IRF to SNF: Referral Patterns of a Single Academic SCI Rehabilitation Center

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Background

Spinal cord injury (SCI) patients have high burdens of medical comorbidities and are likely (20%) to require skilled nursing facility (SNF) care after an inpatient rehabilitation stay. SCI patients at SNF have a much higher readmission rate (52.2%) than those who were discharged home (33.8%). Further, patients with SCI that do transition to a SNF experience a significantly worse overall quality of life, lower physical independence, mobility, and occupational functioning and self-sufficiency compared with their community-dwelling counterparts. Therefore, identifying high-quality nursing facilities may help ensure strong downstream outcomes and prevent adverse events. However, selecting the factors that constitute a high-quality facility continues to be challenging given the conflicting quality data and paucity of research regarding discharge trends and outcomes for SCI patients who discharge to SNF. Star ratings have been proposed as one mechanism to help guide patients to high-performing SNFs. However, local market dynamics and geographical proximity to a patient's home may mitigate the influence of SNF star ratings.

The aim of this study was to characterize SNF utilization for patients with SCI following discharge from an academic inpatient rehabilitation facility. Next, we evaluated what patient factors correlate with SNF star ratings. We also assessed whether SNF star ratings are associated with 30-and 90-day re-hospitalization and ED visits.

Methods

Target population
SCI discharges from one academic inpatient rehabilitation facility (IRF) from 2017-2022

Data Sources
EMR, eRehab, and CMS nursing home compare databases

Data Points
Demographic data (age, race, gender, etc.), Patient clinical data (injury, ventilator status, wound status, FIM, etc.), SNF data (names, location, NPI number, Star Rating), 30- and 90-day office follow up in PM&R, emergency department visits and hospital readmissions

Statistical analysis
All analysis was done in RStudio. Standard descriptive statistics, percents, and means are used to describe the study sample and study outcomes.

Results

Facility characteristics

175 patients were discharged to 90 distinct facilities. One facility located on the campus of the hospital system accepted 16.6% of the patients. Only 13 SNFs accepted 3 or more patients (137 patients discharged to 88 different SNFs). Average facility star rating for our patient cohort was 3.5 stars (Figure 1). Percentage of patients in higher starred facilities was statistically significant (p = 0.000), but this may be confounded by discharge to the on campus, five star rated SNF as patients may have selected to remain close by.

