

Recommendations to Improve Medication Safety: Risks Associated with Medication Reconciliation and Transitions of Care

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Objectives

- Cite evidence regarding the frequency of medication errors in medication histories.
- Describe the role of pharmacists in reducing readmissions through safe medication transition programs.
- Describe the rationale behind using trained pharmacy technicians to obtain medication histories.

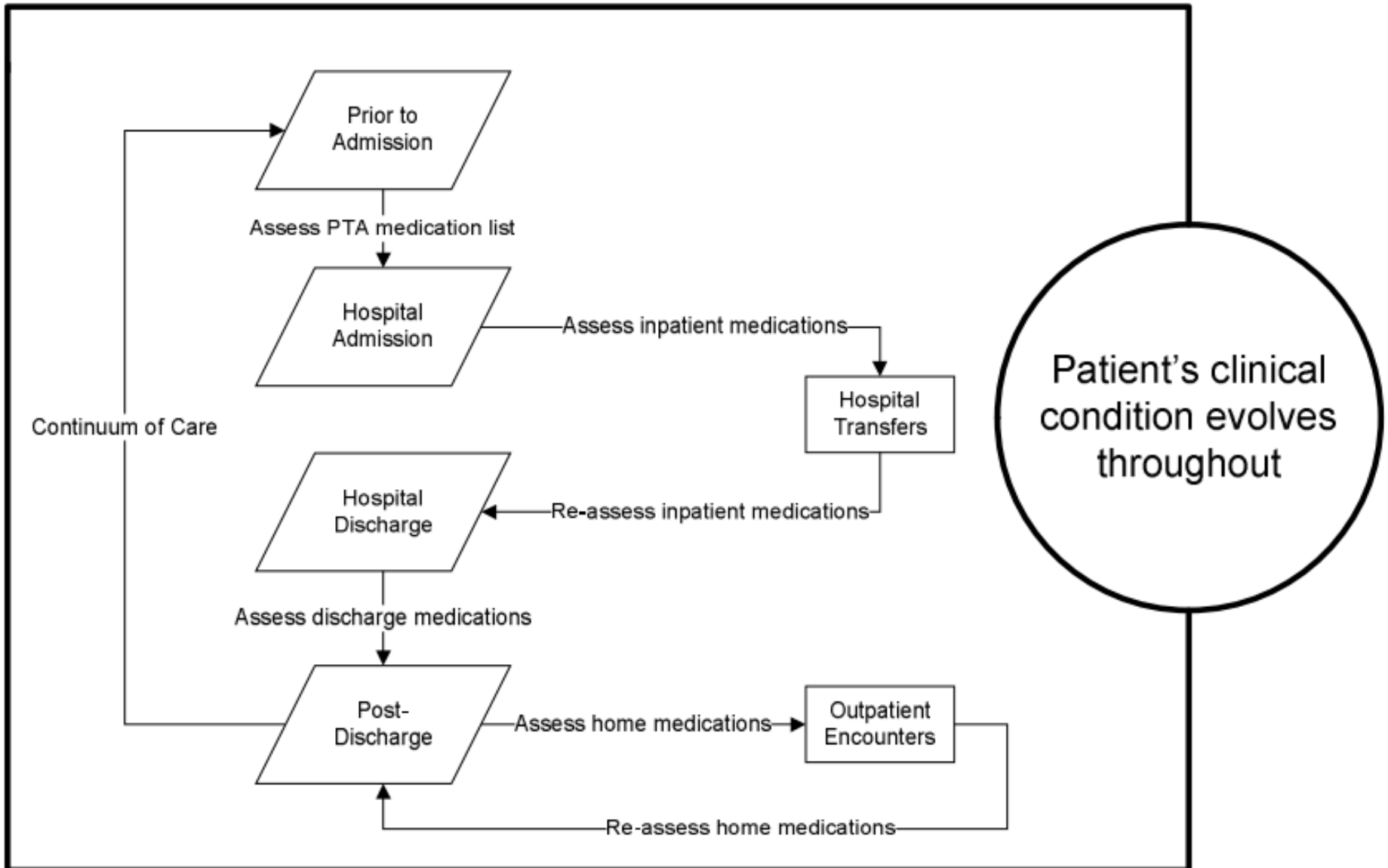
Background

- Medication reconciliation (med rec) is required by The Joint Commission and the Center for Medicare/Medicaid Services as part of Meaningful Use
- The process is intended to ensure the accuracy of the medication list at each patient encounter
- Medication lists are entered into electronic health records (EHR) by a variety of individuals (both licensed and unlicensed) across different healthcare settings
- The medications entered are not always accurate
- These lists are used to create hospital medication orders resulting in continuation of inaccurate and/or incorrect medications

