

## RATIONALE

According to recent literature, upon admission to the hospital, up to 70% of patients have errors on their medication lists and up to 59% of these have the potential to cause moderate to severe harm.<sup>1</sup> A recent study in high risk patients demonstrated that an average of 3 errors per patient occur when hospitalized due to inaccuracies on the admission medication list.<sup>2</sup> When the medication list was obtained by pharmacists and trained pharmacy technicians, there was an 80% reduction in medication errors compared to standard of care.<sup>2,3,4</sup> Through this, pharmacy staff have demonstrated their advanced skills to focus on the accuracy of medications, doses, and formulations in addition to the appropriateness based upon the patient's clinical condition. Accordingly, SB1254 was passed into California law to ensure responsibility for an accurately obtained medication list at hospital admission. This law requires pharmacy staff obtain medication lists for high-risk patients upon hospital admission starting January 1, 2019. This project was part of the SB1254 statewide quality improvement project.

## OBJECTIVES

**PROJECT OBJECTIVES:** 1) determine the number of errors identified and the associated potential harm and 2) determine the cost savings associated with harm avoided.

**HYPOTHESIS:** A pharmacy-driven medication history service will identify many errors on prior to admission medication lists among high-risk patients, leading to cost-savings from prevented adverse drug events caused by translated inpatient errors.

## METHODS

Prospective cohort and IRB exempt quality improvement project conducted via chart review over a 6-week period. Included patients are those who fulfilled the institution's high-risk criteria (see below). Pharmacy staff documented all errors identified on the prior to admission medication lists, including error types and potential severity of harm based upon an adapted version of the National Coordinating Council for Medication Error Reporting and Prevention Index. A second pharmacist reviewed all documented errors, then a physician independently assigned error severity for all potentially life-threatening cases and a random selection of 100 potentially serious cases. Descriptive analyses were performed with Microsoft Excel. Cost-analysis was based on severity and probability of adverse drug event (ADE).

### Inclusion Criteria:

- (High-risk criteria are defined by each facility)
- ≥65 years old with a target diagnosis<sup>v</sup>
- ≥65 years old with >10 medications
- Anticoagulant or antiplatelet (except aspirin)
- Organ transplant
- Hospitalization or emergency room visit within last 30 days
- Skilled nursing facility

### Primary Outcomes

- Medication errors per patient, n
- Identified prior to medication reconciliation by physician, n (%)
- Identified after medication reconciliation by physician, n (%)
- Patients with ≥1 error, n (%)
- Types of errors and severity of potential harm
- Projected total cost avoided by preventing errors

### Secondary Outcomes

- Errors that translated into an incorrect inpatient order
- Errors that reached the patient
- Errors that caused an adverse drug event
- Active time spent interviewing and documenting (excluding time waiting for follow-ups)
- Pharmacist-Physician Congruency