Figure 1: % patients by SNF Star Rating

15%
13%
14%
23%
35%
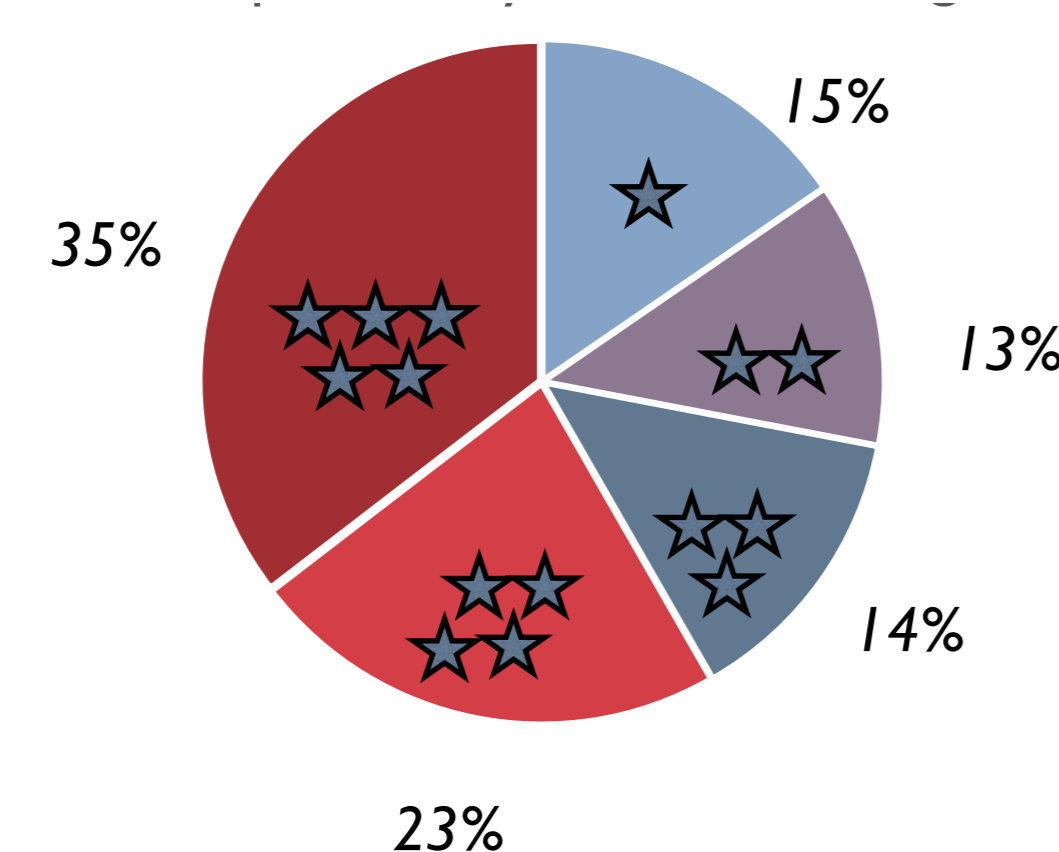
Results