Background

- Clinicians rely on the information and prescribe medications that are listed even though the information may be inaccurate
- The requirement for med rec and adoption of the EHR has increased the potential for harmful medication errors with the unintended consequence of creating “med wreck”
- A medication order is a sentence
 - If any element: drug, dose, dosage form, route, frequency, duration are incorrect, incomplete or unclear, patient harm can result
- Evidence supports the need to improve current processes to prevent medication errors and patient harm

Ensuring the Accuracy of the Medication List



Evidence

- 54-86% of patients have discrepancies in medications upon admission to the hospital with an estimated 3.3 discrepancies or errors/patient^{1,2}
- Reported rates of inpatient medication errors range from 45% to 76% due to inaccuracies in medication histories and reconciliation with most errors occurring on admission³
- 14-80% of patients experienced at least 1 medication discrepancy or error post-discharge⁴⁻⁷
- 19% of patients experienced an adverse event within 3 weeks of hospital discharge, 67% were attributed to medications and 12% of the adverse drug events were preventable⁸

Sources of Medication Lists

Errors introduced in any of these settings can become “hardwired” into the pt record

Home

- Pt
- Family members
- Caregivers
- Home Health nurses

Outpatient Settings

- Certified medical assistants
- Physicians
- Community pharmacies
- Patients

ED/Hospital

- Nurses
- Physicians
- Pharmacists
- Pharmacy technicians
- Pharmacy residents, students

Skilled Nursing Facility

- Nurses
- Physicians

CMS 2012-Meaningful Use

- Any licensed healthcare professional and *credentialed medical assistants*, can enter orders into the medical record
- Credentialed medical assistants are:
 - Certified medical assistants-graduates of an accredited medical assisting program
 - Training requirements: 2-6 units of pharmacology training. (based on evaluation of 4 California programs)
- Medical assistants (who are not certified) who have completed a required order entry course



Medical Assistants

Requirements for Order Entry into Electronic Health Records

- 2 yr recent experience in a health care facility under the supervision of a licensed health care provider (LHP)
- Application signed by supervising LHP attesting proficiency in areas including pharmacology
- Completion of Assessment-Based Recognition in Order Entry (ABR-OE) training-5 courses (1 hr each)
 - Clinical Laboratory Testing
 - Lost in Translation: Eliminate Medical Errors
 - Medical Records: A Vital Wave
 - Disease Screening
 - Legal Aspects of Patient Care Documentation

Prior to Admission Medication History Drug-Related Problems in High Risk Patients (Errors or Discrepancies)

November 2011 – March 2013

**Drug-Related Problems (DRPs) Resolved:
6,184 (803 patients)**

Average : 7.7/patient

- 54% of resolved DRPs were classified as life-threatening or serious
- 35% of inpatient orders needed to be corrected
- Based on risk stratification algorithm only 25% of patients had both high medication adherence and literacy

Prior to Admission (PTA) Drug-Related Problems (DRPs) Examples

Medication on PTA List	Drug-Related Problem	DRP Type	Capacity for Harm
Flecainide	PTA List: Med not listed on PTA med list Finding: Pt reports taking flecainide 50 mg BID	Omission of Medication	Life-Threatening
Clopidogrel	PTA List: Med not listed on PTA med list Finding: Pt reports taking Plavix 75 mg daily	Omission of Medication	Serious
Methotrexate	PTA list: methotrexate 10mg daily Finding: Pt reports taking 10mg every Sunday	Wrong frequency	Life-Threatening
Mycophenolate	PTA List: Mycophenolate 360 mg BID Finding: Pt reports taking 720 mg BID	Wrong Dose	Serious

Resolution of Post-Discharge Drug-Related Problems (DRPs)

Post-discharge Medication Reconciliation

January 2013 – June 2013

DRPs Resolved: 601 (207 patients)