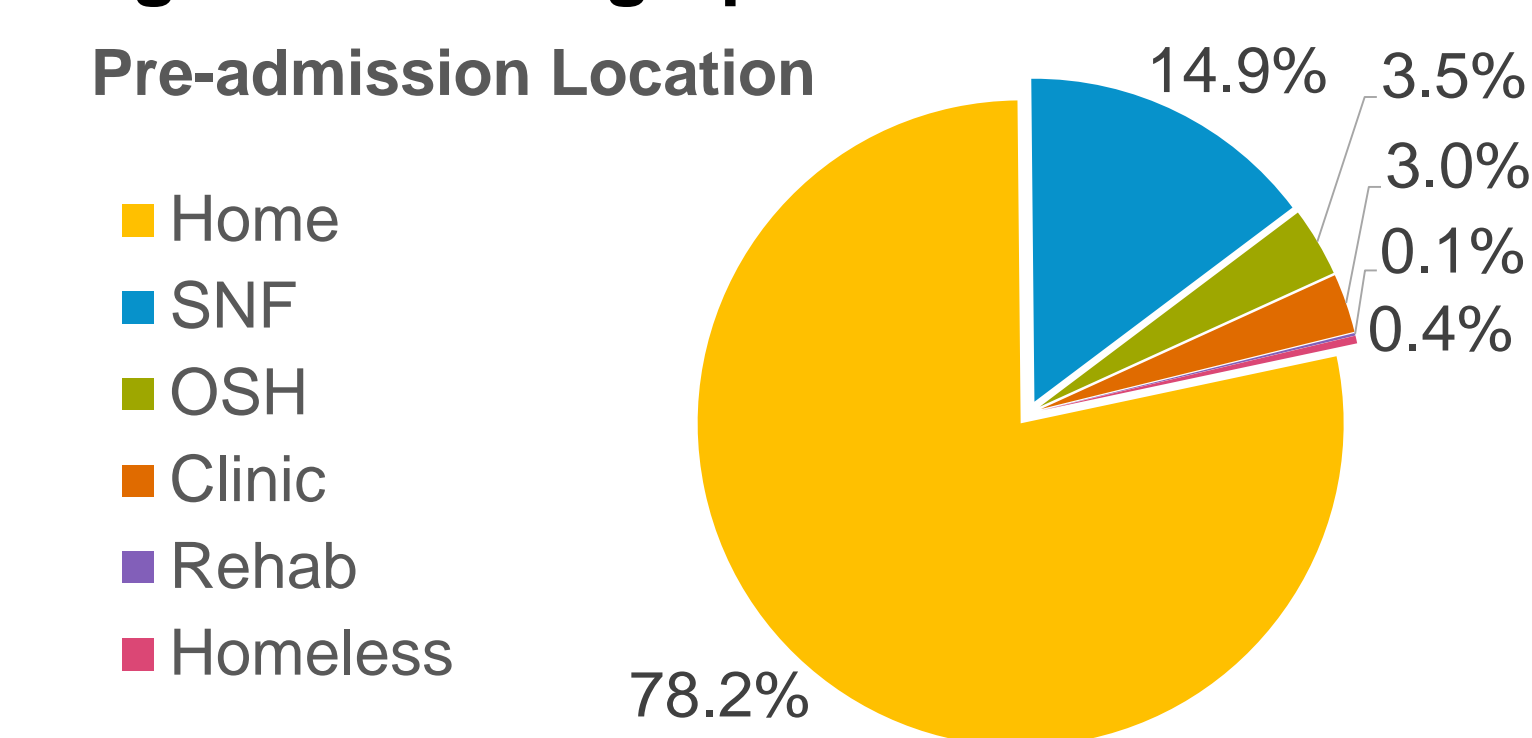
<sup>v</sup>End-Stage Renal Disease, Diabetes Mellitus, Chronic Obstructive Pulmonary Disease, Chronic Heart Failure, Coronary Artery Disease, Atrial Fibrillation, or Acute Myocardial Infarction