Figure 2: Discharge disposition of SCI patients
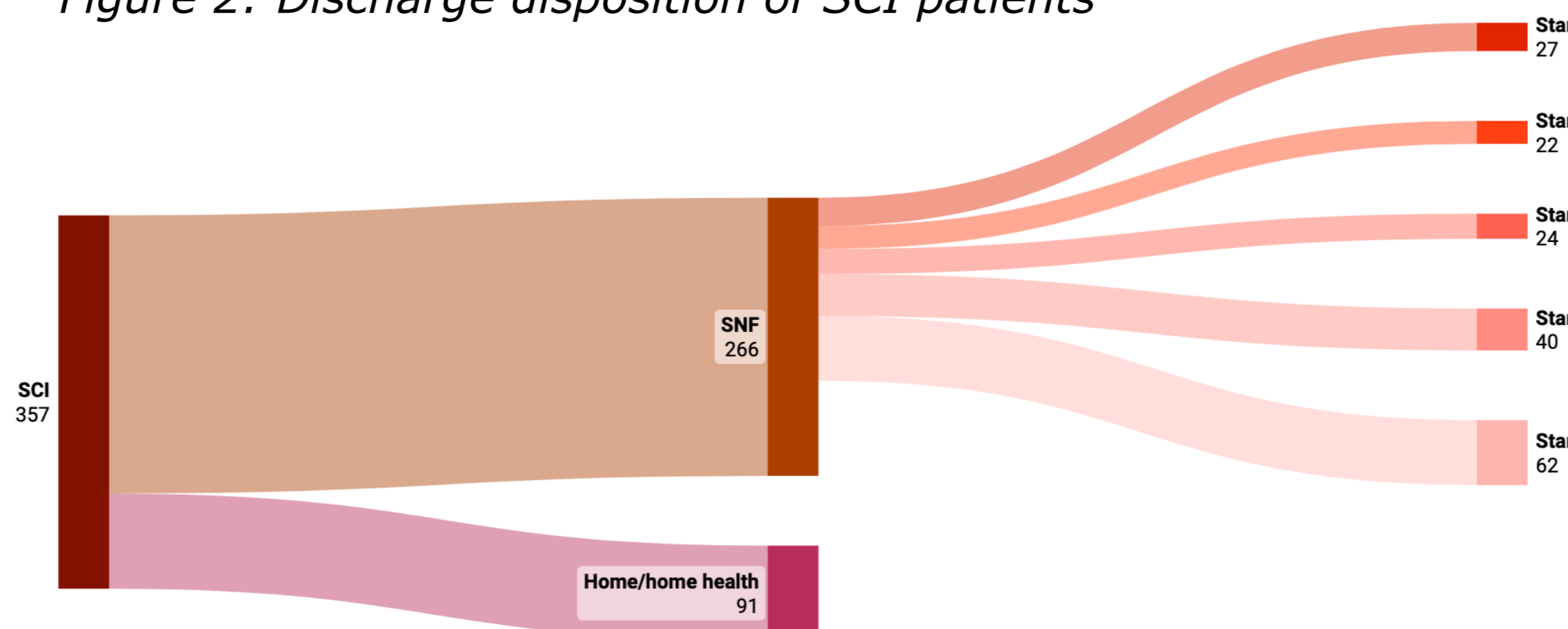
Figure 3: Patient characteristics

