Appendix. Sensitivity Analysis Comparing Thresholds for Extreme Values in Calculation of Standardized Cost

Group	Hospital Median ($) (25th-75th Percentile)	Percent Difference in Median	Coefficient of Variation (CV) (%)	Percent Difference in CV (%)
Overall				
10-fold threshold	48,696 (42,642-55,610)		19.9%	
3-fold threshold	50,240 (43,954-57,425)	3.2%	20.0%	0.7%
STAT 1				
10-fold threshold	31,739 (27,834-36,191)		19.7%	
3-fold threshold	33,052 (29,149-37,478)	4.1%	18.8%	4.4%
STAT 2				
10-fold threshold	44,072 (38,505-50,444)		20.2%	
3-fold threshold	45,668 (39,827-52,366)	3.6%	20.5%	1.4%
STAT 3				
10-fold threshold	60,732 (53,675-68,716)		18.5%	
3-fold threshold	62,898 (55,094-71,807)	3.6%	19.8%	7.4%
STAT 4				
10-fold threshold	102,739 (88,932-118,689)		21.6%	
3-fold threshold	104,828 (90,612-121,273)	2.0%	21.9%	1.0%
STAT 5				
10-fold threshold	166,755 (140,966-197,261)		25.3%	
3-fold threshold	168,140 (142,860-197,892)	0.8%	24.5%	3.1%

As described in the text, there was a small proportion of billed items with extreme units and/or charges, exaggerating the standardized costs. In this instance, the standardized cost was replaced with the estimate from the cost-to-charge ratio method. In choosing the threshold for what was considered “extreme”, a prior study utilized a difference of greater than 3-fold between the standardized cost and cost-to-charge ratio method. We examined varying thresholds including 3-, 5-, 10-, and 20-fold, and felt that a 3-fold threshold was too stringent, impacting a high proportion of billed items in this cohort (23% overall) that may not represent true coding errors or other coding issues but rather actual clinically plausible values. Our final methods used a 10-fold threshold, which impacted 6% of total billed items and appeared to address obvious extreme outliers without being too aggressive. In sensitivity analyses, we compared the 3-fold to the 10-fold threshold, and the choice of threshold did not appear to have an important impact on our results.

As displayed in the table, there was a <5% difference in the median value and coefficient of variation across all STAT categories with the exception of a slightly larger difference in the coefficient of variation for STAT category 3 (18.5% with a 10-fold threshold and 19.8% with a 3-fold threshold, percent difference = 7.4%).

Appendix. Sensitivity Analysis Comparing Alternative Cost Distributions to the Lognormal Distribution Used in the Analysis

Group	Coefficient of Variation (%)		
	Lognormal	**Negative Binomial**	**Gamma**
Cost-to-charge ratio method	24.9%	26.1%	25.8%
Standardized cost method	19.9%	20.0%	19.9%

The table displays minimal differences in the hospital-level coefficient of variation comparing the lognormal to negative binomial and gamma distributions. This was true both for the cost-to-charge ratio and standardized cost method.

Appendix. Characteristics of Hospitals Changing Resource Use Tertiles

Variable	No change N=29	Changed by one tertile N=11	Changed by two tertiles N=3	p-value
Children's hospital type				
Freestanding	22 (75.9%)	10 (90.9%)	3 (100.0%)	0.55
Hospital within a hospital	7 (24.1%)	1 (9.1%)	0 (0.0%)	
Geographic region				
Northeast	3 (10.3%)	3 (27.3%)	0 (0.0%)	
South	9 (31.0%)	5 (45.4%)	1 (33.3%)	0.14
West	9 (31.0%)	0 (0.0%)	2 (66.67%)	
Midwest	8 (27.6%)	3 (27.3%)	0 (0.0%)	
Surgical volume	250 (155-326)	251 (206-339)	315 (294-397)	0.36
Payer mix				
Government	53.6%	52.9%	47.5%	0.87
Private	37.8%	36.3%	45.3%	0.85
Other	7.6%	5.5%	15.1%	0.33

Characteristics of hospitals who did not change, changed by one tertile, or changed by two tertiles for resource use when using the cost-to-charge ratio methods vs. standardized cost methods. Note with regard to location, all hospitals included are characterized as urban (vs. rural).