## RESULTS

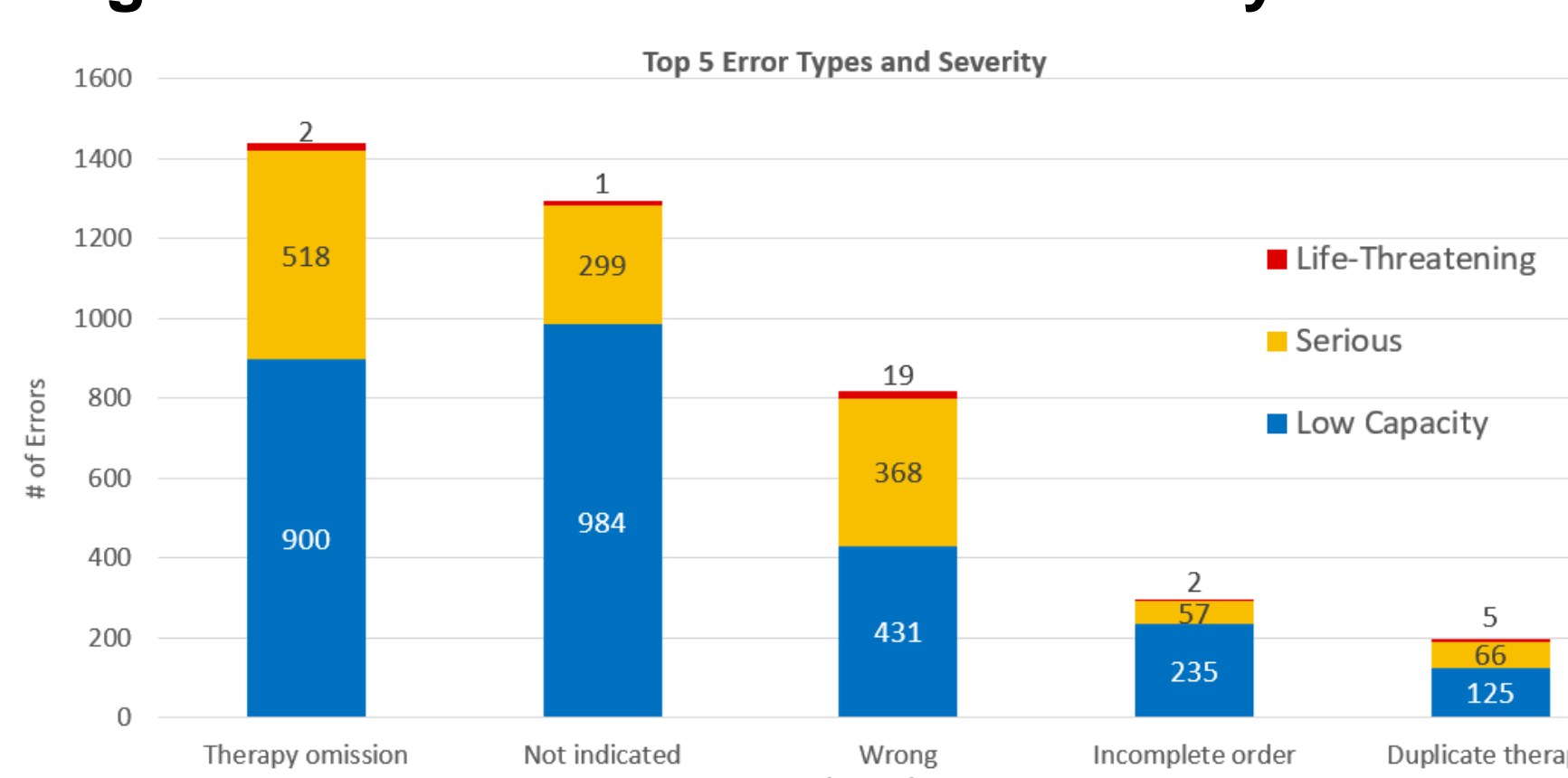
**Table 1. Baseline Characteristics**

Baseline Characteristics	Result
Gender	
Male (n=405)	48%
Female (n=377)	52%
Age	69.9 ± 15.4
Male	69.6 ± 14.7
Female	70.2 ± 16.1

