

Introduction

- In the United States, socioeconomic status has been shown to predict the quality of care patients receive. [1-3]
- As part of the Affordable Care Act, the Center for Medicare and Medicaid Services (CMS) has implemented a program linking healthcare quality with healthcare reimbursements in order to improve the quality of care received by all patients. [4]
- CMS measures healthcare quality and patient safety according to a suite of patient safety indicators (PSI)
- PSI measures the incidence of adverse inpatient events.
- Hospitals participating in this program are financially rewarded for providing high quality care and penalized for a decline in quality of care as determined by yearly PSI incidence.
- As the U.S. healthcare system continues to transition toward value-based reimbursement models, it is increasingly important to identify predictors of variation in healthcare quality among patients presenting with complex and costly diagnoses.

Methods

Study Design: Retrospective cohort design

Study Population: Patients in the Nationwide Inpatient Sample (NIS) that were diagnosed with primary spinal neoplasm between 1998-2011.

Outcome of Interest: Incidence of one or more PSI during an inpatient episode. Insurance status was the independent variable of interest (privately vs. Medicaid/self-pay).

Analytic Approach: Multivariable logistic regression was used to adjust for differences between insured populations. Incidence of one or more PSI served as our outcome variable, while insurance status, Elixhauser comorbidities, age, gender, hospital taching status, hospital bed size, hospital region, and admission status served as covariates [5]

Table 1: Patient Demographics and Hospital Characteristics

	Overall n = 6,095	Medicare n = 1,651	Private Insurance n = 3,691	Medicaid/Se lf-Pay n = 753	P - value
Age (years) ± SD	51.5 ± 17.0	68.6 ± 13	45.9 ± 13.4	41.0 ± 14.1	<0.0001
Female	2,938 (48.4)	859 (52.1)	1,722 (47.0)	357 (47.5)	0.8
Race					
White	3,475 (57.0)	1,077 (65.1)	2,116 (57.4)	282 (37.2)	<0.0001
Black	424 (6.9)	*	217 (5.8)	109 (14.4)	<0.0001
Asian	210 (3.5)	*	129 (3.5)	*	<0.05
Hispanic	393 (6.3)	*	203 (5.4)	121 (15.8)	<0.0001
Other	*	*	103 (2.7)	*	<0.05
Elective Admission	3,2109 (53.0)	718 (43.4)	2,217 (60.3)	284 (37.9)	<0.0001
Academic Hospital	4,438 (73.8)	1,022 (63.1)	2,853 (78.3)	563 (75.6)	0.11
Hospital Size					
Small	487 (7.5)	148 (8.4)	292 (7.4)	*	<0.05
Medium	1,120 (18.3)	332 (20.1)	630 (17.0)	158 (21.0)	<0.05
Large	4,472 (74.0)	1,165 (71.2)	2,762 (75.1)	545 (73.3)	0.18
Hospital Location					
Northeast	1,211 (20.9)	354 (22.4)	702 (20.0)	155 (21.7)	0.3
Midwest	1,289 (21.8)	352 (22.0)	801 (22.4)	136 (18.5)	<0.05
South	2,093 (33.1)	574 (33.5)	1,266 (33.0)	253 (32.5)	0.8
West	1,502 (24.2)	371 (22.1)	922 (24.5)	209 (27.2)	0.14
Number of Comorbidities	1.45 ± 1.44	2.2 ± 1.6	1.11 ± 1.3	1.37 ± 1.4	<0.0001
Comorbidity					
Alcohol Abuse	*	*	*	*	<0.05
Anemia Deficiency	425 (6.9)	184 (11.1)	181 (4.9)	*	<0.05
Arthritis	*	*	*	*	0.6
Blood Loss Anemia	*	*	*	*	0.23
CHF	133 (2.1)	103 (6.3)	*	*	0.22
Chronic Lung Disease	561 (9.3)	243 (14.9)	260 (7.1)	*	0.58
Coagulopathy	126 (2.1)	*	*	*	0.4
Depression	425 (7.0)	152 (9.2)	225 (6.1)	*	0.22
DM	561 (9.3)	252 (15.6)	245 (6.7)	*	0.74
DM with Chronic Cx.	106 (1.7)	*	*	*	*
Drug Abuse	*	*	*	*	*
Hypertension	1,842 (30.5)	821 (50.4)	875 (23.9)	146 (19.7)	0.26
Hypothyroidism	412 (6.8)	182 (11.0)	213 (5.8)	*	0.4
Liver Disease	*	*	*	*	*
Lymphoma	*	*	*	*	*
Electrolyte Disorder	604 (10.0)	262 (15.9)	260 (7.1)	82 (11.2)	<0.05
Metastatic Cancer	212 (3.5)	*	107 (3.0)	*	0.67
Neurological disorder	*	*	*	*	*

