

# From Pilot to Practice: Feasibility & Impact of a Trainee Integrated Pharmacy Practice (TIPP) Model Experience in Cardiology

Bethany A. Kalich, PharmD, BCPS<sup>1</sup>; Jonathan D. Cicci, PharmD, BCPS<sup>2</sup>; Shaily Shah, PharmD<sup>2</sup>; Brent N. Reed, PharmD, BCPS<sup>3</sup>

<sup>1</sup>University of the Incarnate Word, Feik School of Pharmacy, San Antonio, TX

<sup>2</sup>University of North Carolina Eshelman School of Pharmacy, Chapel Hill, NC

<sup>3</sup>University of Maryland School of Pharmacy, Baltimore, MD

## Background

- Improvements in quality of care are at the center of health care reform
- Medication-use is a key area of emphasis given the association with readmissions and adverse events
- Pharmacists possess a unique expertise in optimizing the safety & efficacy of medication therapy and thus can serve as key players in the effort to improve health care outcomes
- Resources for expanding clinical pharmacy services may be limited, therefore trainee integrated pharmacy practice (TIPP) models may provide a strategy for meeting these evolving demands while optimizing the involvement of student and resident trainees in both clinical and educational roles
- The cardiology service, which is traditionally serviced by one clinical pharmacy specialist, was selected for this pilot model given the high rates of readmission and extensive number of medications required to manage this patient population

## Objective

- To conduct a one month pilot TIPP model to evaluate the feasibility and potential impact of providing comprehensive clinical pharmacy services

## Methods

- In February 2013, the TIPP model was organized at this tertiary, academic medical center to coordinate pharmacy coverage across 2 acute care unit teams (MDC<sub>1</sub> and MDC<sub>2</sub>) and 1 cardiac intensive care unit (CICU) team:
  - MDC<sub>1</sub> – PGY1 and PGY2 cardiology specialty resident (PGY2<sub>CV</sub>)
  - MDC<sub>2</sub> – cardiology clinical specialist
  - CICU – PGY2 critical care specialty resident (PGY2<sub>CC</sub>)
  - Service wide admission medication history- pharmacy technician
- Clinical pharmacy services included pre-rounding, cardiology team rounds, plan of care recommendations, medication order verification, admission and discharge medication reconciliation, and discharge medication counseling for high-risk medications (e.g., antiarrhythmics, anticoagulants)
- Documentation included clinical intervention recommendations (categorized by drug, type and acceptance rate), admission reconciliation discrepancies discovered, and time required for daily activities (patient care, education and administrative/“off-rotation” responsibilities)
- Trainee education included daily patient discussions, topic discussions, weekly seminar, case conference and monthly journal club

## Results

Table 1: Patient Census During TIPP Model, mean ± SD

Cardiology Service Team	Average Daily Census
MDC1	10.6 ± 3.2
MDC2	13.2 ± 4.0
CICU	9.6 ± 1.5
Overall Pilot Average Daily Census	33.4 ± 5.3

- Dofetilide discharge counseling: 6/6 (100%) of patients
- Anticoagulation discharge counseling: 9/18 (50%) of patients (RR 3.0, 95% CI 1.37-6.57, p<0.01 compared to historical control months without trainee; data not shown)

Table 2: Medication Reconciliation, mean ± SD

	Admissions	Discharges
Overall pilot total, n	145 <sup>a</sup>	109
Reconciliations per day, n	8.1 ± 2.7	6.0 ± 2.3
Time per reconciliation, min	10.9 ± 7.7 <sup>b</sup>	8.0 ± 6.5
Total medication discrepancies discovered, n	512	N/A
Discrepancies discovered per patient, n	3.5 ± 3.1	N/A
Overall pilot total time per day for reconciliation, hr	2.2 ± 0.7	

