

Supplementary Online Content

Zygorakis CC, Valencia V, Moriates C, et al. Association between surgeon scorecard use and operating room costs. *JAMA Surg*. Published online December 7, 2016. doi:10.1001/jamasurg.2016.4674

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This supplementary material has been provided by the authors to give readers additional information about their work.

eFigure 1. Sample Surgeon Scorecard for June 2015

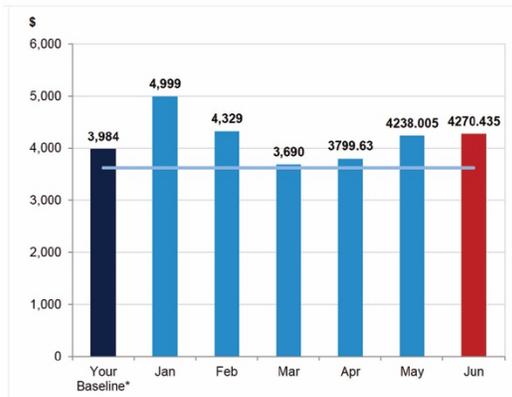
Procedure Details

2_1 CRANI FOR TUMOR RESECTION ASLEEP 4-6 HOURS (n = 6 in June)



Median Supply Costs

\$ 3,618

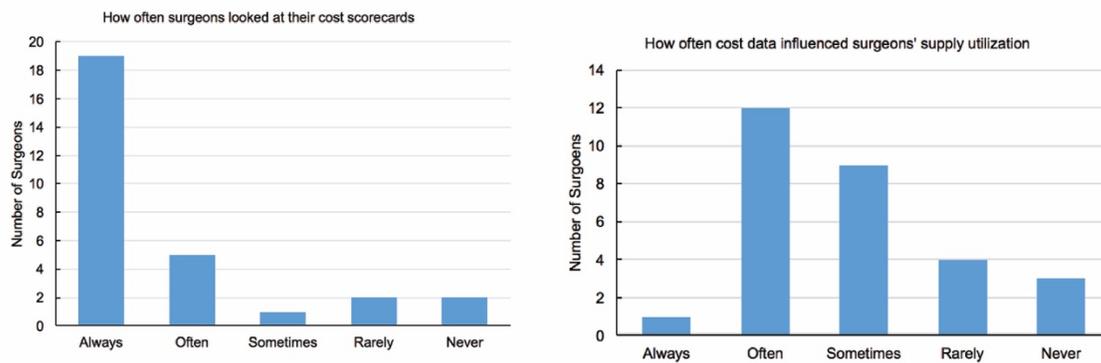


Bang For Your Buck Items (Highest Cost * # Times Used)

Item Description	Total spent on Item (\$)	Unit cost (\$)	Count of Item used (#)
1 SCREW 1.5X4MM SELF-DRILL	3,692		
2 PACK MOTOR MAPPING & AWAKE	3,503		
3 SEALANT DURASEAL 5ML	3,239		
4 COVER BURR HOLE LOW PROFILE 14MM W/TAB	2,280		
5 SEALANT FLOSEAL 10ML HT NEEDLE-FREE	1,686		
6 TIP CUSA EXCEL 14CM CURVED	1,543		
7 CEMENT CRANIO-FACIAL HYDROSET 5CC (10.5GM)	1,014		
8 TUBING MANIFOLD CUSA EXCEL FOR 36 KHZ HANDPIECE	930		
9 PACK BASIC NEURO LATEX SAFE	903		
10 ELECTRODE SUBDERMAL 12MM TWISTED PAIRED 5FT	866		

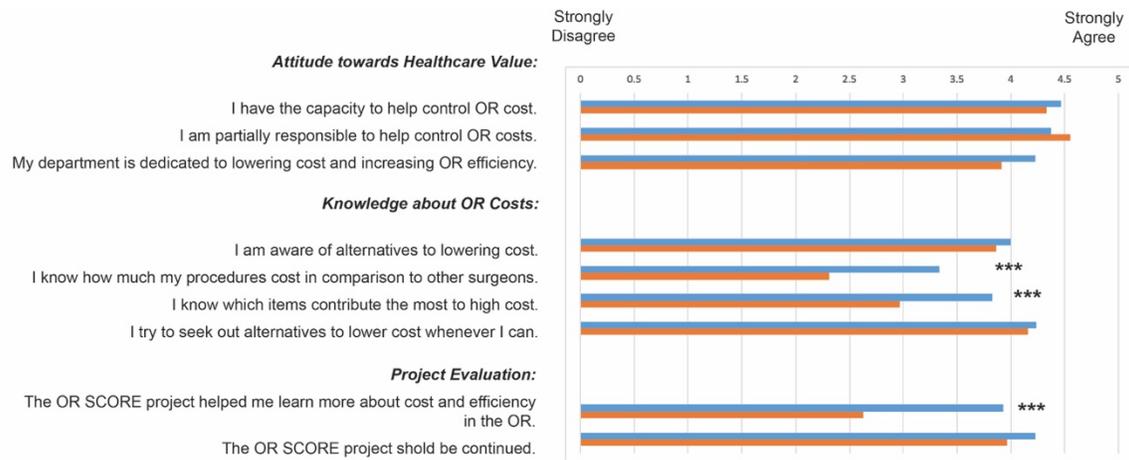
Legend: On the left is the graph of median surgical supply cost for this procedure and surgeon over time. The red bar indicates the median surgical supply cost for the surgeon on this procedure in June 2015; the dark blue bar indicates this surgeon's median surgical supply cost for this procedure in the baseline period (July 2012-November 2014). The light blue horizontal line is the average surgical supply cost for all surgeons at UCSF who performed this procedure during the baseline period. On the right is the list of top 10 "bang for your buck" items, which are the top 10 disposable supplies in terms of unit cost multiplied by frequency of use.

