($p = 0.005$) compared to the non-MedRec group in the multivariable regression analysis when adjusted by all the variables (see Table 1).

Also, the MedRec group was charged \$11,417.20 less per visit ($p = 0.019$) compared to non-MedRec group in the multivariable regression analysis when adjusted by all the variables (see Table 2). In the Kaplan-Meier curve, there was a complete visual separation of the two groups' discharge rates where the MedRec group had significantly higher discharge rates than the non-MedRec group (see Figure 2). Also, both the logrank and Wilcoxon logrank tests showed statistically significant separation of discharge rates between the MedRec and non-MedRec groups with a p value less than 0.000 using Pearson's chi-square test. The adjusted estimated length of stay for the subpopulation of patients older than 65, male, Hispanic/LatinX, Charlson score of 1, and admitted through the ED was greater per visit in the non-MedRec group compared to the MedRec group (see Figure 3).

Table 1

Simple and Multivariable Linear Regression Coefficients for Length of Stay in Hours Between Admitted Patients with MedRec Versus Non-MedRec				
Variable	Unadjusted		Adjusted (n=6,413)	
	Coefficients (95% CI)	p value	Coefficients (95% CI)	p value
Medication Reconciliation	-14.5 (-21.8 to -7.3)	<0.000	-10.1 (-17.1 to -3.0)	0.005
Age ≥ 65	6.3 (3.3 to 9.4)	<0.000	5.4 (0.1 to 10.8)	0.048
Female	-10.9 (-14.0 to -7.8)	<0.000	-12.0 (-17.2 to -6.9)	<0.000
Race				
Asian	4.7 (-3.0 to 12.5)	0.232	5.6 (-7.1 to 18.2)	0.389
Black	3.7 (-6.3 to 13.7)	0.469	-4.5 (-20.7 to 11.8)	0.589
Other	0.3 (-3.0 to 3.7)	0.850	2.2 (-7.6 to 12.0)	0.659
Hispanic/LatinX	-1.2 (-4.4 to 1.9)	0.431	-2.3 (-11.9 to 7.4)	0.646
Charlson Comorbidity Index				
1	10.4 (6.0 to 14.8)	<0.000	-1.8 (-9.0 to 5.4)	0.623
2	13.7 (6.7 to 20.7)	<0.000	2.6 (-8.6 to 13.8)	0.654
3	50.0 (38.4 to 61.6)	<0.000	40.0 (22.4 to 57.7)	<0.000
≥4	62.8 (51.0 to 74.7)	<0.000	39.7 (21.0 to 58.4)	<0.000
Admitted Through ED Visit	42.5 (38.8 to 46.0)	<0.000	5.5 (-13.2 to 24.2)	0.565
Admitted Through OCU	-73.1 (-76.4 to -69.8)	<0.000	-70.4 (-78.2 to -62.7)	<0.000
Constant	-	-	109.0 (89.0 to 129.0)	<0.000

Note. Abbreviations: confidence interval (CI), Latino or Latina (LatinX), Emergency Department (ED), Observation Care Unit (OCU).

Unadjusted analysis was done by simple linear regression, and the adjusted analysis was done by multivariable linear regression analysis of length of stay (hours) with MedRec as the variable of interest adjusted by age, female sex, race, ethnicity, Charlson comorbidity index, and admission through the ED or OCU.

Table 2

Simple and Multivariable Linear Regression Coefficients for Patient Charges per Visit Between Admitted Patients With MedRec Versus Non-MedRec				
Variable	Unadjusted		Adjusted (n=6,413)	
	Coefficients (95% CI)	p value	Coefficients (95% CI)	p value
Medication Reconciliation	-17466.99 (-27248.07 to -7685.90)	<0.000	-11417.20 (-20995.67 to -1838.72)	0.019

Note. Abbreviation: confidence interval (CI).

Unadjusted analysis was done by simple linear regression, and the adjusted analysis was done by multivariable linear regression analysis of total patient charges per visit in U.S. dollars with MedRec as the variable of interest adjusted by age, female sex, race, ethnicity, Charlson comorbidity index, and admission through Emergency Department or Observation Care Unit.

