

## **The Impact of Unexpected Billing in Spine Surgery and How the Price Calculator Can Improve Patient Care**

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**INTRODUCTION:** The average household faces difficulty paying unexpected medical bills. Although legislative efforts have targeted price transparency and rising costs, elective surgical costs continue to rise. The purpose of this study is to determine the impact of unexpected in-network billing following spinal surgery.

**METHODS:** Identified patients were administered a postoperative survey to address questions about patients' billing details, whether an unexpected bill was received, knowledge of the billing process, ways to improve their experience, effect of bills on financial standing, and overall satisfaction. Our institution does not contract out services to third party out-of-network providers, so no patients received an out-of-network bill.

For patients who received an unexpected bill, questions regarding the number and amount, whether they were paid, and whether they were sent to collections were asked. Subjective questions were scored via a 5-point Likert rating scale. Lastly, patients were asked questions about a price estimator offered on our institution's public website including knowledge of the tool, ease of use, and accuracy.

Patients were divided for primary analysis based on whether they received an unexpected bill. Continuous variables were assessed using either an independent t-test or Mann Whitney U-test, for parametric and non-parametric data, respectively. All categorical variables were compared using a Pearson chi-square analysis or Fisher's Exact test in the case of small cell counts. P-values less than 0.05 were deemed significant.

### **RESULTS:**

One-hundred-eighty-three (22.4%) patients received an unexpected bill. These patients were younger, and more likely to undergo a lumbar decompression or microdiscectomy.

Patients who received an unexpected bill were less likely to feel completely/mostly informed about the billing process. Patients who did not receive an unexpected bill were more likely to report that billing had no impact on their surgical satisfaction (Table 1).

Half of patients who received unexpected bills only received one bill, while 7.8% received 5 or more. A total of 131 (73.2%) patients reported that billing affected their financial status, with 17 (19.5%) reporting "extremely affected" and 35 (20.0%) reporting "severely affected." Most patients directed blame to the medical practice (N=99, 54.1%) or hospital (N=81, 44.3%), while 62 (33.9%) blamed their surgeon (Table 2).

Thirty-five patients (4.3%) knew of the price estimator's existence, but only 33 of these 35 patients (94.3%) used it. Those patients were younger and in higher income brackets, although the latter did not reach statistical significance. Patients who did not utilize the calculator were significantly more likely to report not being informed about the billing process. However, price estimator use was not associated with increased surgical satisfaction (Table 3). Additionally, the majority of patients reported that price calculator was very accurate (N=6, 35.3%) or somewhat accurate (N=8, 47.1%) in predicting total costs (Table 4).

**DISCUSSION AND CONCLUSION:** A significant portion of patients undergoing elective spine surgery received unexpected bills leading to financial distress and affecting surgical experience. Although most patients were unaware of the price estimator, those who used it found it easy to use and accurate in cost prediction. Patients may benefit from targeted education including information on the price estimator to alleviate unexpected financial burden.