Figure 1. Medication discrepancies Discovered, by Type

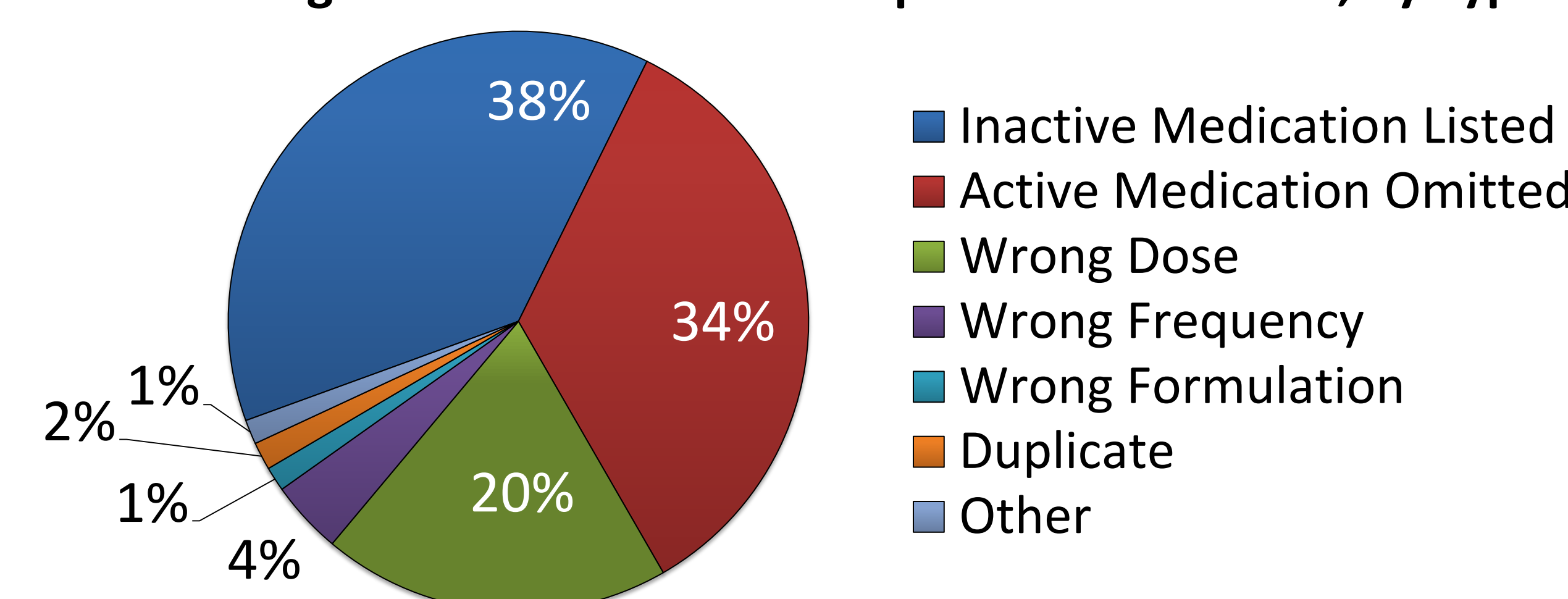


Table 3: Clinical Interventions

Overall Pilot Interventions	
Total	763
Average interventions per day, n	42.4
Acceptance rate of interventions	94.4%
Associated with Improvements In: <sup>c</sup>	
All-cause mortality	7.6%
Major adverse cardiovascular events (MACE)	13.3%
Hospitalizations	6.3%

Table 4. Time Utilization (hr), mean ± SD

Participant	Overall	Patient Care	Education	Administrative	Other
PGY1	10.8 ± 1.6	6.9 ± 1.1	2.5 ± 1.0	1.4 ± 1.0	0.1 ± 0.3
PGY2 <sub>CV</sub>	11.4 ± 1.0	7.2 ± 1.4	1.8 ± 1.0	2.3 ± 1.9	0.1 ± 0.3
PGY2 <sub>CC</sub>	11.0 ± 2.1	6.3 ± 0.9	2.1 ± 0.8	2.3 ± 1.5	0.3 ± 0.1
Clinical Specialist	9.9 ± 2.1	7.1 ± 1.7	1.4 ± 0.7	1.0 ± 1.0	0.3 ± 0.2

Participant	Preparation	Rounds	Med Rec	Counseling	Follow-up
PGY1	1.9 ± 0.3	2.4 ± 0.6	1.5 ± 0.6	0.2 ± 0.3	0.9 ± 0.5
PGY2 <sub>CV</sub>	1.2 ± 0.2	2.6 ± 0.7	1.5 ± 0.6	0.3 ± 0.6	1.7 ± 0.9
PGY2 <sub>CC</sub>	1.0 ± 0.4	3.4 ± 0.5	0.3 ± 0.3	0.1 ± 0.2	1.4 ± 0.5
Clinical Specialist	0.8 ± 0.4	3.2 ± 1.5	1.0 ± 0.4	0.2 ± 0.2	1.9 ± 0.7

<sup>a</sup> 14 patients were new to the health-system

<sup>b</sup> Does not include time spent by pharmacy technician collecting and compiling history