Figure 2

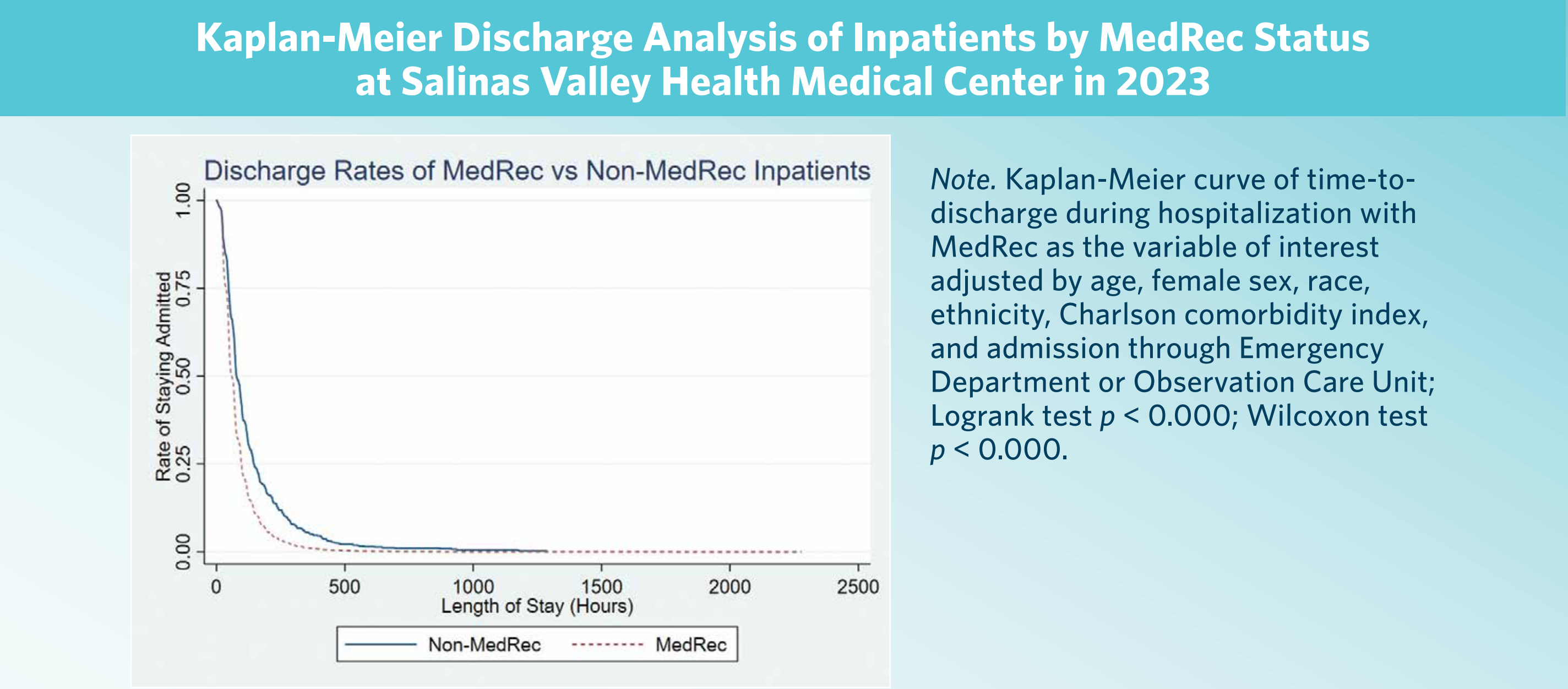
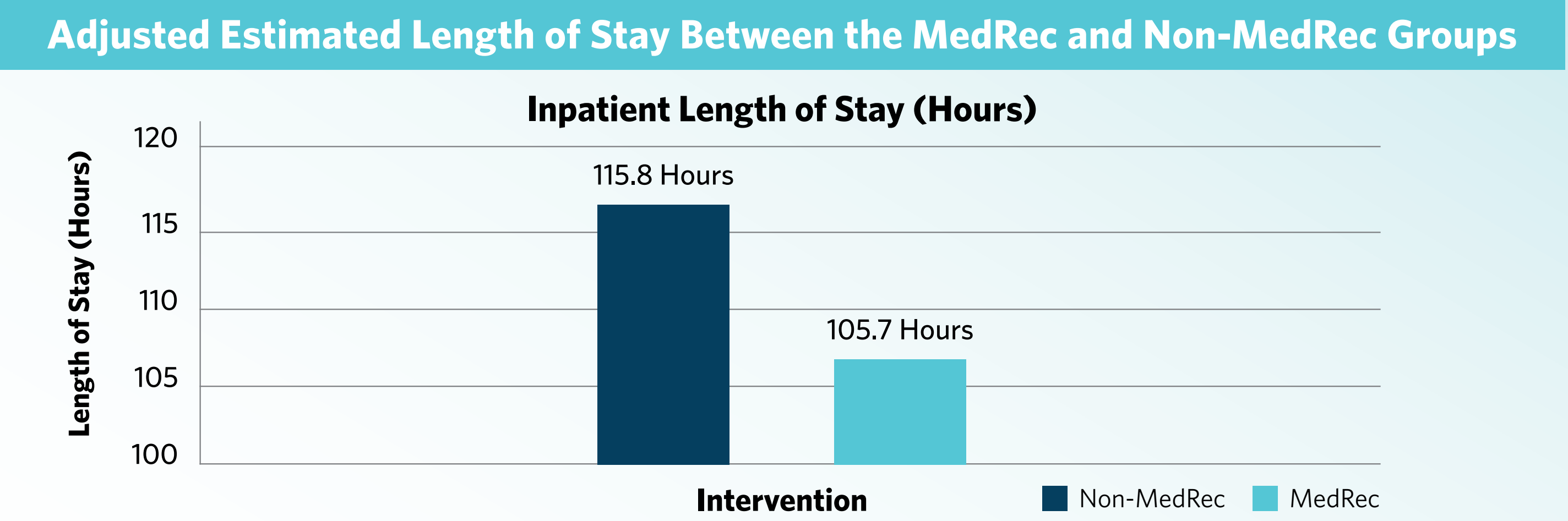


Figure 3



Conclusions

The MedRec pharmacy technicians' interventions resulted in statistically significant decreases in patients' length stay and hospital costs. Accurately gathering the medication history early in patients' hospitalization can streamline patient care, thus shortening length of stay and lowering costs. When MedRec pharmacy technicians complete home medication histories, hospitals can allocate their resources more effectively by prioritizing patient care and ensuring timely discharges.

Research has demonstrated that having pharmacy-led MedRec initiatives improved patient safety, reduced medication errors and adverse drug events, and reduced readmission for patients. The results of our program support the expansion of a MedRec program and highlight the important role of pharmacy technicians. Future research could explore the long-term impacts of such programs on patient outcomes and overall healthcare costs.

Acknowledgements

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