Average: 2.9 DRPs/patient

- 58% of patients had discrepancies between their discharge medication list and what they were taking
- 33% of patients were taking more medications than were prescribed*
- Estimated 16% of patients would have been readmitted base on physician evaluation**

*Excludes vitamins, herbals, OTC supplements

**Validated by hospitalist physicians

Pharmacist's Role in Evaluating Medications (Focus on Hospitals)

Medications

Prior to Admit Medication List

As well as new orders

Drug

Indication

Dose

Route

Frequency

Dosage form

Duration

Patient Characteristics

Age

-Pediatrics

-Geriatrics

Gender

Height/Weight

Allergies

Kidney/Liver Function

Current labs

Previous admissions

Current Medication List

Drug-drug interactions

Drug-disease interactions

Drug-food interactions

Duplicate therapy

Contraindications

Medications needed but not prescribed

Monitoring requirements

Special Considerations

High risk patients or therapies such as:

Chemotherapy

Blood thinners

Antibiotics

Drugs with narrow therapeutic index

ICU

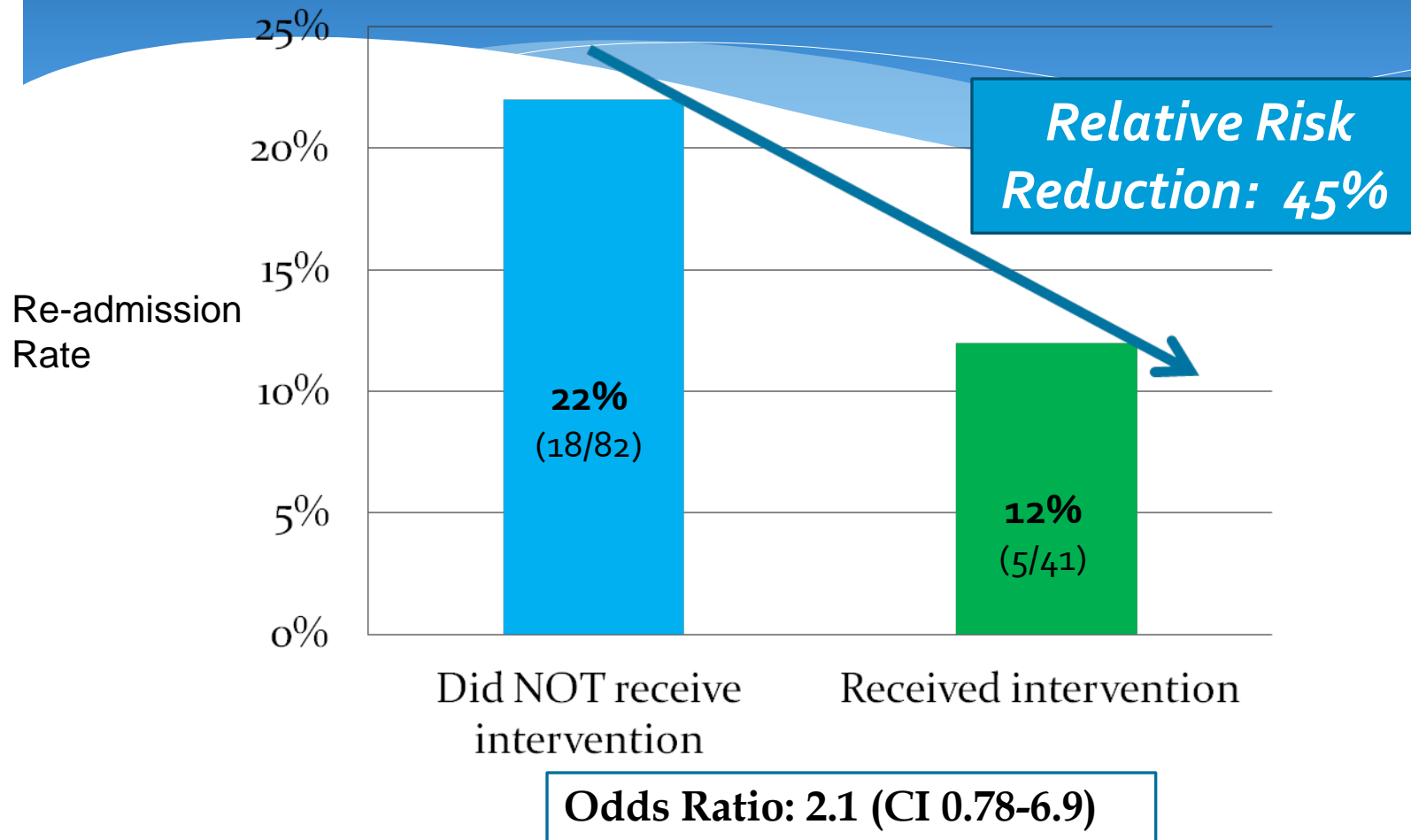
Examples of Pharmacist Post-Discharge Follow-up

