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Coronary Artery Bypass Graft Surgery in California:

2003-2004 Hospital & Surgeon Data

California CABG Outcomes Reporting Program

Office of Statewide Health Planning and Development

The California Report on Coronary Artery Bypass Graft Surgery

2003-2004 Hospital and Surgeon Data

2007

THE CALIFORNIA REPORT ON CORONARY ARTERY BYPASS GRAFT SURGERY

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Office of Statewide Health Planning and Development

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Additional copies of the report can be obtained through the OSHPD Web site (www.oshpd.ca.gov).

PREFACE

March 2007

With the release of this report, information on the quality of care provided by individual physicians in California is made public for the first time. The quality ratings of 302 cardiac surgeons who performed heart bypass surgery during 2003 and 2004 are listed inside. The quality ratings of the 121 hospitals where they performed these surgeries are also provided. Surgeons performed 40,377 isolated coronary artery bypass graft surgeries in California in 2003-2004, with an overall operative mortality rate of 3.08%. Isolated bypass surgery means that no other major heart procedure such as valve repair was performed at the same time.

This information is intended for cardiac patients and their families to use in developing treatment plans with their doctors. It is also intended for hospitals and surgeons to use in developing quality improvement activities and for organizations that purchase health coverage for their members. The clinical data collected and used to generate these findings are accurate and valid and the analytical methods rigorous. However, note that data beyond 2004 are not included, and surgeon and hospital practices may have changed since then.

Cardiac surgery providers in California and the Clinical Advisory Panel that oversees the heart bypass surgery reporting program are to be commended for the hard work and dedication they demonstrated in bringing this report to the public. The Office of Statewide Health Planning and Development continues to work with hospitals, physicians, and professional surgical societies to ensure that our reports are accurate, fair, and contribute to improved cardiac surgical care for all residents of the Golden State.

David M. Carlisle, M.D., Ph.D.
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EXECUTIVE SUMMARY

The *California Report on Coronary Artery Bypass Graft Surgery, 2003-2004, Hospital and Surgeon Data* presents findings from analyses of data collected from California's 121 state-licensed hospitals where 302 surgeons performed adult isolated coronary artery bypass graft (CABG) surgery[1] during 2003 and 2004.

The report uses risk-adjusted operative mortality to evaluate hospital and surgeon performance. Risk adjustment is a statistical technique that allows for fair comparison of healthcare provider operative mortality rates even though some have sicker or healthier patients than average. Operative mortality includes: 1) all deaths during the hospitalization at the hospital where the operation was performed, regardless of length of stay, and 2) deaths occurring anywhere within 30 days after the operation.

This report also provides hospital-level information on internal mammary artery (IMA)[2] usage (a process measure of surgery quality) and examines the relationship between the number of surgeries that hospitals and surgeons perform and their mortality rates. There were 40,377 isolated CABG surgeries reported in 2003-2004, making the California CABG Outcomes Reporting Program (CCORP) the largest public reporting program on CABG surgery outcomes in the United States.

Key findings from this report are:

- The operative mortality rate for isolated CABG surgery in California was 3.08% for 2003-2004 (2.91% for 2003 and 3.29% for 2004). Nationally, the Society of Thoracic Surgeons (STS) reported 2.4%[3] for the same time period. However, STS does not verify hospital reporting of deaths by linking with the state's vital statistics death file as CCORP does.

- The risk-adjusted operative mortality rate for California hospitals ranged from 0% to 7.83%, revealing wide variation in CABG surgery outcomes after adjusting for patients' pre-operative health conditions. However, 111 of 121 hospitals (91.7%) performed within their expected range compared to the state's overall mortality rate.

[1] Isolated CABG surgery refers to a CABG surgery without other major heart-related surgery, such as heart or lung transplantation, valve repair, etc., during the same admission. See Appendix A for a detailed clinical definition of isolated CABG.

[2] The internal mammary artery (IMA) is an artery that supplies blood to the front chest wall and the breasts. It is a paired artery, with one running on each side of the body. Evidence shows that the IMA, when grafted to a coronary artery, is less susceptible to obstruction over time and remains fully open longer than vein grafts.

[3] Society of Thoracic Surgeons: *Spring 2005 Report - Adult Cardiac Database Executive Summary*, 24 October 2005.

- Four of the 121 hospitals performed significantly **"Better"** than the state average, and six hospitals performed **"Worse"** than the state average. These hospitals are presented below in alphabetical order:

Hospitals with "Better" Performance Ratings, 2003-2004	
Hospital	**Region**
Fountain Valley Regional Hospital and Medical Center - Euclid	Orange County
Mercy General Hospital	Sacramento Valley and Northern California
Mercy Medical Center - Redding	Sacramento Valley and Northern California
St. John's Regional Medical Center (Oxnard)	San Fernando Valley, Antelope Valley, Ventura and Santa Barbara
Hospitals with "Worse" Performance Ratings, 2003-2004	
Hospital	**Region**
Bakersfield Memorial Hospital	Central California
Beverly Hospital	Greater Los Angeles
Doctors Medical Center - Modesto Campus	Central California
Lakewood Regional Medical Center	Greater Los Angeles
Santa Rosa Memorial Hospital - Montgomery	San Francisco Bay Area and San Jose
UCSF Medical Center	San Francisco Bay Area and San Jose

- Hospital ratings based on 2004 data were also produced to provide an indication of more recent performance. These results are presented in Table 4 of the main document. The 2003 hospital performance ratings were published in February 2006.

- The risk-adjusted operative mortality rate for surgeons overall (i.e., combined across all facilities where they operate) ranged from 0% to 32.96%, revealing wide variation among surgeons in their CABG surgery outcomes after adjusting for patients' pre-operative health conditions. However, 286 of the 302 surgeons (94.7%) performed within the expected range compared to the state's average mortality rate.