<sup>c</sup> Based on evidence from peer-reviewed literature

## Results (continued)

Figure 2. Clinical Intervention, by Type

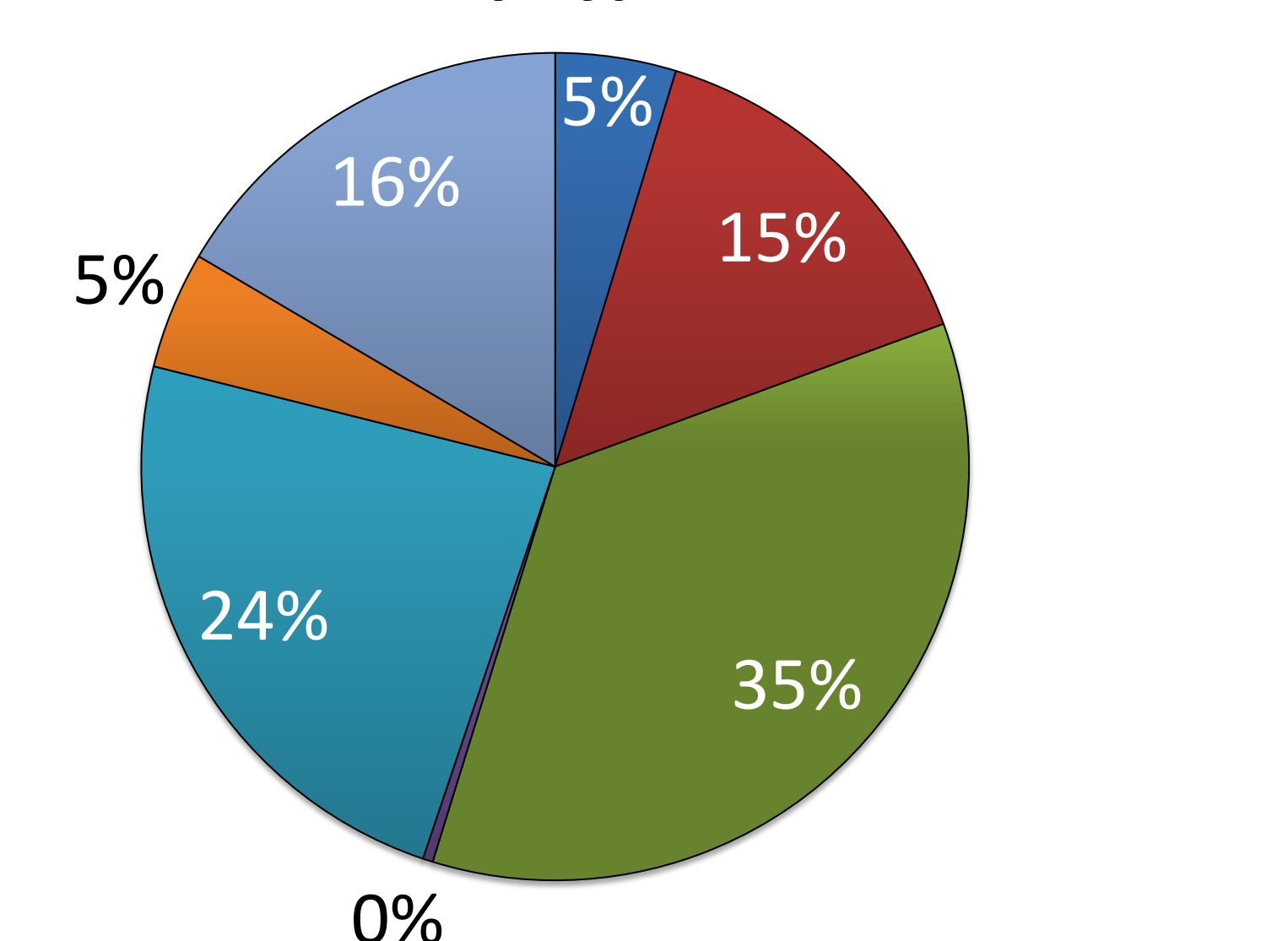
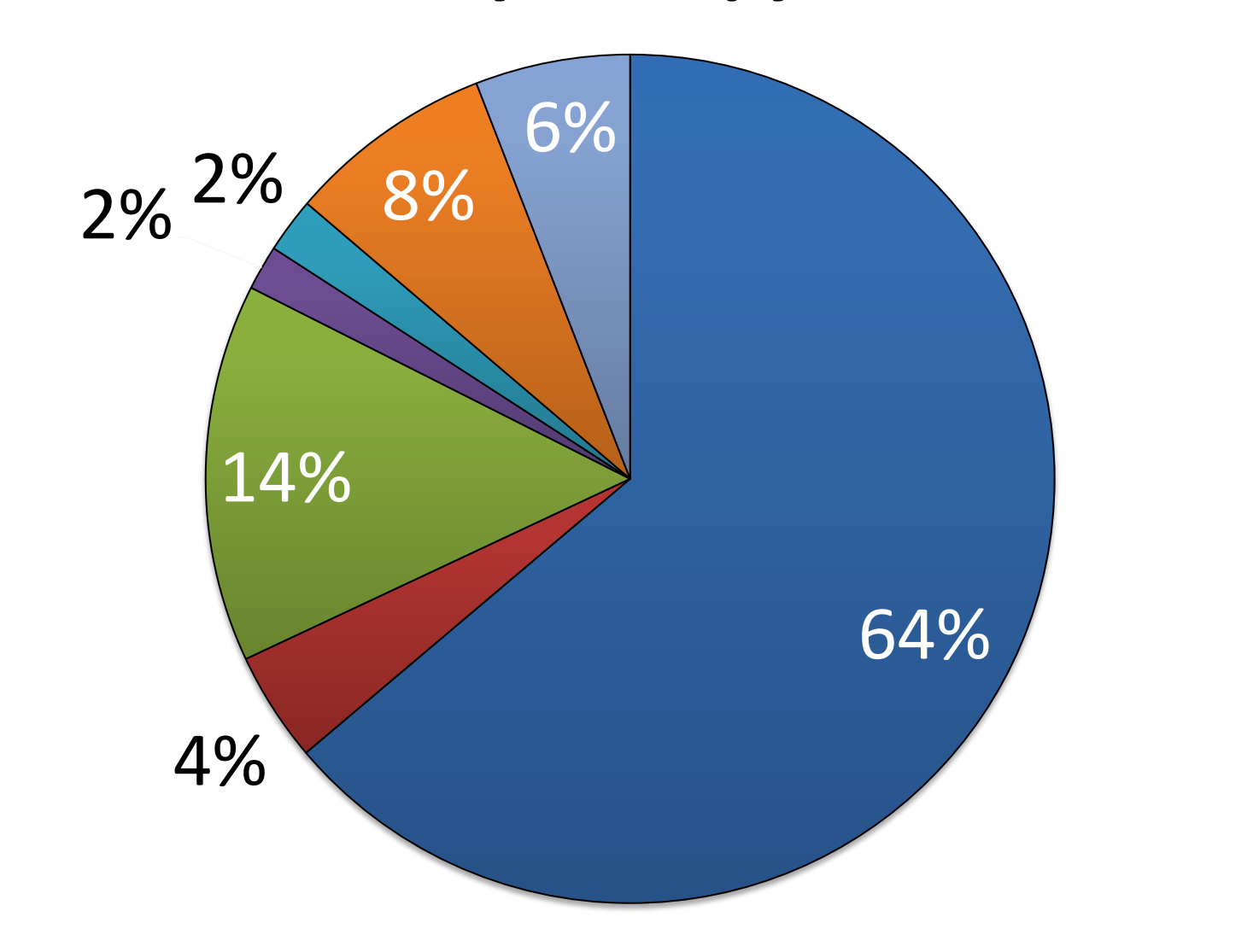