Reason for Admission	Drug-Related Problems Identified Post-Discharge and Pharmacist Intervention	Adverse Outcome Prevented
<p>54 y/o w/ HTN & DVT admitted for sickle cell crisis & left parietal stroke</p>	<p><u>Issue discovered:</u> Pt had <u>self-discontinued</u> warfarin, amlodipine, and carvedilol</p> <p><u>Intervention:</u> Pharmacist contacted MD and confirmed that warfarin and anti-hypertensives should be re-started. Pharmacist educated pt on medications and instructed pt to not adjust any med w/o speaking to MD</p>	<p>Avoided potential thrombo-embolism, readmission, and/or death</p>
<p>92 y/o w/ altered mental status found to have a UTI & toxic digoxin level, also w/ arrhythmias & low blood pressure</p>	<p><u>Issue discovered:</u> Pt had <u>continued taking</u> medications that had been stopped, including digoxin, metoprolol, and zolpidem</p> <p><u>Intervention:</u> Instructed patient to d/c these medications</p>	<p>Avoided potential drug toxicity, life-threatening arrhythmias, recurrence of confusion, readmission, and/or death</p>

Examples of Pharmacist Post-Discharge Follow-Up Skilled Nursing Facility Patients

Reason for Hospital Admission	Drug-Related Problems Identified Post-Discharge and Pharmacist Intervention	Adverse Outcome Prevented
<p>98 y/o M from home w/ hip fracture and multiple medical issues.</p>	<p><u>Issue discovered:</u> Pt was a new start on fentanyl 25mcg patch as an inpatient. Dose was increased to 50mcg 1 hour prior to discharge.</p> <p><u>Intervention:</u> Called SNF to d/c fentanyl 50mcg patch order. Informed SNF RN that the patch was already placed on the pt. SNF RN was unaware.</p>	<p>Avoided severe respiratory depression or death due to potential supra-therapeutic dose of fentanyl.</p>
<p>79 y/o M w/ ESRD - HD on TuThSat - with catheter-related <i>S. aureus</i> bacteremia.</p>	<p><u>Issue discovered:</u> Per ID, vancomycin after dialysis to be continued after d/c and was on discharge medication list. There was an order at the SNF for vancomycin but not at the dialysis center. Pt dialyzed on Sat after d/c but did not receive vancomycin.</p> <p><u>Intervention:</u> Ensured vancomycin administration occurred.</p>	<p>Avoided progression of bacteremia and catheter re-infection d/t missed doses of antibiotics.</p>

Prospective Study of 30 Day Readmission Rates for High-Risk* Patients Who Received Post-Discharge Follow Up



* High-risk: ≥ 10 chronic prescription medications, anticoagulants, diagnosis of CHF, AMI, history of transplant, on narrow therapeutic index drugs e.g. valproic acid, phenytoin, lithium, digoxin.

Pharmacist's Impact on Readmissions

	Einstein Health-care Network	Froedtert Hospital	Hennepin County Medical Center	Johns Hopkins	University of Pittsburgh Medical Center	University of Utah Hospital and Clinics
Re-admissions Reduction	50% (21.4% vs. 10.6%)	34% (30.37% vs. 20.13%)	65% (23% vs. 8%)	15% 13.7% vs. 11.7%	56% (23.7% vs. 10.5%)	28-38% (20.5-22.1% vs 16.0%)