- Four surgeons' overall performance was significantly **"Better"** than the state average, and twelve surgeons' overall performance was **"Worse"** than the state average. These surgeons are presented below in alphabetical order:

Surgeons with " Better" Performance Ratings Overall, 2003-2004	
Surgeon	**Region**
Declusin, Richard J.	San Fernando Valley, Antelope Valley, Ventura & Santa Barbara
Giritsky, Alexander	Greater San Diego
Wang, Nan	Inland Empire, Riverside & San Bernardino
Yap, Alexander G.	San Francisco Bay Area & San Jose
Surgeons with "Worse" Performance Ratings Overall, 2003-2004	
Surgeon	**Region**
Aharon, Alon S.	Inland Empire, Riverside & San Bernardino
Edwards, Phyllis A.	Central California
Hoopes, Charles W.	San Francisco Bay Area & San Jose
Housman, Leland B.	Greater San Diego
Kincade, Robert C.	Sacramento Valley & Northern California Region
Marchbanks, Marshall V.	San Francisco Bay Area & San Jose
Nuno, Ismael N.	Greater Los Angeles
Rosenburg, Jeffrey M.	Greater San Diego
Schwartz, Steven M.	San Francisco Bay Area & San Jose
Sweezer, William P.	San Francisco Bay Area & San Jose
Tzeng, Thomas S.	Orange County and Greater Los Angeles
Vunnamadala, Syam P.	Orange County

- Surgeon ratings were also provided separately for each hospital where they operated. These ratings, which take into consideration both surgeon and hospital-specific factors, are presented in Table 5 of the main document.

Other major findings in this report include:

- Hospital rates for Internal Mammary Artery (IMA) usage, a process indicator of heart bypass surgery quality, are presented in this report for the first time. Use of the IMA in CABG surgery is a nationally endorsed measure of quality and very low rates are associated with poorer care. Results show that in 2003-2004, California hospitals had an average IMA usage rate of 89.6%, with a range from 57% to 100%. The IMA rate for 113 hospitals was deemed acceptable (71% or more), but eight hospitals had significantly lower IMA rates, which may be cause for concern. These ratings are presented in Table 6 of the main document.

- Utilization of Percutaneous Coronary Interventions (PCIs), such as angioplasty with stent insertion, in California has increased from 44,297 procedures in 1997 to 59,786 procedures in 2005—an increase of nearly 35%. Meanwhile, the number of isolated CABG surgeries has dropped from 28,175 to 17,166—a decrease of approximately 39% during the same period. A more comprehensive approach to examining the quality of revascularization procedures in California would include review of the outcomes of PCI providers. More information is included in Section VII.

- No significant association was found between the number of CABG surgeries that hospitals perform annually and their risk-adjusted mortality rates. At the surgeon level, no significant association was found between the number of isolated CABG surgeries performed and surgeons' risk-adjusted mortality rates. However, limited evidence suggests that surgeons who perform more than 100 CABG surgeries per year (isolated and non-isolated combined) have modestly lower isolated CABG surgery mortality rates. These results are presented in Section VII.

ACKNOWLEDGEMENTS

Funding for CCORP was provided by the Office of Statewide Health Planning and Development through its California Health Data and Planning Fund.

Important contributions were made by a host of individuals in each of the hospitals who dedicated their time and resources to collect and clean the data for analysis. Hospitals and surgeons provided ongoing feedback on the design of the program, which was vital to its success. Members of the CCORP Clinical Advisory Panel also made vital contributions, providing oversight and policy guidance in data collection and analysis, as well as presentation of results. The California Department of Health Services provided vital statistics files needed for identifying post-surgery deaths after discharge. CCORP also benefited from collaboration with the Society of Thoracic Surgeons and its California Chapter to coordinate and improve data collection efforts.

CCORP reflects the efforts and significant contributions of numerous individuals, including:

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I. INTRODUCTION

This report is a public disclosure of the quality of care provided by hospitals and surgeons performing coronary artery bypass graft (CABG) surgery in California during 2003 and 2004. It is the second heart bypass surgery report developed by the Office of Statewide Health Planning and Development (OSHPD) covering all of California's 121 state licensed hospitals where this procedure is performed, but it is the first report to detail results for all 302 responsible surgeons who performed the surgery.[4,5]

This report uses risk-adjusted operative mortality as the outcome measure. Operative mortality is defined as patient death occurring in the hospital after CABG surgery, regardless of the length of stay, or death occurring anywhere after hospital discharge but within 30 days of the CABG surgery. Use of operative mortality as the outcome, instead of in-hospital mortality, avoids potential manipulation of outcomes through discharge practices and holds hospitals and surgeons accountable for patients who died at home shortly after discharge or who were transferred and died in other facilities. The National Society for Thoracic Surgery (STS) also uses operative mortality as its primary outcome measure for CABG quality reporting although STS does not verify deaths following patient discharge. The National Quality Forum (NQF), which serves as the national body for vetting quality measures, has endorsed the STS operative mortality measure for CABG surgery.[6]

In this report, the operative mortality rate is adjusted statistically to account for variation in the health condition of patients before CABG surgery. The report is intended to encourage hospitals and surgeons to examine their surgical practices and make changes to improve the quality of care. This report also provides patients and their families with important information they may use when making decisions about CABG surgery.

Prior to this publication, all hospitals and surgeons listed in this report were provided an opportunity to review a preliminary version of this report showing their risk-adjusted results and performance ratings. Per statute, the two statements submitted by hospitals are included in this report and can be found in Appendix C. These statements may help readers better understand the concerns of some healthcare providers regarding the information released in this report.

During the preliminary report review period, surgeons were allowed to submit a statement to OSHPD if they felt their risk-adjusted results did not reflect the quality of care provided. Surgeons were also able to request review of subsequent decisions made by OSHPD to the California CABG Outcomes Reporting Program (CCORP) Clinical Advisory Panel (CAP), which is established in statute and responsible for reviewing and making final decisions on surgeon cases. Nine surgeons submitted 15 statements regarding their risk-adjusted results. In some instances the CAP upheld the decisions of OSHPD but in several instances they allowed surgeon requests for removal and revision of patient data. All surgeon requests for data changes were resolved prior to publication of this report.

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[4] This report provides details for the 302 licensed surgeons who performed isolated CABG surgery in 2003-2004. One surgeon who performed one non-isolated surgery is also noted in Table 5.