eFigure 2. Postintervention Survey Results Regarding Surgeon Engagement



Legend: Histograms indicating how often attending surgeons looked at (left) and responded to (right) their cost feedback data. The y-axis is the number of surgeons who receive scorecards and filled out the post-intervention survey.

eFigure 3. Postintervention Surgeon Responses on Healthcare Value Questionnaire



Legend: Comparison of post-intervention survey responses of attending surgeons who received OR SCORE cards (n=30; blue bars) versus surgeons who did not (n= 58; red bars). Asterisks indicate p-value <0.001 in t-test comparison.

eTable 1. Postintervention Healthcare Value Questionnaire^a

Survey Questions	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
1. "My department is dedicated to lowering cost and increasing efficiency in the OR."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. "I have the capacity to help control OR cost."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. "I am aware of alternatives to lowering cost."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I try to seek out alternatives to lower cost whenever I can."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. "I know how much my procedures cost in comparison to other surgeons."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. "There are too many barriers to lowering cost and increasing efficiency in the OR."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. "I know which items contribute the most to high cost."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. "I am partially responsible to help control OR costs."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. "The OR SCORE project helped me learn more about cost and efficiency in the OR."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. "The OR SCORE project should be continued."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Please indicate which surgical department you are a part of: - CT surgery, General Surgery, Ob-Gyn, Ophthalmology, Orthopedic Surgery, Pediatric Surgery, Neurosurgery, Urology, Vascular Surgery					
12. Did you receive OR scorecards? - Yes, No					
13. How often did you look at your monthly scorecards? - Always, Often, Sometimes, Rarely, Never					
14. Did OR SCORE data influence your decisions about supply utilization in the OR? - Always, Often, Sometimes, Rarely Never					
15. Please discuss any benefits or barriers to the OR SCORE project: - Free response					

^a Post-intervention survey distributed via Qualtrics to surgeons in all departments (intervention and control groups) from December 2015 to April 2016.

eTable 2. Multivariate Model for Effect of Intervention on Surgical Supply Costs for Inpatient Cases^a

Variable	Change in Supply Cost, % (95% CI)	P-Value
Group		0.05
Control	Reference	
Intervention	215.81 (0.05-897.42)	
Time		
Days Post-Intervention (after Jan 1, 2015)	0.03 (0.00-0.06)	0.05
Days after Jan 1, 2014	0.01 (0.00-0.02)	0.22
Patient Factors:		
Sex		<0.001
Male	Reference	
Female	6.18 (4.08-9.42)	
Age	0.70 (0.60-0.80)	<0.001
Payer		
Commercial	Reference	
Medical	-1.98 (-4.88 - -2.02)	0.37
Medicare	-13.06 (-16.47- -9.52)	<0.001
Other	-12.19 (-23.66- -6.76)	0.001
ASA Score	-12.19 (-13.93- -10.42)	<0.001
CMI	6.18 (5.13-6.18)	<0.001
Main Effect:		
Group (Intervention vs Control)*Days Post-Intervention	-0.04 (-0.06- -0.01)	0.003

Abbreviations: ASA, American Society of Anesthesiology; CMI, case mix index

^aResults of time series mixed-effect model for inpatient cases only, so that we can also include CMI as fixed variable. Surgeon and department are random effects. Goal of model is to evaluate the hypothesis that the trend in the logarithm of surgical supply cost per case decreased significantly in the intervention group vs the control group, in the study period vs the baseline. Study period = January 1 - December 31, 2015; baseline = January 1- December 31, 2014.

eTable 3. Surgeon Responses on Postintervention Healthcare Value Questionnaire^a

Survey Questions	Surgeons with Scorecards (N = 30)	Surgeons without Scorecards (N = 58)	P-Value ^b
Attitude Towards Healthcare Value:			
“I have the capacity to help control OR cost.”	4.47 (±0.51)	4.33 (±0.78)	0.32
“I am partially responsible to help control OR costs.”	4.37 (±0.72)	4.55 (±0.50)	0.21
“There are too many barriers to lowering cost and increasing efficiency in the OR.”	2.90 (±1.12)	3.03 (±1.11)	0.60
“My department is dedicated to lowering cost and increasing efficiency in the OR.”	4.23 (±0.86)	3.91 (±1.05)	0.13
Knowledge about Cost Reduction:			
“I am aware of alternatives to lowering cost.”	4.00 (±0.87)	3.86 (±1.01)	0.56
“I know how much my procedures cost in comparison to other surgeons.”	3.33 (±0.99)	2.31 (±1.19)	<0.001
“I know which items contribute the most to high cost.”	3.83 (±1.02)	2.97 (±1.15)	<0.001
“I try to seek out alternatives to lower cost whenever I can.”	4.24 (±0.79)	4.16 (±0.74)	0.63
Project Evaluation:			
“The OR SCORE project helped me learn more about cost and efficiency in the OR.”	3.93 (±1.13)	2.63 (±1.07)	<0.001
“The OR SCORE project should be continued.”	4.23 (±1.04)	3.96 (±0.92)	0.24

^a Mean scores for responses to each question are shown, with standard deviation in parenthesis. Answers are on a scale of 1=Strongly Disagree to 5=Strongly Agree.

^b P-value indicates result of t-test comparison.