Figure 3. Clinical Intervention, by Therapy



- Clarify/Correct an Order
- Discontinue Inappropriate Therapy
- Optimize Dose/Frequency
- Identify Adverse Drug Event
- Initiate Appropriate Therapy
- Pharmacokinetics
- Recommend alternative therapy
- Cardiovascular
- Endocrine
- Anti-infective
- Pulmonary
- Immunologic
- Fluids, Electrolytes, Nutrition
- Misc

## Conclusions

- Despite 90% of patients being known to the health-system, an average of 3.5 medication discrepancies were discovered per patient, illustrating the importance of pharmacist-driven medication reconciliation
- Without the TIPP model's expansion of clinical pharmacy services including medication reconciliation, targeted discharge counseling and outcomes-based interventions, the 10 minutes per patient, or 2 hours per day, required for medication reconciliation would not have been feasible
- While 64% of clinical interventions were related to the optimization of cardiovascular medications, the diversity of the remaining interventions illustrates the complexity of this patient population, highlighting the need for the clinical pharmacist on the patient care team
- Of the 763 clinical interventions recommended by the TIPP model members, 27.2% were recognized in national practice guidelines and peer-reviewed literature as conferring improvements in mortality, MACE and hospitalizations, collectively, which has the potential to represent a considerable impact in a year-round, rather than 18-day model
- Though we did not achieve the 90% anticoagulation discharge counseling threshold set by the Joint Commission's National Patient Safety Goals, patients were 3 times more likely to receive discharge counseling in the TIPP model
- Limitations to recognize when considering implementation of this TIPP model in other settings include the potential lack of consistent trainee coverage from month to month, the inherent challenges in balancing education and practice, and the nature of this study in terms of the short duration and single center, service specific nature

## DISCLOSURES

Authors of this presentation have no disclosures concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this study

## ACKNOWLEDGEMENT:

We would like to thank Nadia Koranteng for her contributions as our medication history technician, as our ability to perform medication reconciliation would not have been possible without her efforts.

## REFERENCE:

The Joint Commission: National Patient Safety Goals. Hospital Accreditation Program. 2012. Available at: [http://www.jointcommission.org/assets/1/18/NPSG\\_Chapter\\_Jan2013\\_HAP.pdf](http://www.jointcommission.org/assets/1/18/NPSG_Chapter_Jan2013_HAP.pdf). Accessed: October 8, 2013.