[5] The term "responsible surgeon" refers to the principle surgeon who performs the coronary artery bypass procedure. If a trainee performs this procedure, the responsible surgeon is the physician responsible for supervising the trainee. In situations where a responsible surgeon cannot otherwise be determined, the responsible surgeon is the surgeon who bills for the coronary artery bypass procedure.

[6] National Quality Forum (NQF), National Voluntary Consensus Standards for Hospital Care: Additional Priority Areas, 2005-2006, Washington, DC: NQF; 2006.

II. CORONARY ARTERY DISEASE AND BYPASS SURGERY

During 2003 and 2004, 232,748 Californians with coronary artery disease (CAD) were admitted to hospitals, which represents 8.5% of all adult non-maternal admissions. For adult non-maternal patients, heart disease was the leading cause of admission to hospitals in California.[7]

Coronary artery disease is a chronic disease in which cholesterol and fat solidify and form plaque along the linings of the coronary arteries. This process is called atherosclerosis or hardening of the arteries. If plaque continues to build up, blood vessels can become partially or completely blocked so the heart does not receive enough oxygen, leading to angina (chest pain) or even myocardial infarction (heart attack).

The two most common procedures for the treatment of coronary artery disease are Percutaneous Coronary Intervention (PCI), which includes drug-eluting stents, and Coronary Artery Bypass Graft (CABG) surgery. Despite recent large increases in the number of PCI procedures performed, CABG surgery is more frequently recommended for patients with extensive coronary disease, reduced left ventricular function, and more severe angina.

During CABG surgery, the surgeon uses arteries or veins from another part of the body (e.g., the saphenous vein from the leg) to reroute blood around a blockage in the coronary arteries. This allows oxygen-rich blood to flow freely to nourish the heart muscle. Surgeons may create single or multiple grafts for patients, depending on how many blood vessels and main branches are blocked.

Study Population

Under state mandate, California-licensed hospitals are required to report all isolated and non-isolated CABG surgeries to CCORP. Isolated CABG surgery is defined as CABG surgery performed without other major heart procedures, such as valve repair, during the same surgery (see Appendix A for the clinical definition of isolated CABG surgery).

In 2003 and 2004, there were 49,435 adult CABG surgeries performed in California; of these, 40,377 (82%) were isolated CABG surgeries, and 9,058 (18%) were non-isolated CABG surgeries. The study population for this report consists of all adult patients who underwent isolated CABG surgery and were discharged in 2003 and 2004. Isolated CABG surgery cases were selected as the study population because the uniformity of the surgical process allows adequate pre-operative risk adjustment for patient conditions. Non-isolated CABG cases were not used to determine hospital and surgeon performance ratings in this report.

[7] Data source: OSHPD, Patient Discharge Data, 2003 and 2004. Patients were identified with CAD if the principal diagnosis was coded as ICD-9-CM 410.0 - 414.9.

III. DATA

The primary data source for this report is the 2003 and 2004 clinical registry data collected by CCORP from reporting hospitals. These data were linked to vital statistics data from the California Department of Health Services to identify patients who died at home or at facilities other than the operating hospital within the 30 days following CABG surgery.

The CCORP clinical data registry draws on a subset of data elements collected by the Society of Thoracic Surgeons (STS) for their National Database of Cardiac Surgery. However, some data elements are exclusive to CCORP. Although the STS and the CCORP data definitions are virtually identical, CCORP provided additional clarifications to assist hospitals with coding. The data elements collected by CCORP in 2003-2004 and their definitions can be found in Appendix B.

Data Quality Review and Verification

The data submitted by each hospital were reviewed for completeness and errors. Prior to the hospital medical chart audit, a two-step process was followed to verify data submissions.

Step 1: Data Quality Reports

This process compares hospital and surgeon-specific prevalence rates for each preoperative risk factor to the state average, highlighting possible reporting issues for hospitals to address. Checks for invalid, missing, and abnormally high or low risk factor values are also included in these summary reports, which are distributed to hospitals for review and data correction.

Step 2: Data Discrepancy Reports

This process compares the CCORP data to the OSHPD Patient Discharge Data (PDD) files, requiring hospitals to account for discrepancies between the two data sources via chart review. This includes cross checking at the patient level to verify that: 1) all CABG surgeries discharged in 2003 and 2004 were reported; 2) all *Isolated* CABG surgery in-hospital deaths were reported; *3)* coding of *Discharge Status* was consistent; 4) *coding of Cardiogenic Shock* was consistent; and 5) coding of *Status of the Procedure "*Emergent/Salvage" was consistent.

Hospital Medical Chart Audit

A preliminary risk model was developed using combined 2003-2004 data that had passed through the data verification processes described above to identify outlier hospitals and surgeons (i.e., "Better" or "Worse" performers). The primary candidates for data audit were hospitals and surgeons identified as preliminary outliers, near outliers, or those possibly having problems in over-reporting or under-reporting risk factors. The 2004 data audit was much larger than the 2003 data audit and included 40 hospitals and a total of 2,824 records (12% of all CABG cases in 2004). An equal number of hospitals from Northern and Southern California were selected for the on-site medical chart review by trained, independent auditors. All isolated CABG deaths at the selected hospitals were audited and high risk patients were over-sampled. The number of cases selected within a hospital was proportional to the isolated CABG volume of the hospital, but with a range of 40 to 160 cases.

Key findings of the medical chart audit are presented below.

Overall results:

- There was modest improvement in the accuracy of hospital-submitted data from 2003 to 2004. In 2004, a total of 86,800 comparisons were performed for 31 categorical risk factors, which resulted in 9,324 data point corrections. When restricted to risk factors present in both audit years, the percentage of data corrections resulting from the audit dropped from 12.5% in year 2003 to 10.8% in year 2004.

- Over-reporting of categorical risk factors dropped from 5.2% in 2003 to 4.7% in 2004. Under-reporting of categorical risk factors dropped from 6.3% to 4.9% during the same period, and for continuous variables, the percentage of data corrections dropped 8%, over-reporting dropped 2%, and under-reporting dropped 5%.

- *Discharge status* was coded correctly for 99.9% of the audited cases. Two cases reported to CCORP as discharged alive were found to have died at discharge by the auditors. This was subsequently confirmed by hospitals. These two cases were not from the same hospital.

