VICS
Vanderbilt Inpatient
Cohort Study

IMPROVE THE MOVE FROM
HOSPITAL TO HOME

Patient characteristics associated with medication errors after hospital discharge

Kathryn Goggins, MPH
Vanderbilt University

Authors: AH Salanitro, AP Myers, C Cawthon, KM Goggins, CL Leak,
JM Jacobsen, SK Nwosu, JS Schildcrout, JF Schnelle, T Speroff, S Kripalani

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Acknowledgements/Disclosures

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Background

- Many patients have problems after hospital discharge

  – Examples: medication management, side effects

  – In spite of medication review, reconciliation, and counseling

- Confusion about

  – "What" medications to take ➡ **Discordance**

  – "Why" prescribed

  – "How" to take them

    Misunderstanding of indication or dose

- Increases risk for adverse events and readmission

Objective

- To determine what patient- and medication-related factors are associated with:

  - **Discordance** (what medicines to take)

  - **Misunderstanding** (drug indication or instructions for use) following hospital discharge

- Examine the role of health literacy and numeracy, and number of medication changes

Study Design

- Vanderbilt Inpatient Cohort Study (VICS)
  - Ongoing 5-year prospective cohort study
  - Vanderbilt University Hospital
  - Patients hospitalized with acute coronary syndrome (ACS) and/or acute decompensated heart failure (ADHF)
- Sample
  - Enrolled October 2011 - August 2012
  - Completed medication review after discharge by phone

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Baseline Measures

- Short Test of Functional Health Literacy in Adults (s-TOFHLA)

- Subjective Numeracy Scale (3 items)

- Cognition (Short Portable Mental Status Questionnaire)

- Global health status (PROMIS, 5 items)

- Depression (Patient Health Questionnaire, 8 items)

- ENRICHD Social Support Inventory (ESSI, 6 items)

- Adherence to Refills and Medications Scale (ARMS, 7 items)

Outcome Assessment

- Follow-up call 2-7 days after hospital discharge
  - Patients asked to report all medications and supplements
  - Indication and dosing instructions for cardiac medications
- Outcomes
  - Discordant: "what" to take differed between discharge list and patient report
    - Omission: on discharge list, but not reported by patient
    - Commission: reported by patient, but not on discharge list
  - Misunderstanding of indication ("why") or dosing ("how")

Assessment of discordant vs. concordant medications

	Med 1	Med 2	Med 3
Patient report	--	Simvastatin	Lisinopril
Discharge list	Clopidogrel	Simvastatin	--
Outcome type	Discordant (Omission)	✓ Concordant	Discordant (Commission)
Total	2 Discordant medications		

Assessment of misunderstanding indication and dosing

SIMVASTATIN	Indication	Dose	Frequency
Patient report	"Keep stent open"	80 mg	At bedtime
Correct response	Lower cholesterol	40 mg	At night
Discrepancies	1	1	✓ 0
Total	2 Misunderstandings		

Table 1. Baseline characteristics

Patient Characteristics (N=471)		Mean (SD) or N (%)
Age		59.4 (12.5)
Female		228 (48.4)
Race:	White	380 (80.6)
	Black	80 (17.0)
	Other	10 (2.3)
Diagnosis:	ACS	333 (70.7)
	ADHF	99 (21.0)
	Both	39 (8.3)
Health Literacy:	Adequate	387 (83.0)
	Marginal	33 (7.1)
	Inadequate	46 (9.9)
Subjective Numeracy (1 to 6)		4.3 (1.4)

Table 2. Frequency of discordant medications and misunderstanding

Outcome (N=471)	N (%)
Discordant medication(s)	243 (51.6)
Omission	130 (27.6)
Commission	168 (35.7)
Misunderstanding of indication/dose/frequency	280 (59.4)

