How Have Cervical Fusion Implant Prices Changed Compared to Overall Costs and Reimbursements?

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INTRODUCTION: Cervical fusion volumes are projected to rise in the US with an increasingly aging US population. Previous studies have documented trends in costs, reimbursements, and volume for cervical fusion. However, there is limited information regarding recent trends in cervical fusion implant prices. As cervical fusion volumes continue to increase and cost control pressure continues to mount, understanding these financial trends will be increasingly important for surgeons. Thus, the purpose of this study was to investigate how implant prices have changed compared to overall costs and reimbursements for cervical fusion. This is the first study to evaluate trends in cervical fusion implant costs and their relative impact on total costs.

METHODS: A commercial insurance claims database was queried from 2012-2022 for overall costs, hospital reimbursements, physician reimbursements, and patient out-of-pocket (OOP) costs for 1-level, 2-level, and 3-level cervical fusion. Average implant prices between 2012-2022 were extracted from Orthopedic Network News (ONN), the largest publicly available implant registry. All costs, reimbursements, and prices were inflation-adjusted to 2022 dollars. Trends were analyzed using linear regressions.

RESULTS:

There were 23,775 total procedures included for 1-level, 2-level, and 3-level cervical fusions. Between 2012 and 2022, the average price for 1-level cervical fusion implants was $3321; $4809 for 2-level cervical fusion implants; and $6679 for 3-level cervical fusion implants.

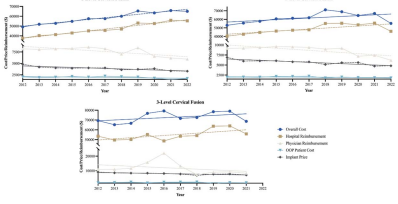
For 1-level cervical fusion, there were significant increases in overall costs (32.2% change, b=1732, p<0.001) and hospital reimbursement (46.7% change, b=1876, p<0.001). There were significant decreases in physician reimbursement (-27.4% change, b=-225.8, p=0.006) and implant prices (-31.4% change, b=-111.7, p<0.001). There was no significant change in OOP patient costs (-17.5% change, b=-38.1, p=0.05).

For 2-level cervical fusion, there was a significant increase in hospital reimbursement (14.1% change, b=1210, p<0.01). There were significant decreases in physician reimbursement (-32.4% change, b=-271, p=0.005) and implant prices (-30.3% change, b=-166.6, p<0.001). There were no significant changes in overall costs (4.2% change, b=937.7, p=0.10) and OOP patient costs (-9.8% change, b=-22.5, p=0.12).

For 3-level cervical fusion, there was a significant increase in hospital reimbursement (4.4% change, b=1156 p=0.04). There was a significant decrease in implant prices (-21.9% change, b=-191, p=0.002). There were no significant changes in overall costs (-1.0% change, b=783.7, p=0.20), physician reimbursement (-23.5% change, b=-498.9, p=0.33), or OOP patient costs (-4.7% change, b=-18.4, p=0.60).

DISCUSSION AND CONCLUSION: Between 2012 and 2022, inflation-adjusted implant prices decreased significantly for 1-level, 2-level, and 3-level cervical fusions. In contrast, hospital reimbursement increased significantly across all three fusion procedures. Overall costs increased for 1-level cervical fusion while remaining steady for 2-level and 3-level cervical fusion. Physician reimbursement decreased significantly for both 1- and 2-level cervical fusion with no significant change for 3-level fusion while OOP patient costs did not change significantly across any of the procedures. Amidst an aging US population and mounting cost control pressures, these trends highlight the need for careful consideration in future adjustments to clinical practices, payment structures, and healthcare policies to ensure sustainable and effective cervical fusion treatments.

Figure 1. Cervical Fusion Cost, Reimbursement, and Implant Price Trends.



Dashed trendlines represent significant change while solid trendlines represent no significant change.

Table 1. Characteristics and Overall Costs, Reimbursement, and Payment for 1-Level, 2-Level, and 3-Level Cervical Fusion, 2012-2022.

	Cervical Fusion 1-Level	Cervical Fusion 2-Level	Cervical Fusion 3-Level
Total number of procedures	10,945	11,226	1,604
Age, mean (SD)	51.6 (11.9)	53.9 (10.4)	57.1 (9.9)
Female (%)	5,585 (51.0%)	6,113 (54.5%)	840 (52.4%)
Length of stay, mean (SD)	1.8 (3.2)	1.8 (2.5)	2.1 (2.4)
Total cost for procedure, $	$42,821	$46,576	$54,861
Total hospital charge, $	$33,420	$35,819	$40,573
Total physician payment, $	$6,556	$7,499	$9,913
Total OOP cost for procedure, $	$1,607	$1,612	$1,486
Average selling price for implant from ONN, $	$3,321	$4,809	$6,679

Table 2. Cervical Fusion Linear Regression Trends from 2012 to 2022.

Procedure	Category	Percent Change from 2012 to 2022	Slope (95% CI)	p-value
1-Level Cervical Fusion	Overall Cost	32.2%	1732. (1420 to 2045)	<0.001
	Hospital Reimbursement	46.7%	1876. (1601 to 2151)	<0.001
	Physician Reimbursement	-27.4%	-225.8 (-367.4 to -84.17)	0.006
	OOP Patient Cost	-17.5%	-38.1 (-77.11 to 0.9447)	0.05
	Implant Price	-31.4%	-111.7 (-155.7 to -67.68)	<0.001
2-Level Cervical Fusion	Overall Cost	4.2%	937.7 (-201.0 to 2078)	0.10
	Hospital Reimbursement	14.1%	1210. (345.9 to 2055)	0.01
	Physician Reimbursement	-32.4%	-271. (-456.0 to -106.0)	0.005
	OOP Patient Cost	-9.8%	-22.5 (-51.78 to 6.741)	0.12
	Implant Price	-30.3%	-166.6 (-231.3 to -101.8)	<0.001
3-Level Cervical Fusion	Overall Cost	-1.0%	783.7 (-495.4 to 2063)	0.20
	Hospital Reimbursement	4.4%	1156. (76.91 to 2236)	0.04
	Physician Reimbursement	-23.5%	-498.9 (-1599 to 600.9)	0.33
	OOP Patient Cost	-4.7%	-18.4 (-95.29 to 58.47)	0.60
	Implant Price	-21.9%	-191. (-286.9 to -95.08)	0.002

P-values highlighted in green represent significant increases, red represent significant decreases, black represents no significant change.