Table 1: Patient Demographics and Hospital Characteristics. All results are listed as N (weighted %) except that age and number of Elixhauser comorbidities are reported as mean ± standard deviation (SD). P-values refer to comparisons of Medicaid/Self-Pay and Private Insurance. * denotes an incidence rate that is below the reporting guidelines and cannot be reported.

Table 2: Effect of Insurance Status on Odds of PSI

	Insurance Status Only		Insurance Status + Patient Characteristics		Insurance Status + Patient and Hospital Characteristics	
	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
PSI	1.58*	1.01 - 2.49	1.78*	1.09 - 2.92	1.81*	1.11 - 2.95

Table 2: Effect of Insurance Status on Odds of PSI. All results are odds ratios comparing Medicaid/self-pay to private insurance. “*” denotes statistical significance at p<0.05. The results of three models are displayed: a univariable analysis with insurance status as the sole explanatory variable, a multivariable analysis with insurance status and patient characteristics as explanatory variables, and a multivariable analysis with insurance status and patient and hospital characteristics as explanatory variables. All calculations were performed using SAS version 9.4. PSI = patient safety indicator

Results

We identified 6,095 hospitalizations in which a spinal neoplasm was recorded during the inpatient episode. We excluded patients less than 18 years of age and with “other” or “missing” primary insurance status, leaving 5,880 patients for analysis. **After adjusting for patient demographics and hospital characteristics, Medicaid/self-pay patients had significantly greater odds of experiencing one or more PSI (OR 1.81 95% CI 1.11- 2.95) relative to privately insured patients.**

Conclusions

- This study is the first to demonstrate an association between insurance status and the quality of care administered to patients undergoing inpatient treatment for primary spinal neoplasms.
- As reimbursement continues to become intertwined with reportable patient outcomes, PSI will increasingly serve as a metric for clinicians and hospitals.
- Identifying methods to reduce the incidence of PSI in hospitalized patients will therefore not only benefit patients but also surgeons and hospital systems.
- Further research is warranted to better understand the cause of the observed disparities in PSI incidence and to develop initiatives that can improve care quality for all spinal neoplasm patients.

References

- Hacquebord, J., et al., Medicaid status is associated with higher complication rates after spine surgery. *Spine (Phila Pa 1976)*, 2013. 38(16): p. 1393-400.
- Lad, S.P., et al., Disparities in the outcomes of lumbar spinal stenosis surgery based on insurance status. *Spine (Phila Pa 1976)*, 2013. 38(13): p. 1119-27.
- Stone, M.L., et al., Primary payer status is significantly associated with postoperative mortality, morbidity, and hospital resource utilization in pediatric surgical patients within the United States. *J Pediatr Surg*, 2013. 48(1): p. 81-7.
- Agency for Healthcare Research and Quality. Quality Indicator User Guide: Patient Safety Indicators (PSI) Composite Measures Version 5.0.
- Elixhauser A, S.C., Harris DR, Coffey RM. Comorbidity Measures for Use with Administrative Data. *Med Care*. 1998;36:8-27.