- The audit found that 99.2% of all reported isolated CABG cases were correctly coded as isolated. However, there were 24 isolated CABG cases reported to CCORP that auditors found to be non-isolated.

- The percent of missing values that would have been incorrectly assigned to the lowest risk category by default was low for most of the risk factors, indicating that missing data is not a major concern for the CCORP risk algorithm.

Specific Risk Factors:

- Using the percent of exact agreement between CCORP data submission and the audit data as an indicator of reporting reliability, the significant prognostic risk factors *Arrhythmia Type (Sustained VT/VF)* and *Cardiogenic Shock* showed strong agreement (96.8% and 95.9%, respectively). The audit also found at least 90% hospital-auditor agreement for *Patient Age*, *Gender, Dialysis, Immunosuppressive Treatment, Diabetes, Cerebrovascular Disease, Previous Operations with Cardio Pulmonary Bypass, PCI Interval, and Cerebrovascular Accident Timing*.

- Percent agreement is not a good measure of reporting accuracy for risk factors with low prevalence and kappa statistics were also consulted (not shown) in making determinations about inclusion of risk factors in the final model. Significant reporting problems were found for *Hepatic Failure*, *Arrhythmia Type (Heart Block),* and *Immunosuppressive Treatment* despite percent agreement of more than 90%. Hepatic Failure is a risk factor that exists for less than 0.5% of isolated CABG patients and auditors were able to confirm only 3 of the 29 diagnoses provided by hospitals. This risk factor has very strict reporting requirements and is difficult to code without complete laboratory documentation. After consulting with statisticians and the CCORP consulting cardiologist, it was determined that *Hepatic Failure* should be removed from the risk model.

- Percent agreement for *Arrhythmia Type (Heart Block)* was also relatively high, but auditors agreed with only 13 of the 70 diagnoses claimed by hospitals. This data element is incorporated into the overall categorical variable Arrhythmia Type, which showed good

overall agreement, and subsequently remained in the risk model. Auditors agreed with 33 of the 76 hospital diagnoses of *Immunosuppressive Treatment.* Over-reporting and under-reporting were of similar magnitude for this risk factor, which argued for its inclusion.

- The percent agreement was lower (<=80%) for *Status of the Procedure* (*Acuity*), *Chronic Lung Disease, Myocardial Infarction Timing, Mitral Insufficiency, NYHA Classification, and Angina Type.* Under-reporting was relatively high for *NYHA Classification* and *Angina Type*. This means that hospital submission of these variables, on average, incorrectly characterized patients as being lower risk. On the other hand, for the risk factors *Chronic Lung Disease* and *Myocardial Infarction Timing*, over-reporting was relatively high, indicating hospital submission of these risk factors incorrectly characterized patients as being higher risk. For the risk factor *Mitral Insufficiency,* there were equal levels of under- and over-reporting problems.

- Regarding *Status of the Procedure (Acuity),* a risk factor significantly affecting mortality, 111 records (4%) were coded in CCORP as Emergent or Emergent/Salvage while the audit found these were actually Elective or Urgent cases (over-reporting problem). Conversely, 55 records (2%) were coded as Elective or Urgent in CCORP while the audit reclassified these records as Emergent or Emergent/Salvage (under-reporting problem).

- For 2004, *NYHA Classification* I, II, and III were combined and served as the reference category in the risk model, with *NYHA Class IV* as the risk factor. Agreement statistics for NYHA Class using this approach improved slightly from 62% in the 2003 audit to 67% in 2004. This justified its retention in the risk model despite continued high levels of under-reporting (20%).

- As a result of substantial problems in the reporting of *Angina Type* (64.8% agreement) during this and previous audits, this variable was excluded from the risk-adjustment model.

At the end of the data correction process, the audited data were incorporated into the CCORP data for developing the public report and a summary of the audit report was sent to hospitals for review. All hospital outliers except one identified in the 2003-2004 ratings were audited either in 2003 or 2004. The one hospital not audited emerged as a statistical outlier very late in the process because of changes in other hospitals' relative rankings: it is targeted for audit next year. For surgeons, all outliers identified in the 2003-2004 ratings were audited without exception.

IV. 2003-2004 RISK MODEL FOR ADJUSTING HOSPITAL AND SURGEON OPERATIVE MORTALITY RATES

Hospital and surgeon performance are important factors that impact patient outcomes. Whether patients recover quickly, have complications, or die following CABG is in part a result of the medical care they receive. However, it is difficult to compare outcomes among providers in assessing performance because patients treated at different hospitals or by different surgeons often vary in the severity of their pre-operative clinical conditions.

To make fair comparisons of outcomes among different providers, it is necessary to adjust for the differences in the case mix of patients across hospitals and surgeons. CCORP "levels the playing field" by taking into account the pre-operative condition of each patient. Hospitals and surgeons who handle complex cases (i.e., sicker patients prior to surgery) get a larger risk-adjustment weighting in the risk model, while hospitals that handle less complex cases get a smaller weighting. Thus, hospitals and surgeons treating sicker patients are not at a disadvantage when their performance is compared with other hospitals and surgeons.

CCORP used a multivariable logistic regression model to determine the relationship between each of the demographic and pre-operative risk factors and the likelihood of operative mortality. Multivariable logistic regression models relate the probability of death to the explanatory factor (e.g., *Patient Age, Last Creatinine Level Preop*) while controlling for all other explanatory factors in the model.

The risk model was developed in two steps. In the first step, the 40,377 isolated CABG cases were evaluated for missing data; 36,510 of these had no missing data in any field and were used for the risk model parameter estimation. The 3,867 (10%) isolated CABG cases with missing data fields were removed to ensure that the effects of risk factors were estimated based on the most complete data available. In the second step, missing values for these 3,867 records were imputed by replacing them with the lowest risk category. CCORP assigned the lowest risk value based on the following rationale: 1) Many hospitals may leave data fields blank by design (e.g., blank means a risk factor was not present or the value was normal); 2) to maintain consistency with other major cardiac reporting programs where missing data are replaced with the lowest-risk or normal value; and 3) assigning values for missing data in this way creates an incentive for more complete reporting by hospitals. After imputing the missing values, the parameters of the risk model were applied to all data records for computation of hospital and surgeon expected mortality.

