

Supplemental Content

Trends in institutional payments to anesthesia groups: A retrospective analysis of nonacademic hospitals in California

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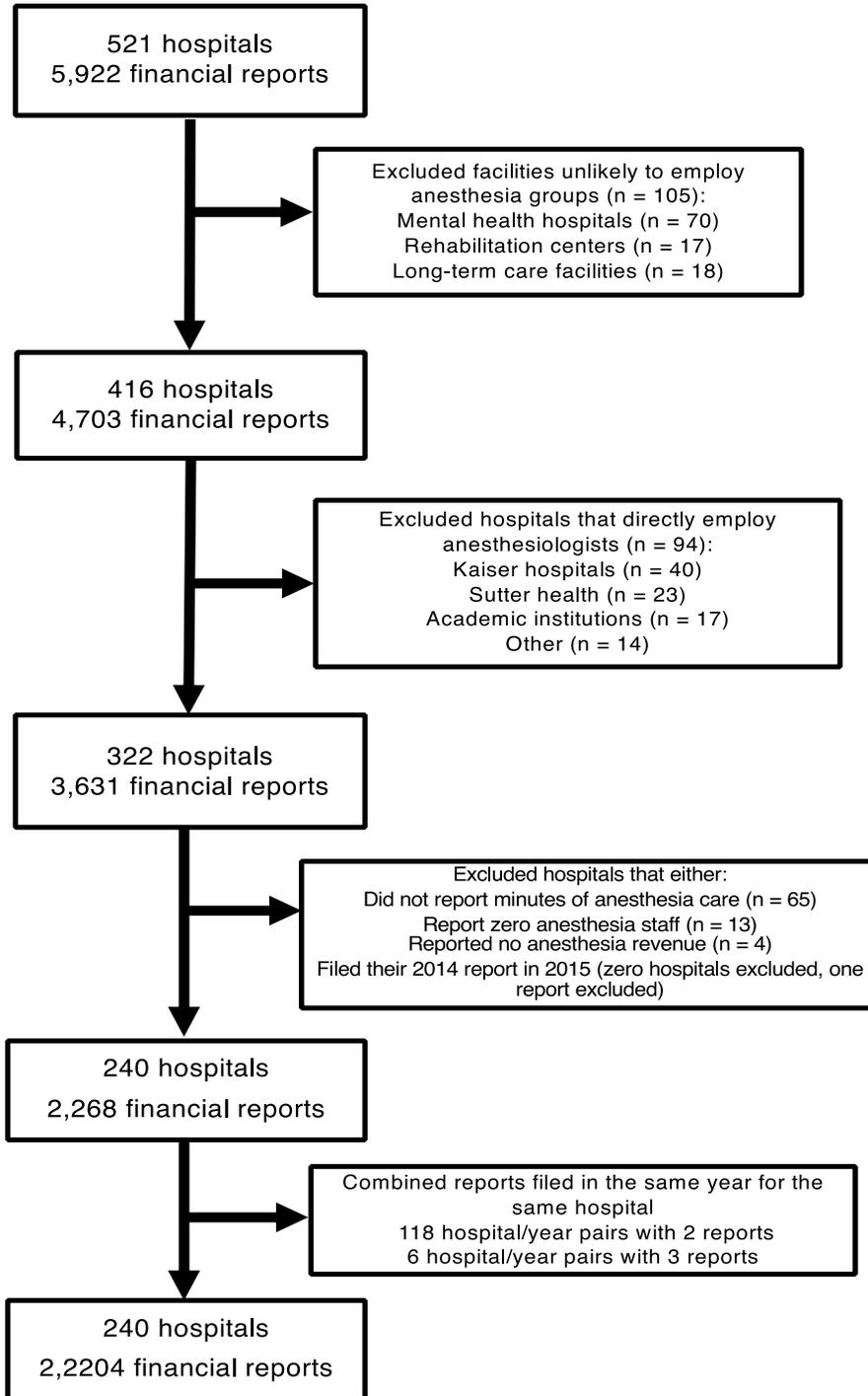
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Supplemental Figure 1: Inclusion and exclusion flow diagram



Supplemental Figure 1 presents a flow diagram outlining the construction of our sample.