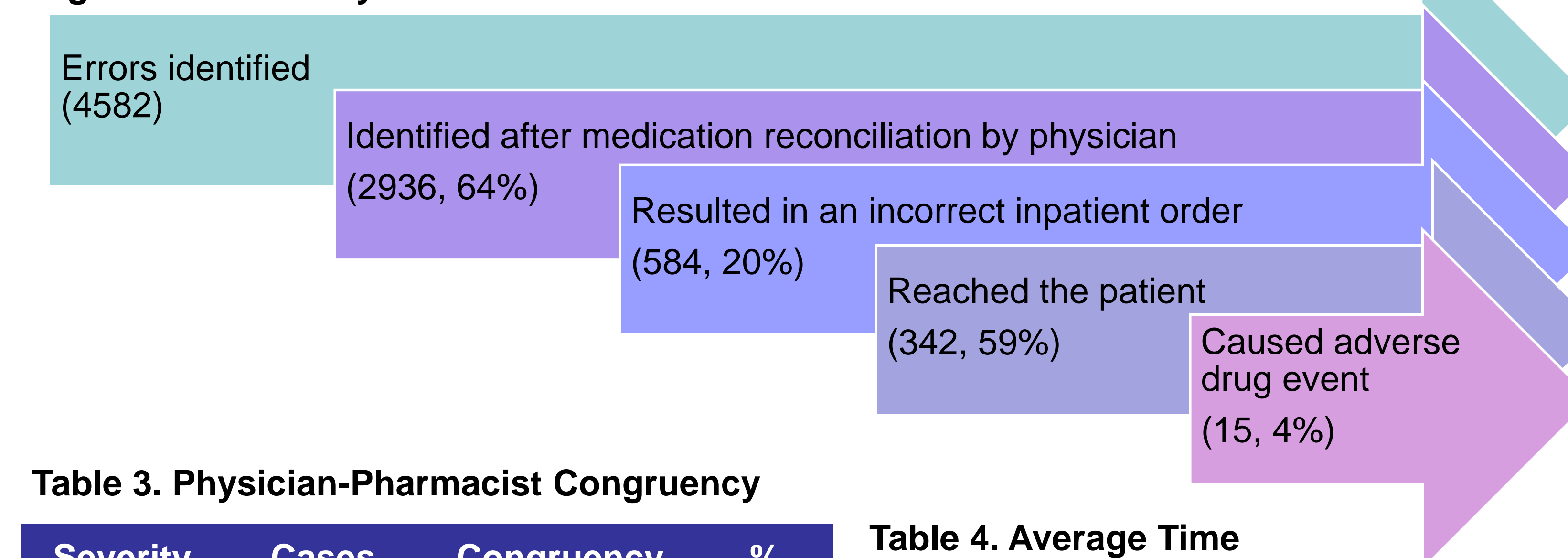
**Figure 1. Demographics**



**Figure 2. Common Errors and Severity**



**Figure 4. Secondary Outcomes**



**Table 3. Physician-Pharmacist Congruency**

Severity	Cases	Congruency	%
Serious	100	88	88.0%
Life-Threatening	70	54	77.1%
<b>Total</b>	<b>170</b>	<b>142</b>	<b>83.5%</b>

**Table 5. Projected Total Cost Avoided<sup>7,8</sup>**

Intervention Severity	Probability of ADE Happening	Average ADE Cost	# of Interventions	Cost Avoidance
No Harm	0%	\$5,000	0	\$0
Low Capacity	1%	\$5,000	3014	\$150,700
Serious	25%	\$5,000	1498	\$1,872,500
Life-Threatening	60%	\$5,000	70	\$210,000