Although all pre-operative risk factors listed in Appendix B were candidates for the risk-adjustment model, only those associated with mortality in the expected direction from a clinical perspective were selected for the final model. Table 1 presents the final model based on the 2003 and 2004 dataset.

The final risk model included all variables used in the CCORP 2003 risk model[8] except *Hepatic Failure* (Yes/No) which was removed due to coding problems revealed in the medical chart audit.

[8] Parker JP, Li Z, Danielsen B, Marcin J, Dai J, Mahendra G, Steimle AE. *The California Report on Coronary Artery Bypass Graft Surgery 2003 Hospital Data*, Sacramento, CA: California Office of Statewide Health Planning and Development, February 2006.

GUIDE TO INTERPRETING THE 2003-2004 LOGISTIC REGRESSION RISK MODEL

Coefficient	The coefficient for each explanatory factor represents the effect that a factor has on a patient's likelihood of dying (in the hospital or within 30 days) following bypass surgery. If the value is positive, it means that the characteristic is associated with an increased risk of death compared to not having the characteristic, while controlling for the effect of all other factors. If the coefficient is negative, having that characteristic is associated with a lower risk of death compared to not having it. The larger the value (whether positive or negative), the greater the effect or weight this characteristic has on the risk of dying. For example, the coefficient for "Congestive Heart Failure" in the 2003-2004 model is 0.26 and statistically significant. This value is positive, so it indicates that CABG patients with congestive heart failure are at an increased risk of dying compared to patients who do not have the disease.
Standard Error	The standard error is the standard deviation of the sampling distribution of an estimate. It measures the statistical reliability of that estimate.
p-value	The p-value is a measure of the statistical significance of the coefficient compared to the reference category. Commonly, p-values of less than 0.05 are considered statistically significant. The smaller the p-value, the more likely the effect of a factor is real rather than due to chance.
Significance	When the p-value of a coefficient is less than 0.05, it is deemed statistically significant at the 0.05 level and is denoted with one star (*). Two stars (**) indicate statistical significance at the 0.01 level, and three stars (***) indicate statistical significance at the 0.001 level. All statistical tests performed for this model are two-tailed.
Odds Ratio	An odds ratio (OR) is another way of characterizing the impact of each risk factor on operative mortality. Mathematically, the odds ratio is the antilogarithm of the coefficient value. The larger the odds ratio (above 1.0), the greater the impact that risk factor has on the risk of dying. An odds ratio of 1.0 means the factor has no effect. An odds ratio less than 1.0 means that the factor is associated with a decreased risk of dying. For example, the odds ratio for congestive heart failure (CHF) in the 2003-2004 model is 1.29. This means that for patients with CHF, the odds of dying is about 29% higher compared to patients without CHF, assuming all other risk factors are the same.

Table 1: Logistic Regression Risk Model for Operative Mortality, 2003-2004

Risk Factor		Coefficient	Standard Error	p-value	Significance	Odds Ratio
Intercept		-9.78	0.37	<.0001		
Age (by single year)		0.06	0.00	<.0001	***	1.06
Gender	Male			Reference		
	Female	0.47	0.07	<.0001	***	1.61
Race	Caucasian			Reference		
	Non-Caucasian	0.14	0.07	0.045	*	1.16
Body Mass Index	18.5-39.9			Reference		
	<18.5	0.71	0.21	0.001	***	2.03
	>=40.0	0.25	0.18	0.162		1.28
Status of Procedure	Elective			Reference		
	Urgent	0.43	0.09	<.0001	***	1.53
	Emergent	0.86	0.15	<.0001	***	2.37
	Emergent/Salvage	2.49	0.31	<.0001	***	12.01
Last Creatinine Level Preop (mg/dl)		0.99	0.14	<.0001	***	2.68
Hypertension		0.06	0.09	0.523		1.06
Dialysis		0.61	0.16	0.000	***	1.85
Peripheral Vascular Disease		0.37	0.08	<.0001	***	1.45
Cerebrovascular Disease		0.19	0.10	0.068		1.21
Cerebrovascular Accident	No CVA			Reference		
	Remote (>2 weeks)	0.06	0.12	0.622		1.06
	Recent (<=2 weeks)	0.52	0.36	0.150		1.69
Diabetes		0.05	0.07	0.483		1.05
Chronic Lung Disease	None			Reference		
	Mild	0.07	0.11	0.489		1.08
	Moderate	0.20	0.12	0.096		1.22
	Severe	0.77	0.13	<.0001	***	2.16
Immunosuppressive Treatment		0.38	0.17	0.02	*	1.47
Arrhythmia Type	None			Reference		
	Atrial Fibrillation/Flutter	0.40	0.10	<.0001	***	1.50
	Heart Block	0.16	0.17	0.349		1.18
	Sustained VT/VF	0.77	0.13	<.0001	***	2.15
Myocardial Infarction	None			Reference		
	21 or more days ago	0.02	0.10	0.848		1.02
	8-20 days ago	0.12	0.14	0.403		1.12
	1-7 days ago	0.08	0.09	0.358		1.08
	>6 but within 24 Hours	0.22	0.15	0.145		1.25
	Within 6 Hours	0.42	0.20	0.034	*	1.52
Cardiogenic Shock		0.99	0.12	<.0001	***	2.68
Congestive Heart Failure		0.26	0.08	0.001	***	1.29
NYHA Class IV		0.42	0.07	<.0001	***	1.52
Prior Cardiac Surgery	None			Reference		
	One or more	0.44	0.12	0.000	***	1.56
Prior PCI Interval	No Prior PCI			Reference		
	> 6 Hours	0.19	0.08	0.027	*	1.20
	<= 6 Hours	0.43	0.20	0.033	*	1.53
Ejection Fraction (%)		-0.01	0.00	<.0001	***	0.99
Left Main Disease (% Stenosis)		0.00	0.00	0.602		1.00
Number of Diseased	None, One, or Two			Reference		
Vessels	Three or more	0.39	0.09	<.0001	***	1.47
Mitral Insufficiency	None			Reference		
	Trivial	-0.03	0.12	0.777		0.97
	Mild	-0.07	0.10	0.454		0.93
	Moderate/Severe	0.25	0.12	0.039	*	1.28

Notes: Last creatinine level preop (mg/dl), ejection fraction, and percent left main stenosis were all modeled using piecewise linear transformations.
* significant at the 0.05 level (two-tailed test), ** significant at the 0.01 level (two-tailed test),
*** significant at the 0.001 level (two-tailed test)

Key Findings Regarding the Risk Model

- Although some of the risk factors are not statistically significant, all significant coefficients (p-value<0.05) appeared with the expected directional sign from a clinical standpoint, i.e., ”+“ for increased risk of dying and “-“ for decreased risk of dying.