Supplemental Table 1: Variable key containing relevant entries in OSHPD financial disclosures

	Page	Column	Line	Notes
Hospital zip code	0	1	10	
24-hr anesthesiologist in-house	1	3	95	Must be certified to perform anesthesia services; may include cRNAs depending on hospital policy
Total beds	1	1	5	
Anesthesia staff	1	1-6	120	Includes MD anesthesiologists, cRNAs, and anesthesia technicians
Anesthesia minutes	4	1	245	
Inpatient anesthesia minutes	4	7	245	
Outpatient anesthesia minutes	4	13	245	
Gross anesthesia revenue	12	23	245	
Anesthesia salary/wages	15	1	245	
Anesthesia benefits	15	2	245	
Direct anesthesia payments	15	3	245	Primary outcome: sum of professional fees, not including salary, wages, and benefits
Total anesthesia compensation	15	4	245	Outcome used in sensitivity analysis #1

All reports are publicly available at <https://siera.oshpd.ca.gov/FinancialDisclosure.aspx>.

Dataset Validity Checks

The dataset used for this study came from publicly reported hospital records submitted to the California Office of Statewide Health Planning and Development (OSHPD). The data have presumed face validity as they are audited and required by law to be accurate. However, to further assess validity, we examined the relationship between certain variables that should be highly correlated. For example, hospitals report total anesthesia minutes and total operating room minutes, which should be highly correlated. **Supplemental Table 2** below describes the pairs of variables whose correlation we examined. Each association was assessed using multivariable linear regression incorporating hospital fixed effects, with year as a covariate along with the independent variable of interest. The following associations were assessed, for which positive and significant associations were expected and found.

Supplemental Table 2: Correlation Between Variables Reported in the Hospital Financial Reports

Dependent variable	Independent variable	β (95% CI)	p-value
Total anesthesia staff (n)	Number of surgeons (n)	0.20 (0.15 – 0.23)	<0.001
Anesthesia time (minutes)	Total anesthesia staff (n)	20335 (14996 – 25673)	<0.001
Total operating room time (minutes)	Anesthesia time (minutes)	0.73 (0.51 – 0.95)	<0.001
Time per anesthesiologist (minutes)	Time per operating room (minutes)	0.25 (0.19 – 0.31)	<0.001

Supplemental Table 3: Full Regression Results for Primary Analysis

	Probability of receiving a subsidy		Increase in subsidy amount, conditioned on receiving a subsidy	
	β (95% CI)	p-value	β (95% CI)	p-value
Economic factors				
Percent of anesthesia revenue from public payers	0.45 (0.10 to 0.81)	0.013	2.10 (0.74 to 3.45)	0.003
Demographic factors				
Median income (per \$100,000)	0.04 (-1.02 to 1.10)	0.954	4.51 (0.70 to 8.34)	0.021
County population (per 100,000)	-0.13 (-0.46 to 0.20)	0.455	-1.72 (-3.19 to -0.24)	0.023
County population, % white	3.62 (0.04 to 7.21)	0.048	8.55 (-9.2 to 26.3)	0.343
County population, % over 65 years old	6.3 (-2.27 to 15.0)	0.151	14.8 (-9.1 to 38.6)	0.223
Hospital factors				
Number of beds (per 100 beds)	0.02 (-0.03 to 0.07)	0.533	0.11 (-0.09 to 0.31)	0.287
24-hr anesthesiologist on call in house	-0.10 (-0.21 to 0.01)	0.074	-0.04 (-0.36 to 0.28)	0.806
Percent of anesthesia revenue generated from inpatient sources	-0.11 (-0.38 to 0.17)	0.462	0.87 (0.05 to 1.69)	0.037

Supplemental Table 3 presents the full regression results for our primary analysis examining the association between the percent of anesthesia revenue coming from public payers and the probability of receiving a subsidy, as well as the subsidy amount. 95% confidence intervals shown were calculated using standard errors that were adjusted for clustering at the hospital level. Not shown in the table are the coefficients for the hospital- and year-fixed effects.