Source: ASHP-APhA Medication Management in Care Transitions Best Practices. 2013

Pharmacist's Impact on Readmissions

University of Kansas Medical Center

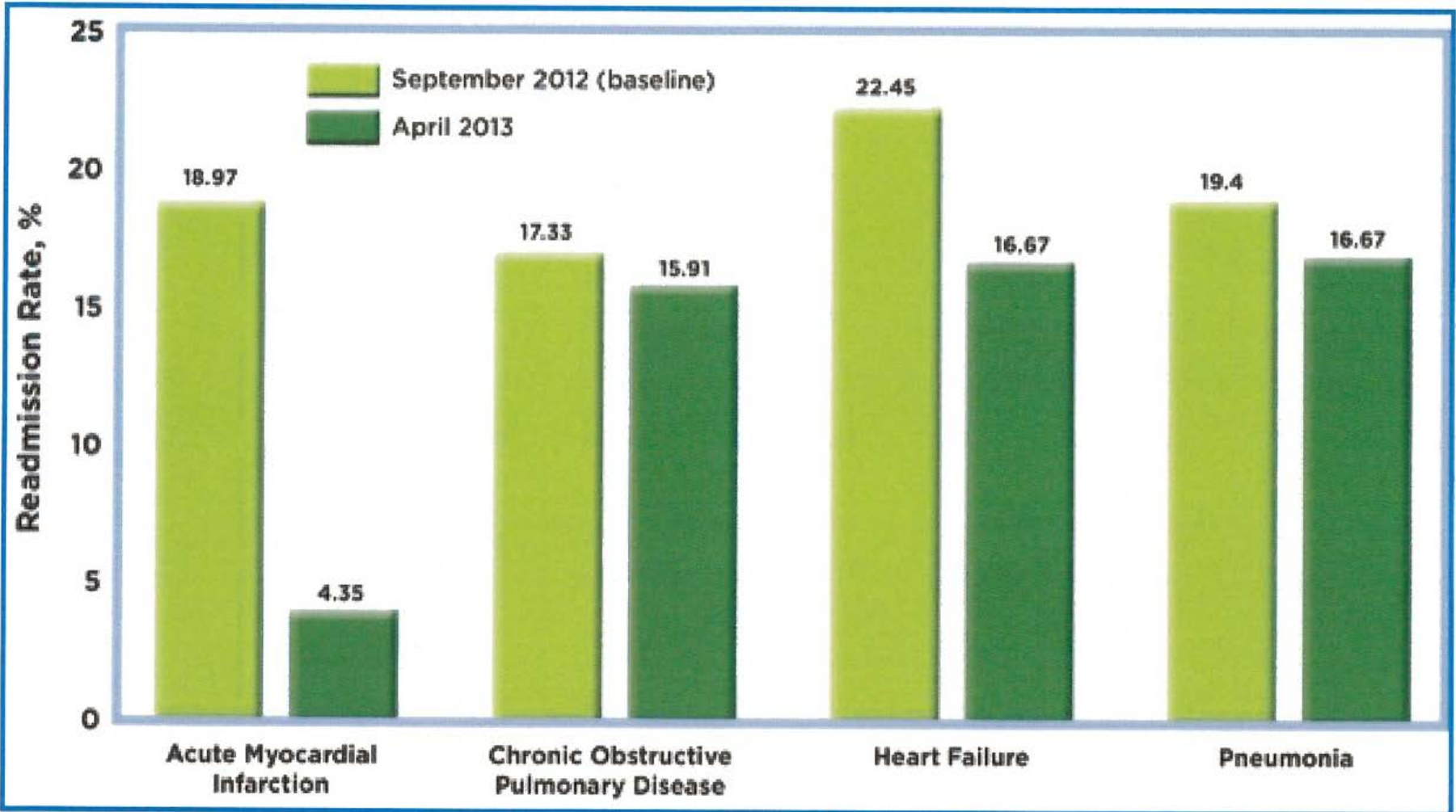


Figure. 30-Day readmission rates for core-measure patients.