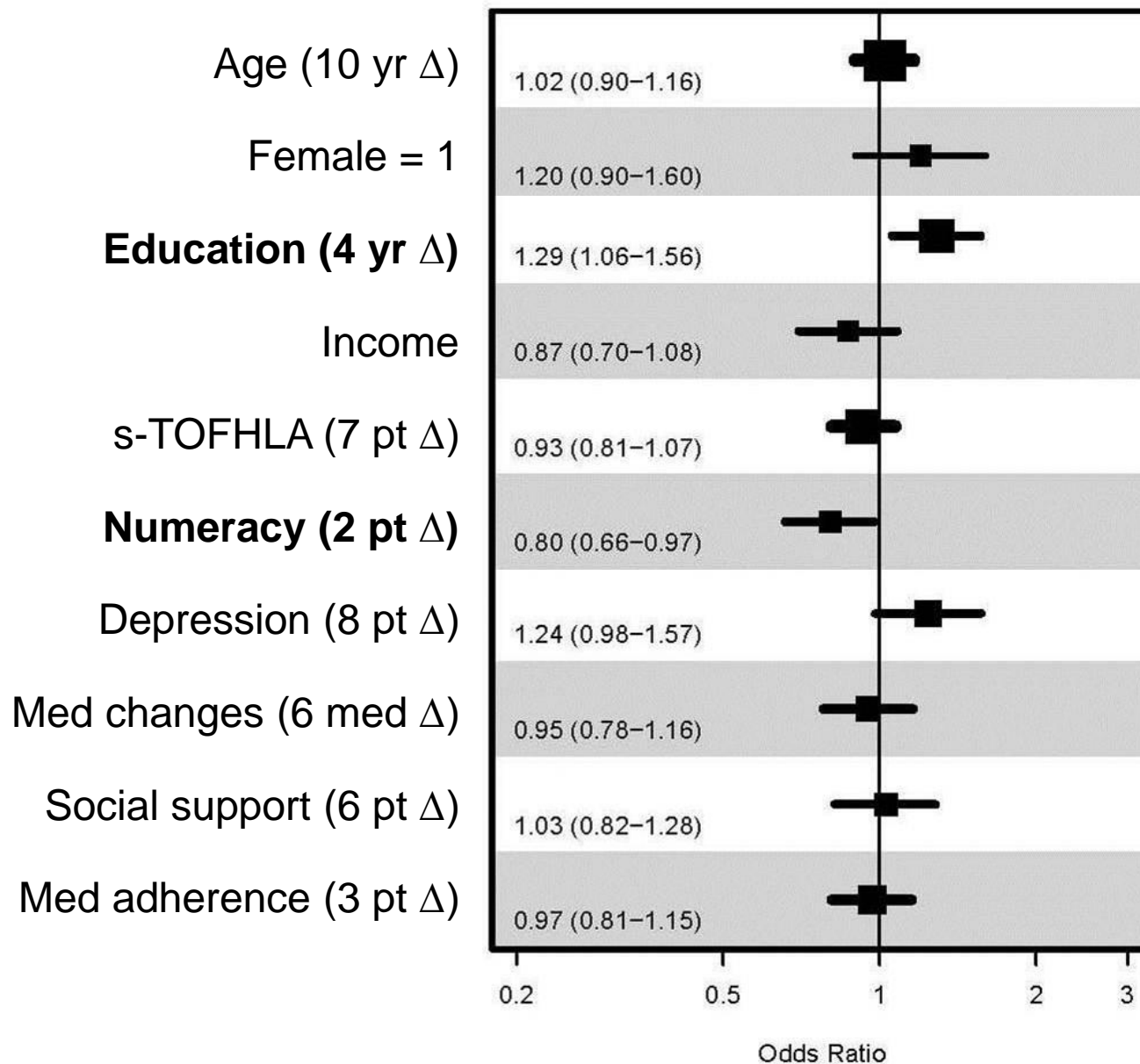# Figure 3. Factors associated with discordant medications