- Among demographic variables, *Patient Age, Gender,* and *Race* were all significant risk factors. The clinical literature suggests that *Gender* may be a proxy for body size and/or coronary artery size (diameter); smaller coronary arteries in women may be more prone to thrombosis or restenosis. For non-Caucasian patients, the probability of operative death was 16% higher than for Caucasian patients, controlling for all other variables.

- Patients who were very underweight (*Body Mass Index (BMI)* <18.5) had a higher risk of dying (Odds Ratio (OR)=2.03) than those in the reference group (*BMI* 18.5-39.9). Patients who were extremely obese (*BMI* ≥ 40.0) were also at increased risk of dying (Odd Ratio (OR)=1.28), although the association was not statistically significant. A very low *BMI* may be a proxy for frailty or indicate a wasting comorbid condition not captured by other risk variables.

- Of the comorbidities in the risk model, severe *Chronic Lung Disease* (OR=2.16), *Dialysis* (OR=1.85), and *Peripheral Vascular Disease* (OR=1.45) had strong associations with operative mortality. The risk factor *Last Creatinine Level Preop* (OR=2.68) also had a strong association with operative mortality.

- Of the cardiac risk factors, *Cardiogenic Shock* and the *Arrhythmia Type category* “Sustained VT/VF” had the largest effect (OR=2.68 and 2.15, respectively). *Congestive Heart Failure* also had a significant impact on operative mortality (OR=1.29).

- Controlling for all other variables, patients with prior cardiac surgery had a 56% greater chance of operative death after the CABG surgery.

- Among hemodynamic risk factors, *Ejection Fraction* had a significant effect on mortality (OR=0.99). Three or more *Diseased Vessels* also was a significant risk factor (OR=1.47). The Degree of *Left Main Disease* (% stenosis) did not independently contribute to the risk of operative mortality. Only moderate/severe *Mitral Insufficiency* was associated with an increased risk of death (OR=1.28).

Discrimination

Models that distinguish well between patients who die and those who survive are said to have good discrimination. A commonly used measure of discrimination is the c-statistic (also known as the area under the Receiver Operating Characteristic (ROC) curve. For all possible pairs of patients, where one dies and the other survives surgery, the c-statistic describes the proportion of pairs where the patient who died had a higher predicted risk of death than the patient who lived. The c-statistic ranges from 0.5 to 1, with higher values indicating better discrimination. For the 2003-2004 risk model, the c-statistic was 0.819. In recently published studies of CABG operative mortality using logistic regression models (including those from New Jersey and the National Society of Thoracic Surgeons), the c-statistic ranged from 0.76 to 0.78. In comparison, the CCORP 2003-2004 risk model appears to discriminate better than other programs that produce risk-adjusted outcomes data for isolated CABG surgery.

Calibration

Calibration refers to the ability of a model to match predicted and observed mortality across the entire spectrum of the data. A model in which the number of observed deaths matches closely with the number of deaths predicted by the model demonstrates good calibration. Good calibration is essential for reliable risk adjustment. A common measure of calibration is the Hosmer-Lemeshow χ^2 test, which compares observed and predicted outcomes over deciles of risk. The p-value of the Hosmer-Lemeshow test statistic for the risk model is 0.617, indicating a nonsignificant likelihood of poor calibration. That is, the predicted mortality was consistent with actual mortality in the data.

Another way to test model calibration is to partition the data and compare observed events (death) with predicted events (death) by risk group. As presented in Table 2, the first row shows the patients in the lowest risk group (i.e., their predicted mortality was less than 10%). Among the 34,442 patients in this group, 724 patients died, but the model predicted 713.3 patient deaths. Assuming a Poisson distribution for a binary outcome, the predicted range of deaths for this group is 660.9 to 765.6. The observed number of 724 deaths falls within the range of expected deaths. In fact, examination of all the risk groups shows no risk groups had deaths outside of the expected range and no systematic underestimates or overestimates of mortality at the extreme. More importantly, for the high risk groups (4 thru 10) the number of predicted deaths was either close to or slightly higher than the observed number of deaths, which indicates the model gives credit to providers who treat high-risk patients.

Table 2: Calibration of 2003-2004 Risk Model

Risk Group	Predicted mortality	N	Observed deaths	Predicted deaths	Difference	95% CI of Predicted deaths
1	<0.10	34,442	724	713.3	10.7	(660.9, 765.6)
2	0.10 – 0.19	1,392	193	189.4	3.6	(162.4, 216.3)
3	0.20 – 0.29	364	89	88.9	0.1	(70.4, 107.3)
4	0.30 – 0.39	167	50	57.6	-7.6	(42.7, 72.5)
5	0.40 - 0.49	68	31	30.3	0.7	(19.5, 41.1)
6	0.50 – 0.59	30	15	16.4	-1.4	(8.4, 24.3)
7	0.60 – 0.69	24	13	15.4	-2.4	(7.7, 23.1)
8	0.70 – 0.79	11	4	8.3	-4.3	(2.6, 13.9)
9	0.80 – 0.89	8	8	6.8	1.2	(1.7, 11.9)
10	0.90 – 1.00	4	3	3.7	-0.7	(0.0, 7.5)
Total		36,510	1,130	1.130		

V. RISK-ADJUSTED OPERATIVE MORTALITY AND HOSPITAL/SURGEON PERFORMANCE RATING

The risk-adjusted mortality rate (RAMR) represents the best estimate, based on the risk model, of what the provider's mortality rate would have been if the provider had a patient case mix identical to the statewide mix. Thus, this rate is comparable among providers since the differences in patient severity of illness have been accounted for. The RAMR is computed, first by dividing the observed mortality by the provider's expected mortality rate to get the observed/expected (O/E) ratio. If the O/E ratio is greater than one, the provider has a higher mortality than expected based on its patient mix; if the O/E ratio is less than one, the provider has a lower mortality rate than expected. The O/E ratio is then multiplied by the overall state mortality rate (3.08% for 2003-2004 combined; 3.29% for 2004 alone) to obtain the provider's risk-adjusted mortality rate.