Age at Admission	
Median [Min, Max]	59 [18, 93]
Sex	
Female	29.7%
Race	
White	60.6%
Black / African American	36.0%
Asian	0.6%
Ethnicity	
Non-Hispanic	96.6%
Hispanic	2.9%

| Length of Stay	
Median [Min, Max]	20 [6, 58]
Admit FIM score	
Mean (SD)	21.3 (25.4)
Discharge FIM score	
Mean (SD)	29.2 (34.7)
Total FIM Change	
Mean (SD)	7.96 (11.5)
Distance from Home to SNF	
Mean (SD)	17.6 (54.6)
Median [Min, Max]	5.89 [0, 565]

Patient characteristics correlation

Most correlations between patient demographic and clinical characteristics with star ratings were weak (Figure 4). Sex and payer were more strongly correlated than race, pressure injury status, or ventilator status.

Medicare and Medicare advantage patient (79% and 64% respectively) are more likely to discharge to 4 and 5 star rated facilities.

Variance in SNF star ratings is greater for people who live within the same county as the SNF than those who live outside the county (p=0.023).

Figure 4: Correlation of factors with SNF star rating
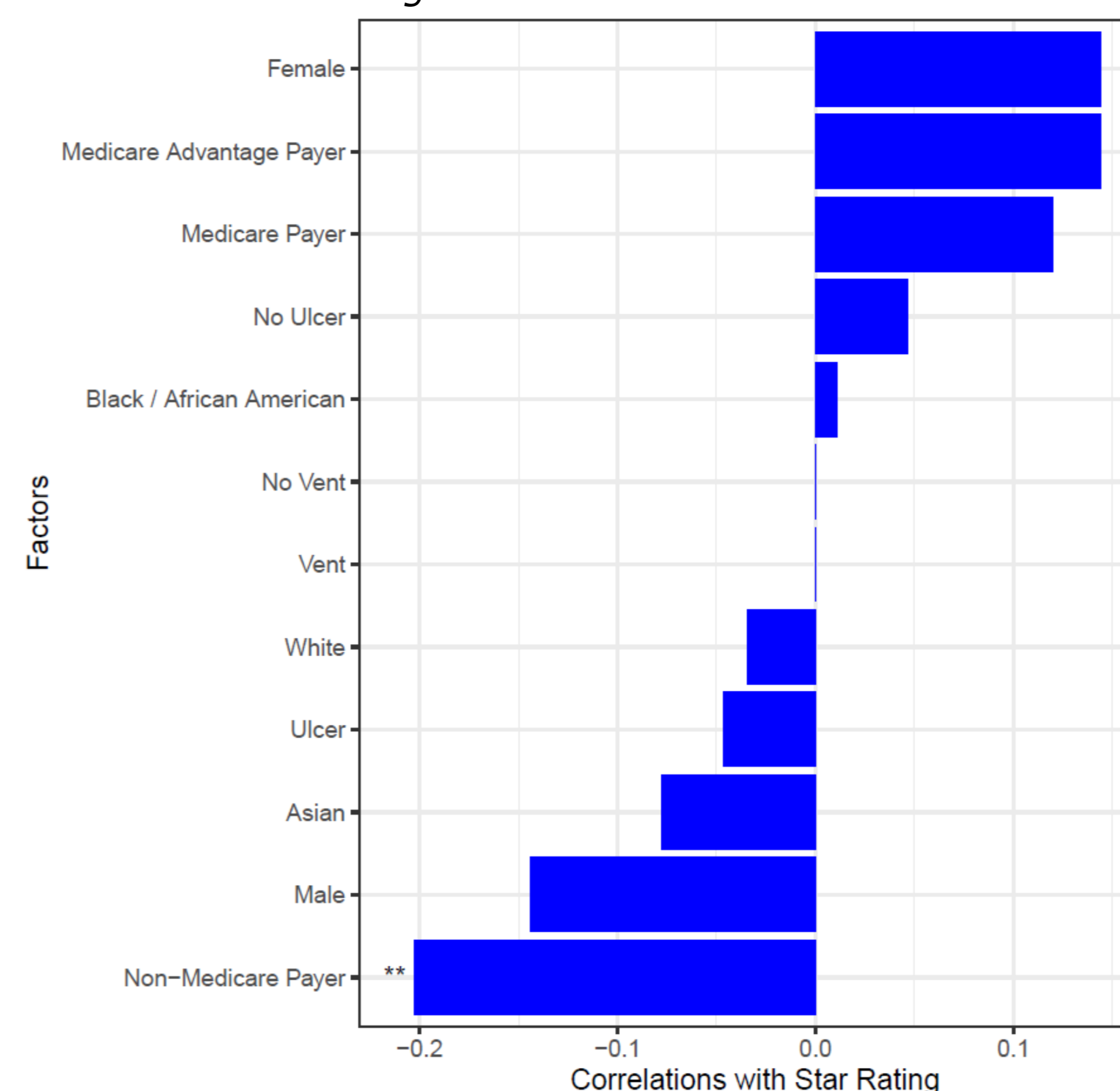
Results

### Hospital readmission, ED visit by 30- and 90-day
Star ratings are not associated with a statistically significant increase in hospital and emergency department readmission rates.

Figure 5: ED, hospital readmissions

ED-30	ED-90
1 Star 0.22 (0.44)	0.22 (0.44)
2 Star 0.18 (0.60)	0.73 (1.10)
3 Star 0.44 (0.53)	1.00 (1.22)
4 Star 0.11 (0.33)	0.44 (0.53)
5 Star 0.09 (0.29)	0.36 (0.58)
Total 0.18 (0.43)	0.52 (0.81)

Hops-30	Hosp-90
1 Star 0.09 (0.30)	0.27 (0.47)
2 Star 0.13 (0.35)	0.50 (0.54)
3 Star 0.56 (0.53)	1.00 (0.71)
4 Star 0.41 (0.62)	0.77 (1.09)
5 Star 0.27 (0.46)	0.73 (0.77)
Total 0.30 (0.49)	0.67 (0.81)

