



## Outcomes of Surgery for Lumbar Spinal Stenosis Depend on Insurance Type

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## Introduction

Lumbar spinal stenosis is one of the most common reasons patients undergo spinal procedures. The association between insurance type and outcomes of surgery for lumbar spinal stenosis is unknown. We sought to evaluate insurance disparities in the rate of complications, rate of reoperation, and health care resource usage after surgery for lumbar stenosis.

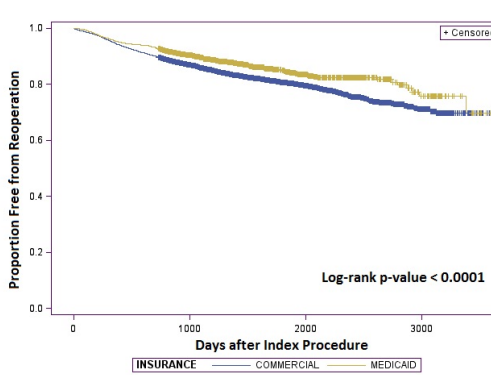
## Methods

We analyzed the Medicaid and Commercial datasets of the Reuter's MarketScan database. We included all adult patients with a primary diagnosis of lumbar stenosis who underwent laminectomy or fusion between 2000 and 2009. We excluded those who lacked 2 years of pre- and post-operative follow-up. We used multivariate regression and general linear models to determine the association between the different insurance types and the rate of reoperation, amount of health care resource usage, and rate of complications. We controlled for age, sex, year of index operation, length of follow-up, and comorbidities.

### Cohort Characteristics

	Total (n= 12127)	Commercial (n= 10604)	Medicaid (n= 1523)	p-value
Age [mean (SD)]	56 (8)	56 (7)	60 (12)	<0.0001*
Post-operative follow-up days [mean (SD)]	1505 (633)	1481 (623)	1675 (675)	<0.0001*
Gender: females [n (%)]	6500 (53.60)	5399 (50.91)	1101 (72.29)	<0.0001*
Charlson index [n (%)]				
0	9755 (80.44)	8816 (83.14)	939 (61.65)	<0.0001*
1	1891 (15.59)	1495 (14.10)	396 (26.00)	
2	368 (3.03)	222 (2.09)	146 (9.59)	
≥ 3	113 (0.93)	71 (0.67)	42 (2.76)	

### Trends of Reoperation



Kaplan-Meier curves for proportion free from reoperation stratified by insurance type.

### Complications after Lumbar Stenosis Surgery

	Total	Commercial	Medicaid	p-value
Index hospitalization	28462	25821	3641	
complications	1985 (6.97)	1725 (6.68)	260 (9.84)	<0.0001*
aOR (95% CI)		REF	1.215 (1.046, 1.410)	0.0109*
30-day complications				
Total n w/ 30 days post-op data	27577	25000	2577	
N(%)	2347 (8.51)	2059 (8.24)	288 (11.18)	<0.0001*
aOR (95% CI)		REF	1.144 (0.993, 1.318)	0.0626
90-day complications				
Total n w/ 90 days post-op data	25771	23307	2464	
N(%)	1932 (8.29)		274 (11.12)	<0.0001*
aOR (95% CI)		REF	1.092 (0.948, 1.259)	0.2224

### Association of Insurance Type and Risk of Reoperation

		Total (n = 12127)	Commercial (n = 10604)	Medicaid (n = 1523)	p-value
1 year re-operation [n (%)]	All-type	645 (5.32)	575 (5.42)	70 (4.60)	0.1790
aOR (95% CI)	Laminectomy	366 (3.02)	317 (2.99)	49 (3.22)	0.3874
	Fusion	280 (2.31)	261 (2.46)	19 (1.25)	0.0032*
	Fusion revision	176 (1.45)	151 (1.42)	25 (1.64)	0.0097*
2 year re-operation [n (%)]	All-type	1202 (9.91)	1092 (10.30)	110 (7.22)	0.2900
aOR (95%CI)	Laminectomy	664 (5.48)	586 (5.53)	78 (5.12)	0.0002*
	Fusion	579 (4.77)	550 (5.19)	29 (1.90)	0.5162
	Fusion revision	374 (3.08)	329 (3.10)	45 (2.95)	0.3710
Overall re-operation [n (%)]	All-type	2003 (16.52)	1791 (16.89)	212 (13.92)	<0.0001*
aOR (95%CI)	Laminectomy	1174 (9.68)	1029 (7.70)	145 (9.52)	0.8211
	Fusion	1033 (8.52)	959 (9.04)	74 (4.86)	0.1501
	Fusion revision	696 (5.74)	615 (5.80)	81 (5.32)	<0.0001*
				0.822 (0.637, 1.060)	0.4502