Table 1. Summary of Patients' Experiences with Unexcused Billing	No	Yes	P Value
How many surprise bills did you receive?			
1	122 (31.3%)	10 (2.7%)	
2	21 (5.7%)	1 (0.3%)	
3	21 (5.7%)	1 (0.3%)	
4	21 (5.7%)	1 (0.3%)	
5	21 (5.7%)	1 (0.3%)	
6	21 (5.7%)	1 (0.3%)	
7	21 (5.7%)	1 (0.3%)	
8	21 (5.7%)	1 (0.3%)	
9	21 (5.7%)	1 (0.3%)	
10	21 (5.7%)	1 (0.3%)	
11	21 (5.7%)	1 (0.3%)	
12	21 (5.7%)	1 (0.3%)	
13	21 (5.7%)	1 (0.3%)	
14	21 (5.7%)	1 (0.3%)	
15	21 (5.7%)	1 (0.3%)	
16	21 (5.7%)	1 (0.3%)	
17	21 (5.7%)	1 (0.3%)	
18	21 (5.7%)	1 (0.3%)	
19	21 (5.7%)	1 (0.3%)	
20	21 (5.7%)	1 (0.3%)	
21	21 (5.7%)	1 (0.3%)	
22	21 (5.7%)	1 (0.3%)	
23	21 (5.7%)	1 (0.3%)	
24	21 (5.7%)	1 (0.3%)	
25	21 (5.7%)	1 (0.3%)	
26	21 (5.7%)	1 (0.3%)	
27	21 (5.7%)	1 (0.3%)	
28	21 (5.7%)	1 (0.3%)	
29	21 (5.7%)	1 (0.3%)	
30	21 (5.7%)	1 (0.3%)	
31	21 (5.7%)	1 (0.3%)	
32	21 (5.7%)	1 (0.3%)	
33	21 (5.7%)	1 (0.3%)	
34	21 (5.7%)	1 (0.3%)	
35	21 (5.7%)	1 (0.3%)	
36	21 (5.7%)	1 (0.3%)	
37	21 (5.7%)	1 (0.3%)	
38	21 (5.7%)	1 (0.3%)	
39	21 (5.7%)	1 (0.3%)	
40	21 (5.7%)	1 (0.3%)	
41	21 (5.7%)	1 (0.3%)	
42	21 (5.7%)	1 (0.3%)	
43	21 (5.7%)	1 (0.3%)	
44	21 (5.7%)	1 (0.3%)	
45	21 (5.7%)	1 (0.3%)	
46	21 (5.7%)	1 (0.3%)	
47	21 (5.7%)	1 (0.3%)	
48	21 (5.7%)	1 (0.3%)	
49	21 (5.7%)	1 (0.3%)	
50	21 (5.7%)	1 (0.3%)	
51	21 (5.7%)	1 (0.3%)	
52	21 (5.7%)	1 (0.3%)	
53	21 (5.7%)	1 (0.3%)	
54	21 (5.7%)	1 (0.3%)	
55	21 (5.7%)	1 (0.3%)	
56	21 (5.7%)	1 (0.3%)	
57	21 (5.7%)	1 (0.3%)	
58	21 (5.7%)	1 (0.3%)	
59	21 (5.7%)	1 (0.3%)	
60	21 (5.7%)	1 (0.3%)	
61	21 (5.7%)	1 (0.3%)	
62	21 (5.7%)	1 (0.3%)	
63	21 (5.7%)	1 (0.3%)	
64	21 (5.7%)	1 (0.3%)	
65	21 (5.7%)	1 (0.3%)	
66	21 (5.7%)	1 (0.3%)	
67	21 (5.7%)	1 (0.3%)	
68	21 (5.7%)	1 (0.3%)	
69	21 (5.7%)	1 (0.3%)	
70	21 (5.7%)	1 (0.3%)	
71	21 (5.7%)	1 (0.3%)	
72	21 (5.7%)	1 (0.3%)	
73	21 (5.7%)	1 (0.3%)	
74	21 (5.7%)	1 (0.3%)	
75	21 (5.7%)	1 (0.3%)	
76	21 (5.7%)	1 (0.3%)	
77	21 (5.7%)	1 (0.3%)	
78	21 (5.7%)	1 (0.3%)	
79	21 (5.7%)	1 (0.3%)	
80	21 (5.7%)	1 (0.3%)	
81	21 (5.7%)	1 (0.3%)	
82	21 (5.7%)	1 (0.3%)	
83	21 (5.7%)	1 (0.3%)	
84	21 (5.7%)	1 (0.3%)	
85	21 (5.7%)	1 (0.3%)	
86	21 (5.7%)	1 (0.3%)	
87	21 (5.7%)	1 (0.3%)	
88	21 (5.7%)	1 (0.3%)	
89	21 (5.7%)	1 (0.3%)	
90	21 (5.7%)	1 (0.3%)	
91	21 (5.7%)	1 (0.3%)	
92	21 (5.7%)	1 (0.3%)	
93	21 (5.7%)	1 (0.3%)	
94	21 (5.7%)	1 (0.3%)	
95	21 (5.7%)	1 (0.3%)	
96	21 (5.7%)	1 (0.3%)	
97	21 (5.7%)	1 (0.3%)	
98	21 (5.7%)	1 (0.3%)	
99	21 (5.7%)	1 (0.3%)	
100	21 (5.7%)	1 (0.3%)	