Figure 6: Correlation of factors with ED bounce back
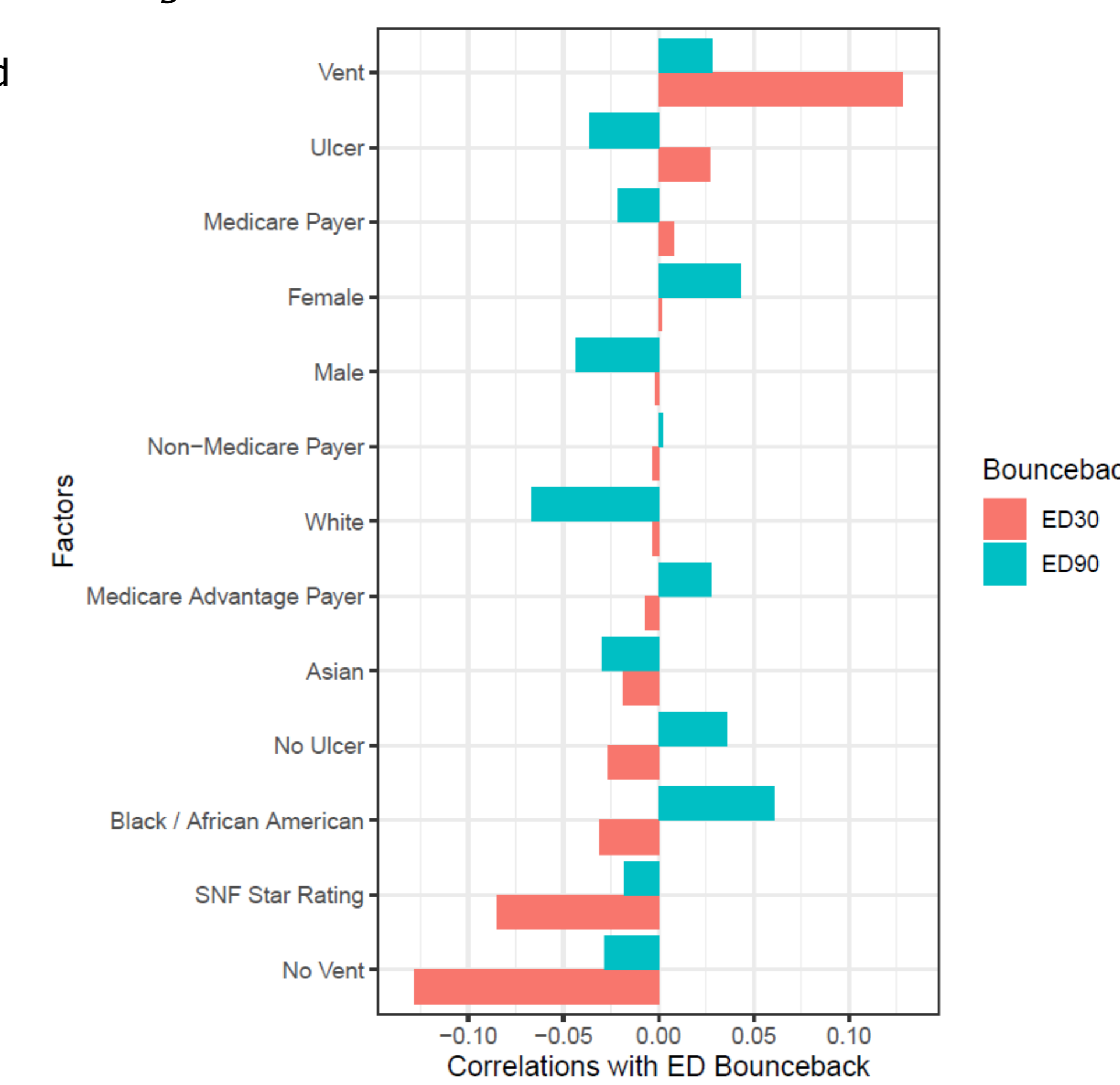
Discussion

SCI patient characteristics were not strongly associated with star rating of the receiving SNF at discharge from IRF. SNF Star rating was also not statistically predictive of hospital and ED readmission rates. Overall, the distribution of facility star rating was surprisingly even, and further review suggest location is the most strongly associated factor. Medicare enrollment results in discharge to higher-rated facilities, although this may be due to higher-rated facilities selecting for Medicare patients.

There is no clear evidence suggesting star ratings is or should be the top criteria when SCI patients select a SNF after IRF. Patients and families deserve objective data when selecting a SNF but clinically meaningful differences in quality-of-care dependent on star rating were not seen. In turn, patients and families likely choose convenience factors like location to select SNFs.

Limitation of this study include single site,. Readmission and ED data reflected only a single system and missing data was likely large and biased to location. Future studies should include prospective data including patient perspectives about factors impacting SNF selection and hard to track social determinants of health.

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