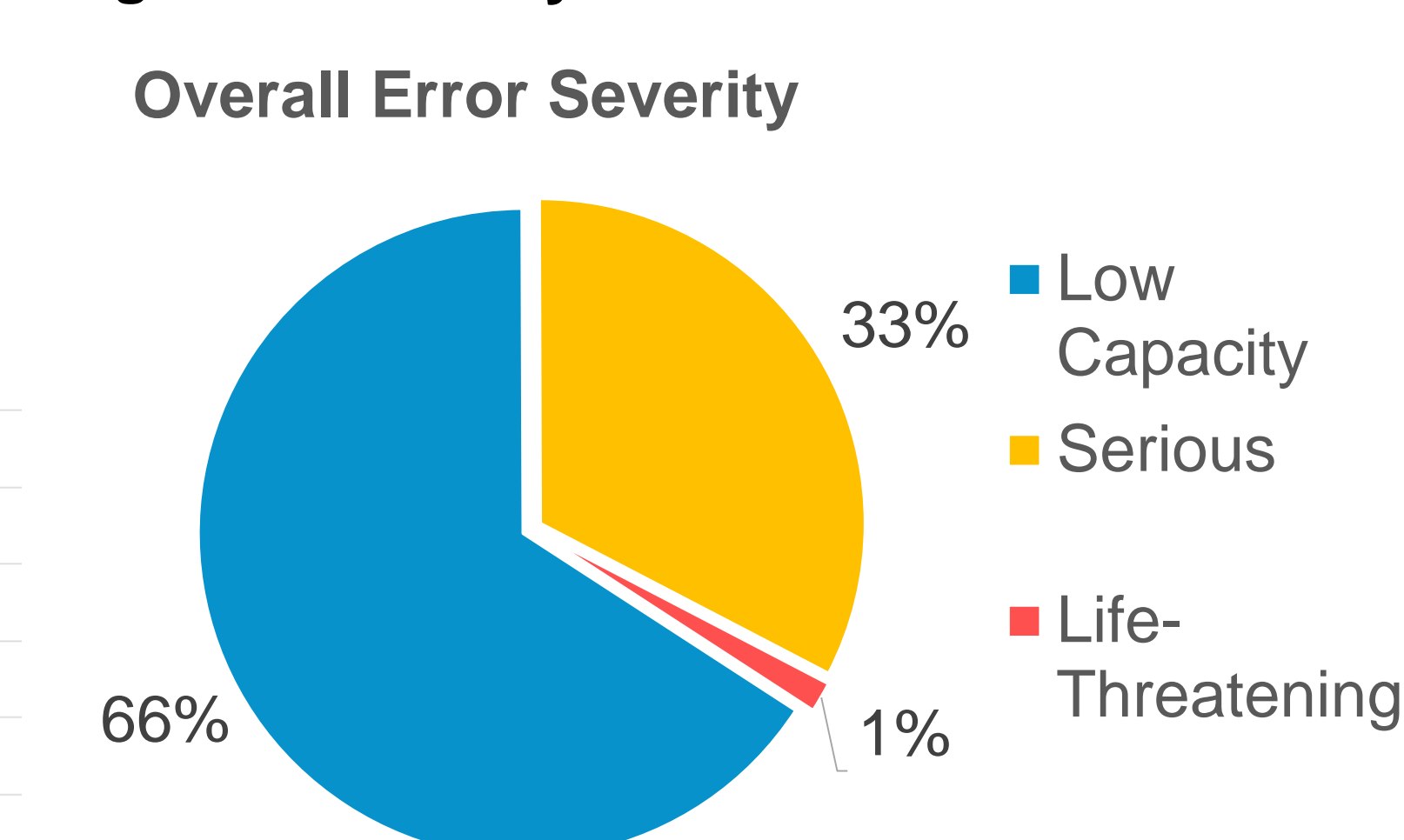
Total per 6-week project period: \$2,233,200

**Total per year: \$19,407,571**

**Table 2. Primary Outcomes**

Primary Outcomes	Per Patient (n=782)	Total
Errors	5.7 ± 5.4	4582
Identified prior to medication reconciliation by physician		36%
Identified after medication reconciliation by physician		64%
Patients with at least one error		90%
Patients with at least one serious or life-threatening error		64%

**Figure 3. Severity of Potential Harm**



**Table 4. Average Time**

Active Time Spent	Time
Interviewing patient and documenting in EMR	44 ± 23 minutes

## DISCUSSION

- In general, high-risk patients at Long Beach Medical Center have many errors on the prior to admission medication list prior to pharmacy review.
- 90% of admitted patients had inaccurate medication lists with an average of 6 medication errors on list.
- 64% of patients had serious errors on their medication lists
- 48% of incorrect inpatient orders were classified as potentially serious
- 20% of errors caused an incorrect inpatient order when medication reconciliation was completed prior to completion of the pharmacy med history
- Physician-pharmacist congruency rate was high, overall 84%
- Pharmacy team driven medication history program impact:
  - 44 minutes of nursing time saved per patient
  - Correcting serious and even life-threatening errors prior to discharge, minimizing harm to patient outside of hospital
  - Cost savings of millions of dollars annually

## LIMITATIONS

- Descriptive project, no statistical significance established
- Single facility data, limited generalizability
- High-risk criteria screening limited by information available in Electronic Medical Record at time of admission
- Classifying error type limited by information provided by patient
- Subjectivity of error classifications (hypothetical situations, differing opinions)
- Sample size was impacted by the COVID-19 pandemic

## CONCLUSIONS

High-risk patients have many errors on the prior to admission medication lists. Pharmacy staff involvement improves accuracy of medication lists, corrects errors prior to discharge, minimizes harm to patients outside of the hospital, saves nursing time, and saves millions of dollars.

For future directions, expansion of pharmacy medication history to all admitted patient may be considered to strengthen pharmacy impact on a larger population.

## REFERENCES

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## ACKNOWLEDGMENTS

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## DISCLOSURES

None