### Healthcare Resource Use

		Total (n = 12127)	Commercial (n = 10604)	Medicaid (n = 1523)	p-value
Hospital days [mean (SD)]	Index hosp.	3 (4)	3 (4)	4 (5)	<0.0001*
Mean Ratio estimate (95% CI)	Post-op 1yr total	2 (7)	2 (6)	3 (10)	<0.0001*
	Post-op 2yr total	3 (10)	3 (9)	5 (13)	<0.0001*
Outpatient services [mean (SD)]	Post-op 1yr total	69 (65)	67 (63)	82 (77)	<0.0001*
Mean diff estimate (95% CI)	Post-op 2yr total	131 (115)	126 (109)	161 (149)	<0.0001*
Outpat ER services [mean(SD)]	Post-op 1yr total	2 (10)	1 (6)	9 (21)	<0.0001*
Mean diff estimate (95% CI)	Post-op 2yr total	4 (17)	2 (9)	18 (39)	<0.0001*
Medications [mean(SD)]	Post-op 1yr total	40 (40)	36 (34)	67 (62)	<0.0001*
Mean diff estimate (95% CI)	Post-op 2yr total	77 (78)	70 (67)	130 (119)	<0.0001*
Hospital charges[mean (SD)]	Index hosp.	22612 (22649)	23196 (22491)	18545 (23322)	<0.0001*
Mean Ratio estimate (95% CI)	Post-op 1yr total	7031 (23735)	6913 (25969)	7837 (24034)	<0.0001*
	Post-op 2yr total	13651 (37151)	13318 (37203)	15968 (36715)	<0.0001*
Outpatient charges[mean (SD)]	Post-op 1yr total	8495 (11990)	6233 (11661)	2365 (5474)	<0.0001*
Mean Ratio estimate (95% CI)	Post-op 2yr total	16104 (20814)	12830 (20555)	5594 (12248)	<0.0001*
Outpatient ER charges[mean (SD)]	Post-op 1yr total	274 (1269)	183 (1190)	196 (843)	<0.0001*
Mean Ratio estimate (95% CI)	Post-op 2yr total	508 (1745)	354 (1499)	434 (1526)	<0.0001*
Medication charges [mean(SD)]	Post-op 1yr total	3418 (4634)	2136 (3952)	1089 (2689)	<0.0001*
Mean Ratio estimate (95% CI)	Post-op 2yr total	6982 (9368)	4836 (8223)	2673 (5459)	<0.0001*
Overall cost: index hosp + postop input + postop output + postop meds	1 year total	41557 (41222)	42327 (41634)	36196 (37809)	<0.0001*
	2 year total	59348 (57095)	60146 (57522)	53797 (53720)	<0.0001*

## Results

After applying our inclusion and exclusion criteria, our cohort contained 10,604 patients with commercial insurance and 1,523 with Medicaid. On average, the Medicaid population was slightly older, had longer follow-up, contained more females, and had more comorbidities than those with commercial insurance. After adjusting for covariates, Medicaid patients were 32% less likely to receive any reoperation than those with commercial insurance (aOR = 0.78, p < 0.01). Patients with Medicaid were at 21% increased risk of immediate post-operative complications (aOR = 1.21, p < 0.0001) and were prescribed more medications (130 vs. 70, p < 0.0001) than those with commercial insurance.

## Conclusions

The results of our national, retrospective study suggest that **patients with Medicaid have worse outcomes after lumbar stenosis operations**, even after correcting for age, sex, and comorbidities. Patients with Medicaid have more complications, receive fewer reoperations, and use more health care resources than patients with commercial insurance.