Table 2. Comparison of Patients of The Price Estimator to Not Utilize	No	Yes	P Value
Age of Provider	6,512 (12.2%)	2,051 (4.8%)	0.002
Gender	3,668 (69.4%)	1,158 (26.6%)	0.001
Female	3,668 (69.4%)	1,158 (26.6%)	0.001
Male	2,844 (53.2%)	893 (20.4%)	
What was the total amount of money you were charged from these surprise bills (in thousands)?			
None	444 (8.3%)	27 (0.6%)	
< 25	1,411 (26.4%)	87 (2.0%)	
25-50	2,199 (41.1%)	134 (3.1%)	
50-75	2,242 (42.1%)	134 (3.1%)	
75-100	2,242 (42.1%)	134 (3.1%)	
100-150	2,242 (42.1%)	134 (3.1%)	
150-200	2,242 (42.1%)	134 (3.1%)	
200-300	2,242 (42.1%)	134 (3.1%)	
300-500	2,242 (42.1%)	134 (3.1%)	
500-1000	2,242 (42.1%)	134 (3.1%)	
1000+	2,242 (42.1%)	134 (3.1%)	
How surprised were you about the billing process?			
Not at all	211 (3.9%)	13 (0.3%)	0.001
Slightly	121 (22.5%)	7 (0.2%)	
Moderately	311 (57.4%)	19 (0.4%)	
Very	197 (36.4%)	11 (0.3%)	
Completely	105 (19.3%)	6 (0.1%)	
How much of the billing process impact your satisfaction with your surgeon?			
Not at all	274 (5.1%)	17 (0.4%)	0.001
Slightly	91 (16.8%)	5 (0.1%)	
Moderately	311 (57.4%)	19 (0.4%)	
Very	197 (36.4%)	11 (0.3%)	
Completely	105 (19.3%)	6 (0.1%)	
How satisfied were you about the billing process?			
Not at all	211 (3.9%)	13 (0.3%)	0.001
Slightly	121 (22.5%)	7 (0.2%)	
Moderately	311 (57.4%)	19 (0.4%)	
Very	197 (36.4%)	11 (0.3%)	
Completely	105 (19.3%)	6 (0.1%)	
How satisfied with your surgeon?			
Not at all	71 (1.3%)	4 (0.1%)	0.001
Slightly	114 (21.2%)	7 (0.2%)	
Moderately	311 (57.4%)	19 (0.4%)	
Very	197 (36.4%)	11 (0.3%)	
Completely	105 (19.3%)	6 (0.1%)	
How satisfied with your surgeon?			
Not at all	1,111 (20.6%)	112 (2.6%)	0.001
Slightly	877 (16.3%)	53 (1.2%)	

Table 3. Price Estimator Evaluation	No	Yes	P Value
How easy was the provided billing link to understand?			
Very Easy	4,374 (81.4%)	1,327 (30.2%)	0.001
Easy	847 (15.7%)	271 (6.2%)	
Moderate	423 (7.9%)	137 (3.1%)	
Hard	211 (3.9%)	68 (1.5%)	
Very Hard	105 (1.9%)	34 (0.8%)	
How accurate was the price estimator tool at providing your total cost?			
Very Accurate	3,368 (62.5%)	1,051 (24.0%)	0.001
Accurate	1,411 (26.4%)	451 (10.3%)	
Not Accurate	423 (7.9%)	137 (3.1%)	
Very Inaccurate	211 (3.9%)	68 (1.5%)	
Did you pay more than the calculator estimated?			
No	4,374 (81.4%)	1,327 (30.2%)	0.001
Yes	847 (15.7%)	271 (6.2%)	

Table 4. Comparison Between Patients Who Received an Unexcused Bill and Those Who Did Not	No	Yes	P Value
Age of Provider	6,512 (12.2%)	2,051 (4.8%)	0.002
Gender	3,668 (69.4%)	1,158 (26.6%)	0.001
Female	3,668 (69.4%)	1,158 (26.6%)	0.001
Male	2,844 (53.2%)	893 (20.4%)	
What procedure did you have?			
Endometrial Resection or Myomectomy	1,541 (28.7%)	66 (1.5%)	0.001
Uterine Fibroid	444 (8.3%)	27 (0.6%)	
Other	4,527 (84.0%)	1,364 (30.9%)	
How surprised were you about the billing process?			
Not at all	211 (3.9%)	13 (0.3%)	0.001
Slightly	121 (22.5%)	7 (0.2%)	
Moderately	311 (57.4%)	19 (0.4%)	
Very	197 (36.4%)	11 (0.3%)	
Completely	105 (19.3%)	6 (0.1%)	
How much of the billing process impact your satisfaction with your surgeon?			
Not at all	274 (5.1%)	17 (0.4%)	0.001
Slightly	91 (16.8%)	5 (0.1%)	
Moderately	311 (57.4%)	19 (0.4%)	
Very	197 (36.4%)	11 (0.3%)	
Completely	105 (19.3%)	6 (0.1%)	
How satisfied were you about the billing process?			
Not at all	211 (3.9%)	13 (0.3%)	0.001
Slightly	121 (22.5%)	7 (0.2%)	
Moderately	311 (57.4%)	19 (0.4%)	
Very	197 (36.4%)	11 (0.3%)	
Completely	105 (19.3%)	6 (0.1%)	
How satisfied with your surgeon?			
Not at all	71 (1.3%)	4 (0.1%)	0.001
Slightly	114 (21.2%)	7 (0.2%)	
Moderately	311 (57.4%)	19 (0.4%)	
Very	197 (36.4%)	11 (0.3%)	
Completely	105 (19.3%)	6 (0.1%)	
How satisfied with your surgeon?			
Not at all	1,111 (20.6%)	112 (2.6%)	0.001
Slightly	877 (16.3%)	53 (1.2%)	