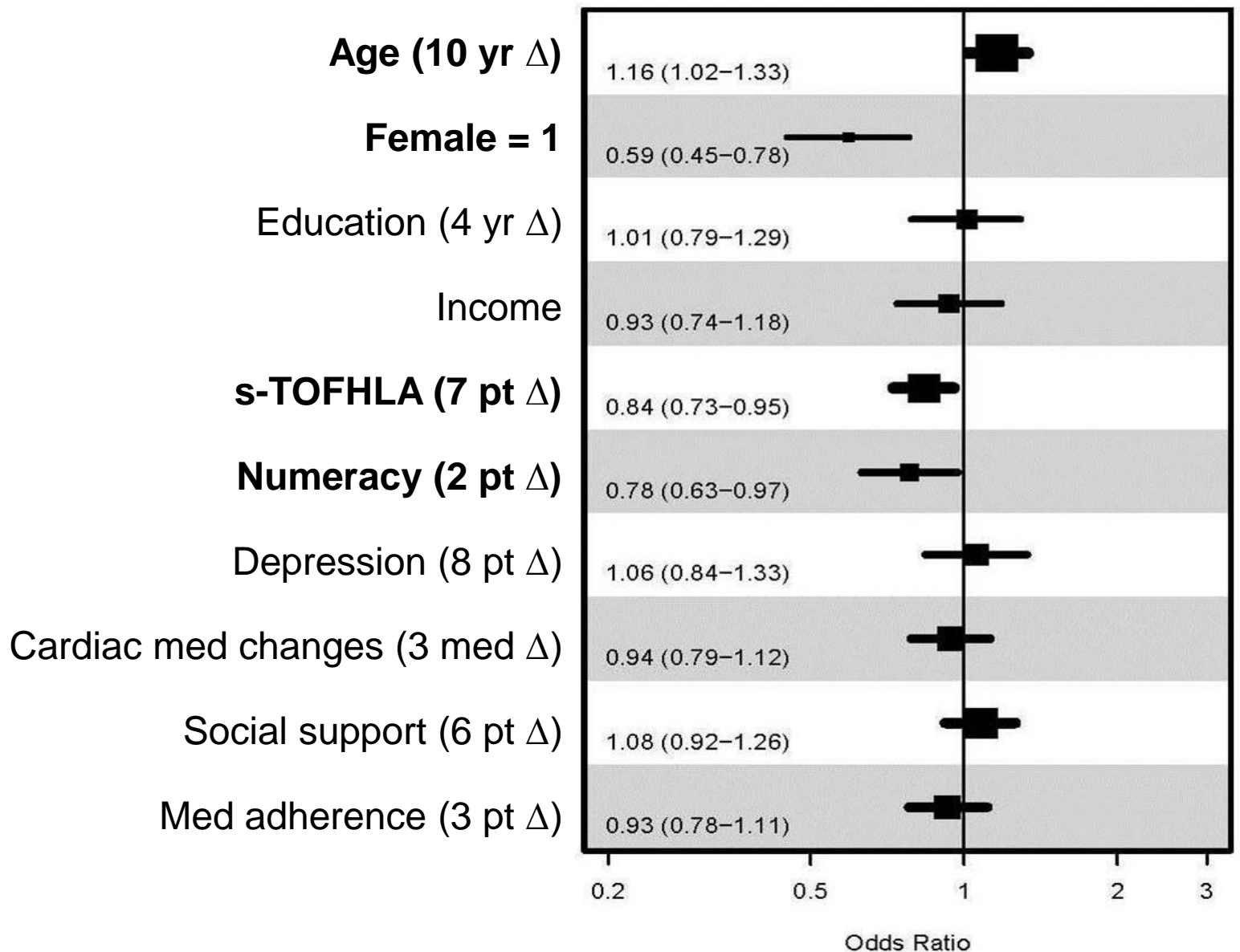|		
Age (10 yr Δ)	1.02 (0.90–1.16)	
Female = 1	1.20 (0.90–1.60)	
Education (4 yr Δ)	1.29 (1.06–1.56)	
Income	0.87 (0.70–1.08)	
s-TOFHLA (7 pt Δ)	0.93 (0.81–1.07)	
Numeracy (2 pt Δ)	0.80 (0.66–0.97)	
Depression (8 pt Δ)	1.24 (0.98–1.57)	
Med changes (6 med Δ)	0.95 (0.78–1.16)	
Social support (6 pt Δ)	1.03 (0.82–1.28)	
Med adherence (3 pt Δ)	0.97 (0.81–1.15)	

Odds Ratio

Figure 4. Factors associated with misunderstanding of indication, dose, and frequency for concordant cardiac medications

Factor	Odds Ratio (95% CI)
Age (10 yr Δ)	1.16 (1.02−1.33)
Female = 1	0.59 (0.45−0.78)
Education (4 yr Δ)	1.01 (0.79−1.29)
Income	0.93 (0.74−1.18)
s-TOFHLA (7 pt Δ)	0.84 (0.73−0.95)
Numeracy (2 pt Δ)	0.78 (0.63−0.97)
Depression (8 pt Δ)	1.06 (0.84−1.33)
Cardiac med changes (3 med Δ)	0.94 (0.79−1.12)
Social support (6 pt Δ)	1.08 (0.92−1.26)
Med adherence (3 pt Δ)	0.93 (0.78−1.11)

Odds Ratio

Discussion

- 51.6% of patients had discordant medication(s)
  - Predictors: higher education, lower numeracy
    - Low-numeracy had more errors of omission
    - Educated patients had more errors of commission

- 59.4% had misunderstanding of indication or dosing instructions for cardiac medications
  - Predictors: lower health literacy, lower numeracy, older age, male gender

Discussion

- Strengths
  - Utilized large sample size
  - Assessed several social determinants
  - Accounted for medication changes during hospitalization as a covariate

- Limitations
  - Single hospital limits generalizability
  - Have not yet delved into etiology of discrepancies
  - Did not rate potential for harm or actual harm

Conclusion

- More attention needed to medication safety among patients with low health literacy or numeracy
    - Potential for post-discharge follow-up (phone, office visit, home health) to identify and resolve discrepancies

Thank you!