Supplemental Table 4: Full Regression Results for Sensitivity Analysis #1 (Alternative definition of direct payments)

	Probability of receiving a subsidy		Increase in subsidy amount, conditioned on receiving a subsidy	
	β (95% CI)	p-value	β (95% CI)	p-value
Economic factors				
Percent of anesthesia revenue from public payers	0.45 (0.10 to 0.81)	0.013*	2.09 (0.74 to 3.45)	0.003*
Demographic factors				
Median income (per \$100,000)	-0.03 (-1.03 to 1.10)	0.954	4.52 (0.70 to 8.35)	0.021*
County population (per 100,000)	-0.13 (-0.46 to 0.21)	0.455	-1.72 (-3.19 to -0.24)	0.023*
County population, % white	3.61 (0.34 to 7.20)	0.048*	8.60 (-9.2 to 26.4)	0.341
County population, % over 65 years old	6.3 (-2.31 to 14.9)	0.151	14.8 (-9.1 to 38.6)	0.223
Hospital factors				
Number of beds (per 100 beds)	0.02 (-0.04 to 0.07)	0.533	0.11 (-0.09 to 0.31)	0.287
24-hr anesthesiologist on call in house	-0.10 (-0.21 to 0.01)	0.074	-0.04 (-0.36 to 0.28)	0.806
Percent of anesthesia revenue generated from inpatient sources	-0.10 (-0.37 to 0.17)	0.462	0.87 (0.05 to 1.69)	0.037*

Supplemental Table 4 presents the full regression results for a sensitivity analysis examining the association between the percent of anesthesia revenue coming from public payers and the probability of receiving a direct hospital payment, as well as payment amount. This analysis was similar to our primary analysis, except that we used an alternative definition of these payments that included the sum of all wages, salaries, benefits, and professional fees paid to the anesthesia group. 95% confidence intervals shown were calculated using standard errors that were adjusted for clustering at the hospital level. Not shown in the table are the coefficients for the hospital- and year-fixed effects.

Supplemental Table 5: Full Regression Results for Sensitivity Analysis #2 (Analysis after removing outliers)

	Probability of receiving a subsidy		Increase in subsidy amount, conditioned on receiving a subsidy	
	β (95% CI)	p-value	β (95% CI)	p-value
Economic factors				
Percent of anesthesia revenue from public payers	0.46 (0.10 to 0.82)	0.012*	2.09 (0.73 to 3.45)	0.003*
Demographic factors				
Median income (per \$100,000)	-0.04 (-1.09 to 1.01)	0.941	4.59 (0.71 to 8.46)	0.021*
County population (per 100,000)	-0.15 (-0.48 to 0.18)	0.371	-1.72 (-3.21 to -0.23)	0.024*
County population, % white	3.46 (-0.10 to 7.03)	0.057	8.51 (-9.3 to 26.3)	0.346
County population, % over 65 years old	5.58 (-3.04 to 14.2)	0.204	14.3 (-10.4 to 39.0)	0.254
Hospital factors				
Number of beds (per 100 beds)	0.012 (-0.04 to 0.068)	0.651	0.12 (-0.10 to 0.33)	0.279
24-hr anesthesiologist on call in house	-0.09 (-0.21 to 0.018)	0.099	-0.03 (-0.35 to 0.30)	0.870
Percent of anesthesia revenue generated from inpatient sources	-0.87 (-0.36 to 0.19)	0.530	0.87 (0.05 to 1.69)	0.039*

Supplemental Table 5 presents the full regression results for a sensitivity analysis examining the association between the percent of anesthesia revenue coming from public payers and the probability of receiving a direct hospital payment, as well as payment amount. This analysis was similar to our primary analysis, except that we excluded hospitals whose payments to anesthesia groups were in the top 1% of payments overall. 95% confidence intervals shown were calculated using standard errors that were adjusted for clustering at the hospital level. Not shown in the table are the coefficients for the hospital- and year-fixed effects.