To prevent a misinterpretation of differences caused by chance variation, the performance rating is based on a comparison of the 95% Confidence Interval (CI) of each provider's RAMR to the California state average mortality rate.[9] This was done because a point estimate of the RAMR based on just one or two years of data can be attributed to chance. Thus, we treated 2003-2004 data as a sample for inference. As shown in Tables 3, 4, and 5, if the entire 95% CI of a provider's risk-adjusted mortality is below the state average mortality rate, indicating the provider's RAMR is significantly lower than the state average, the performance rating will be **"Better"**; if the entire 95% CI of a provider's RAMR is above the state average mortality rate, indicating the provider's risk-adjusted mortality is significantly higher than the state average, the performance rating will be **"Worse"**; and if the state average mortality rate is within the 95% CI of a provider's RAMR, the performance rating will be **"Not Different"** (blank in the column).

2003-2004 Hospital Risk-Adjusted Operative Mortality Results

Table 3 and Figure 1 present the risk-adjusted results for each hospital for 2003-2004 combined. The table is sorted by geographic region and contains, for each hospital, the total number of CABG surgeries performed (isolated and non-isolated combined), the number of isolated CABG surgeries, the number of observed isolated CABG deaths, the observed mortality rate, the expected mortality rate predicted by the risk model, the risk-adjusted mortality rate and the 95% confidence interval (CI) of the risk-adjusted mortality rate, and the associated hospital performance rating.

To help the reader interpret the hospital performance rating, Figure 1 shows results graphically, sorted alphabetically by hospital name within geographic region. The vertical line on each bar represents the risk-adjusted mortality rate the each hospital, and the entire bar on the graph represents the 95% confidence interval (CI) of the risk-adjusted mortality rate for each hospital in a specific geographic region.[10] If the entire bar is positioned to the left of the vertical line indicating the state average, we conclude with 95% confidence that the hospital's risk-adjusted mortality is significantly lower than the state average ("Better"). If the entire bar is positioned to the right of the vertical line indicating the state average, we conclude with 95% confidence that

[9] The Poisson exact probability method was used for computation of 95% confidence interval for the risk-adjusted mortality rate. (Buchan Iain, *Calculating Poisson Confidence Interval in Excel*, January 2004)

[10] If there is no vertical line on the bar, the risk-adjusted mortality rate for the hospital is zero.

the hospital's risk-adjusted mortality is significantly higher than the state average ("Worse"), and if the bar crosses the vertical line, we conclude with 95% confidence that the hospital's risk-adjusted mortality rate is not different from the state average. For this report, the upper and lower portions of the 95% CIs are often not equal (unlike in the 2003 data report) since the Poisson exact probability method was used for computation of 95% CIs.

Among the 40,377 isolated CABG surgeries performed in 2003 and 2004, 1,244 patients died in-hospital or within 30 days of the surgery date, reflecting an overall operative mortality rate of 3.08% in California. The observed mortality rates among hospitals ranged from 0% to 12.73%. The expected mortality rates, which measure patient severity of illness, were between 1.23% and 5.42%. The risk-adjusted mortality rates, which measure hospital performance, ranged from 0% to 7.83%.

Based on the 95% confidence intervals for risk-adjusted mortality rates, 111 of 121 hospitals (91%) performed within the expected range compared to the state's overall mortality rate (denoted by a blank space in the performance rating column of Table 3), four of the 121 hospitals performed significantly **"Better"** than the state average, and six hospitals performed **"Worse"** than the state average. Hospital names marked with two asterisks (**) in Table 3 are hospitals that have submitted statements regarding this report. These are presented in Appendix C.

GUIDE TO INTERPRETING TABLES 3, 4 AND 5	
All CABG Cases	The total number of isolated and non-isolated CABG cases submitted to CCORP for the time period indicated (i.e., 2003-2004, or 2004 alone). Non-isolated CABS cases are not used in calculating performance ratings.
Isolated CABG Cases	The number of isolated CABG cases submitted to CCORP during the time period indicated. Only isolated CABG cases are used in calculating performance ratings.
Isolated CABG Deaths	The actual number of operative deaths for isolated CABG cases for the time period indicated. The number of deaths includes: (1) all deaths that occur during the hospitalization in which the CABG surgery was performed, even after 30 days, and (2) all deaths occurring within 30 days after the CABG surgery.
Observed Mortality Rate	The ratio of the number of isolated CABG deaths and the isolated CABG cases multiplied by 100: Observed Mortality Rate = Number of Isolated CABG Deaths/Isolated CABG Cases X 100.
Expected Mortality Rate	The ratio of the expected number of operative deaths predicted for a provider (after adjusting for its patient population) and the number of Isolated CABG cases multiplied by 100: Expected Mortality Rate = Number of Expected Deaths/Number of Isolated CABG Cases X 100.
Risk-Adjusted Mortality Rate (95% CI)	The Risk-Adjusted Mortality Rate (RAMR) is obtained by multiplying the observed overall California mortality rate (CAMR) by a hospital/surgeon's O/E ratio: (CAMR X O/E ratio). The 95% confidence interval represents the confidence we have in the estimate for the RAMR. The lower and upper confidence limits are calculated using exact Poisson 95% confidence interval calculations.
Performance Rating	The performance rating is based on a comparison of each provider's risk-adjusted mortality rate and the California observed mortality rate. This is a test of statistical significance. A hospital or surgeon is classified as "Better" if the entire 95% confidence interval of the RAMR falls below the California observed mortality rate (3.08% for 2003-2004, 3.29% for 2004). A hospital or surgeon is classified as "Worse" if the entire 95% confidence interval of the RAMR is higher than the California observed mortality rate. A hospital or surgeon is classified as "Not Different" (performance rating is blank) if the California mortality rate falls within the confidence interval of the hospital's or surgeon's risk-adjusted mortality rate.