Minimizing Errors in Medication Histories Obtained at Hospital Admission

Randomized Controlled Trial

Usual Care:
MD or RN

Pharmacist

Trained
Technician

- **High Risk Patients*** admitted via Emergency Dept
- **300 pt enrolled; 283 in final analysis**
- **Median age: ~76 (range: 50-83)**
- **Median # of meds” 14 (range; 10-19)**

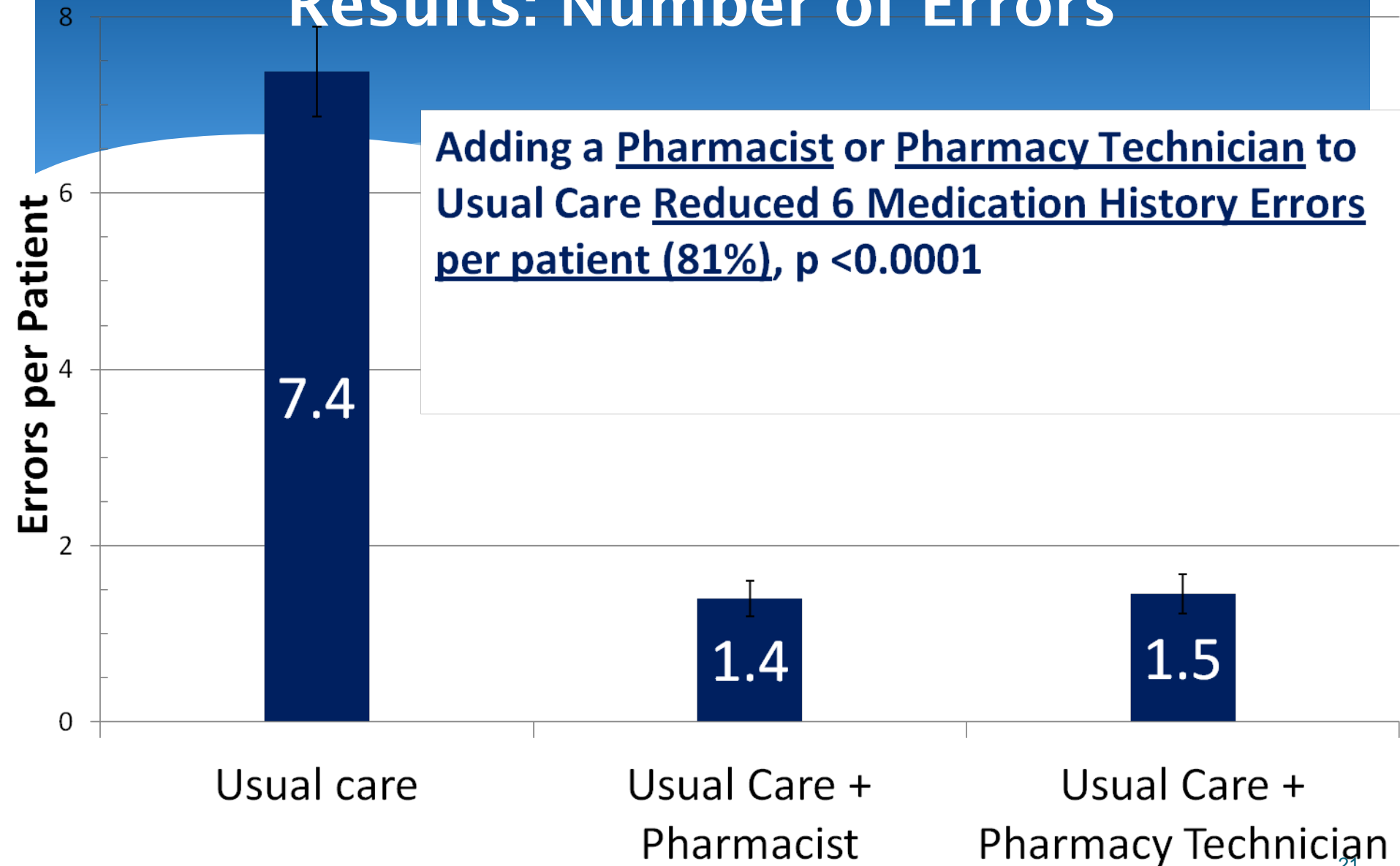
**High risk: ≥ 10 chronic meds, Acute MI, CHF, admitted from SNF, on anticoagulants, insulin, narrow therapeutic drugs, history of transplant*

Minimizing Errors in Medication Histories Obtained at Hospital Admission

Randomized Controlled Trial

- Pt histories independently evaluated within 24 hr by gold standard pharmacist (proven study methodology)
- Gold standard pharmacist took patient history, compared with history taken, determined # errors and severity of errors:
 - * Low capacity for harm: vitamin, laxative
 - * Serious: beta blocker for hypertension
 - * Life Threatening: transplant drug

