Challenges in Predicting Discharge Disposition for Trauma and Emergency General Surgery Patients

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Background

- Ineffective discharge planning and subsequent delays leads to higher costs, increased hospital resource utilization, and increased risk for complications
- No prediction tools exist that cover the variety of injuries and diseases that encompass trauma and emergency general surgery (TEGS)

Study Objectives

- Determine the accuracy with which TEGS providers can predict the final discharge disposition of patients at the time of admission
- Determine the clinical factors associated with incorrect discharge disposition predictions

Methods

- TEGS team (medical students, residents, fellows, attending, advanced practice providers) were individually surveyed during morning sign-out
  - Fellows included with senior resident level
- Team members asked to predict the final discharge disposition for patients admitted to the service within the previous 24 hours
- Continuous data compared using Wilcoxon rank sum test and presented as median [IQR]
- Categorical data compared using Fisher's exact test

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Results: Patient Demographics

- 200 patients; 1,498 disposition predictions
- 83 (41.5%) admitted for traumatic injury
- Age: 45 [31-62] years
- Length of Stay: 3 [1.5-6] days
- ICU Admission: 55 (27.5%)
- 37 (18.5%) patients ultimately had a change in disposition at discharge compared to prior to admission

Results: Prediction Accuracy

Table 1: Overall discharge disposition correct prediction rate stratified by provider level

Provider Level	Correct Prediction Rate
TEGS Team	74.1%
Medical Student	73.8%
Junior Resident (PGY 1-3)	74.9%
Senior Resident (PGY 4-5)	73.9%
Attending Surgeon	74.7%
Advanced Practice Provider	73.0%

*No individual group statistically different, p = 0.984

Table 2: Discharge disposition correct prediction rate stratified by provider level and patient's final disposition compared to prior to admission

Provider Level	Discharged to Original Place of Residence	Change in Disposition at Discharge	p value
TEGS Team	83.0%	35.0%	< 0.001
Medical Student	85.6%	24.3%	< 0.001
Junior Resident (PGY 1-3)	82.5%	39.5%	< 0.001
Senior Resident (PGY 4-5)	82.3%	37.9%	< 0.001
Attending Surgeon	82.9%	38.9%	< 0.001
Advanced Practice Provider	81.1%	38.0%	< 0.001

*No individual group statistically different for patients discharged home (p = 0.694) or with a change in disposition (p = 0.262)

Results: Characteristics of Incorrect Predictions

Table 3: Characteristics associated with incorrect disposition predictions

	Correct Discharge Disposition Prediction (N = 1110)	Incorrect Discharge Disposition Prediction (N = 388)	p value
Age (years)	41 [30-58]	59 [37-74]	< 0.001
Female	457 (41.2%)	179 (46.1%)	0.095
Admission Type			
Trauma	381 (34.3%)	237 (61.1%)	< 0.001
Penetrating Injury	61 (5.5%)	20 (5.2%)	0.007
Blunt Injury	320 (28.8%)	217 (55.9%)	0.007
Emergency General Surgery	729 (65.7%)	151 (38.9%)	< 0.001
Weekend Admission (yes)	276 (24.9%)	110 (28.4%)	0.178
Surgery Performed (yes)	626 (56.4%)	208 (53.6%)	0.343
Length of Stay (days)	2 [1-4]	6 [3-11]	< 0.001
Geriatric (≥ 65 years, yes)	182 (16.4%)	143 (36.9%)	< 0.001
Frail (yes)	55 (5.0%)	80 (20.6%)	< 0.001
ICU Admission (yes)	213 (19.2%)	215 (55.4%)	< 0.001
Charlson Comorbidity Index (pt)	0 [0-2]	3 [0-5]	< 0.001
Injury Severity Score (pt)	8 [4-13]	12 [5-21]	< 0.001
APACHE II Score (pt)	7 [4-12]	10 [6-13]	0.001
ASA Score (pt)	2 [1-3]	3 [2-3]	< 0.001
Insurance			< 0.001
Commercial	579 (52.2%)	122 (31.4%)	
Medicaid or Medicare	389 (35.0%)	210 (54.1%)	
No Insurance	111 (10.0%)	43 (11.1%)	
Other/Unknown	31 (2.8%)	13 (3.4%)	
Discharge Disposition			< 0.001
Home	986 (88.8%)	187 (48.2%)	
Home with Services	51 (4.6%)	67 (17.3%)	
Acute Inpatient Rehabilitation	20 (1.8%)	54 (13.9%)	
Skilled Nursing Facility	35 (3.2%)	48 (12.4%)	
Long Term Acute Care Facility	10 (0.9%)	18 (4.6%)	
Death	8 (0.7%)	14 (3.6%)	

Conclusions

- TEGS team correctly predicted 74% of discharge dispositions
- Prediction accuracy did not correlate with clinical experience
- Incorrect predictions were associated with patients that were older, admitted for trauma, admitted to the ICU, frail, and more acutely ill or injured with higher acuity scores
- Flagging these patients and actively planning for their discharge earlier in the admission may improve resource utilization and decrease discharge delays