Results: Number of Errors



Results: Severity of Errors

Weighted Errors per Patient

Adding a Pharmacist or Pharmacy Technician to Usual Care Reduced Weighted Medication Errors by >17/ patient (82%), p <0.0001

- 2 Life Threatening Errors or
- 4 Serious Errors or
- 17 Low-Capacity for Harm Errors

Usual care



Usual Care + Pharmacist



Usual Care + Pharmacy Technician



Recommendations to Ensure Patient Safety

Patient Safety Imperatives

- Medication lists are frequently inaccurate and can lead to harm
- Ensuring the accuracy of the medication list at each transition of care is essential, especially when patients are admitted to and discharged from the hospital setting

Recommendations to Ensure Patient Safety

- Hospital pharmacies should be responsible for ensuring the medication list is accurate upon admission
- Evidence supports that trained technicians can gather prescription information for the medication list for the pharmacist's review
- For high risk pts, pharmacists should conduct post-discharge follow up to prevent adverse drug events and admissions

Appendix

References

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7. Kilcup M, Schultz D, Carlson J, et al. Postdischarge pharmacist medication reconciliation: Impact on readmission rates and financial savings. *J Am Pharm Assoc.* 2003; 53:78-84.
8. Forster AJ, Murff HJ, Peterson JF, Gandhi TK, Bates DW. The incidence and severity of adverse events affecting patients after discharge from the hospital. *Ann Intern Med* 2003; 138: 161-7.

MedAL Score

Medication Adherence and Literacy Score

		Medication Literacy (Scale 0-4)		
		High Literacy (4 points)	Intermediate (2-3 points)	Low Literacy (0-1 point)
Medication Adherence (Scale 0-4)	High Adherence (4 points)	No Post DC Follow-up	No Post DC Follow-up	Perform Post DC Follow-up
	Intermediate (2-3 points)	No Post DC Follow-up	<u>Score 6</u> : No Post DC Follow-Up	Perform Post DC Follow-up
			<u>Score <6</u> : Perform Post DC Follow-Up	
	Low Adherence (0-1 point)	Perform Post DC Follow-up	Perform Post DC Follow-up	Perform Post DC Follow-up

DC= Discharge from hospital

1. Impact of Pharmacist Post-discharge Phone Calls on Hospital Readmission and Patient Medication Literacy and Adherence. <http://clinicaltrials.gov/show/NCT02031406>
2. Medication Adherence and Literacy as Predictors of Hospital Readmission. American Geriatrics Society Meeting 2014
3. Transitions trifecta: calibrating the severity of drug related problems, medication adherence, and literacy in a high risk population. [Abstract]. Presented at ASHP The Midyear on December 10, 2013.

Use of the Medication Adherence and Literacy Algorithm to Identify Pts At Risk for 30-Day Readmission

Retrospective Cohort Study (2/13-7/13): 278 pts

Pts admitted to hospitalist service and identified as high risk

Primary objective:

Determine if the Medication Adherence and Literacy (MedAL) algorithm effectively identifies patients at risk of readmission within 30 days

- High literacy/adherence (n=115)
 - 30 day readmission: 10% (12/115)
- Low literacy/adherence (n=163)
 - 30 day readmissions: 24% (39/143)

Secondary objective:

Determine if post-discharge (post D/C) follow-up impacts 30-day readmission rates for pts identified by MedAL algorithm

- Post-D/C follow-up completed (n=102)
 - 30 day readmission: 14% (14/102)
- Post-D/C follow-up not able to complete (n=61)
 - 30 day readmission 41% (26/61)

Use of the Medication Adherence and Literacy Algorithm to Identify Pts At Risk for 30-Day Readmission

Value as Predictive Indicator

The odds of readmission for the group identified as needing post-discharge follow-up was 2.8 times greater than for the group identified as not needed post-discharge follow-up (95% CI 0.172 - 0.710, p=0.0045)

Conclusion: The MedAL algorithm can serve as a tool to identify patients that are at risk for readmission within 30 days. Post-discharge follow-up of patients identified by the MedAL algorithm may reduce 30-day admission rates.