Table 3: Hospital Risk-Adjusted Operative Mortality Results by Region, 2003-2004

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Sacramento Valley & Northern California Region	Enloe Medical Center	454	366	9	2.46	3.13	2.42	(1.11, 4.59)	
	Mercy General Hospital	2,294	1,637	20	1.22	1.93	1.95	(1.19, 3.01)	Better
	Mercy Medical Center - Redding	588	486	10	2.06	3.85	1.65	(0.79, 3.03)	Better
	Mercy San Juan Hospital	315	238	4	1.68	1.95	2.65	(0.72, 6.80)	
	Redding Medical Center	57	42	3	7.14	5.41	4.06	(0.84, 11.88)	
	Rideout Memorial Hospital	381	318	6	1.89	2.69	2.16	(0.79, 4.70)	
	St. Joseph Hospital - Eureka	176	148	2	1.35	4.17	1.00	(0.12, 3.61)	
	Sutter Memorial Hospital	1,426	1,114	39	3.50	2.90	3.72	(2.64, 5.08)	
	UC Davis Medical Center	387	272	4	1.47	2.36	1.92	(0.52, 4.91)	
San Francisco Bay Area & San Jose	Alta Bates Summit Medical Center - Summit Campus	1,746	1,502	43	2.86	2.94	3.00	(2.17, 4.04)	
	California Pacific Medical Center - Pacific Campus	319	235	9	3.83	4.30	2.74	(1.25, 5.21)	
	Doctors Medical Center - San Pablo Campus	116	102	5	4.90	3.44	4.39	(1.43, 10.24)	
	Dominican Hospital	215	191	5	2.62	3.43	2.35	(0.76, 5.49)	

* A hospital is classified as "Better" if the upper 95% CI of the RAMR falls below the California observed mortality rate (3.08). A hospital is classified as "Worse" if the lower 95% CI of the RAMR is higher than the California observed mortality rate. A hospital's performance is considered "Not Different" from the state average (rating is blank) if the California mortality rate falls within the CI of the RAMR.

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State		**49,435**	**40,377**	**1,244**	**3.08**				
San Francisco Bay Area & San Jose (continued)	El Camino Hospital	208	181	2	1.10	3.10	1.09	(0.13, 3.97)	
	Good Samaritan Hospital - San Jose	492	420	19	4.52	3.02	4.61	(2.78, 7.20)	
	John Muir Medical Center	227	177	6	3.39	2.52	4.14	(1.52, 9.02)	
	Kaiser Foundation Hospital (Geary San Francisco)	1,856	1,432	37	2.58	2.23	3.56	(2.51, 4.92)	
	Marin General Hospital	131	105	5	4.76	3.57	4.11	(1.33, 9.59)	
	Mt. Diablo Medical Center	543	440	17	3.86	3.16	3.76	(2.19, 6.03)	
	O'Connor Hospital	238	214	9	4.21	3.06	4.24	(1.94, 8.04)	
	Mills-Peninsula Health Center	177	132	2	1.52	3.57	1.31	(0.16, 4.72)	
	Queen of the Valley Hospital	380	339	7	2.06	3.99	1.59	(0.64, 3.28)	
	Salinas Valley Memorial Hospital	474	415	9	2.17	2.68	2.49	(1.14, 4.73)	
	San Jose Medical Center	97	88	4	4.55	4.53	3.09	(0.84, 7.91)	
	San Ramon Regional Medical Center	124	111	2	1.80	2.52	2.20	(0.27, 7.96)	
	Santa Clara Valley Medical Center	109	98	3	3.06	1.23	7.66	(1.58, 22.40)	

* A hospital is classified as "Better" if the upper 95% CI of the RAMR falls below the California observed mortality rate (3.08). A hospital is classified as "Worse" if the lower 95% CI of the RAMR is higher than the California observed mortality rate. A hospital's performance is considered "Not Different" from the state average (rating is blank) if the California mortality rate falls within the CI of the RAMR.

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State		**49,435**	**40,377**	**1,244**	**3.08**				
San Francisco Bay Area & San Jose (continued)	Santa Rosa Memorial Hospital	271	206	17	8.25	4.37	5.81	(3.39, 9.31)	Worse
	Sequoia Hospital	448	245	5	2.04	3.60	1.75	(0.57, 4.07)	
	Seton Medical Center	498	438	7	1.60	3.26	1.51	(0.61, 3.11)	
	St. Helena Hospital	357	322	15	4.66	4.07	3.53	(1.97, 5.81)	
	St. Mary's Medical Center, San Francisco	190	140	7	5.00	5.32	2.89	(1.16, 5.96)	
	Stanford University Hospital	402	260	7	2.69	2.31	3.60	(1.44, 7.40)	
	Sutter Medical Center of Santa Rosa	319	241	1	0.41	1.72	0.73	(0.02, 4.14)	
	UCSF Medical Center**	315	270	16	5.93	3.35	5.45	(3.11, 8.85)	Worse
	Washington Hospital - Fremont	348	305	5	1.64	3.55	1.42	(0.46, 3.32)	
Central California	Bakersfield Heart Hospital	447	365	12	3.29	3.10	3.27	(1.69, 5.71)	
	Bakersfield Memorial Hospital	600	516	24	4.65	2.79	5.13	(3.29, 7.64)	Worse
	Community Medical Center - Fresno	512	446	16	3.59	3.92	2.82	(1.61, 4.58)	
	Dameron Hospital	152	125	10	8.00	4.27	5.77	(2.77, 10.61)	

* A hospital is classified as "Better" if the upper 95% CI of the RAMR falls below the California observed mortality rate (3.08). A hospital is classified as "Worse" if the lower 95% CI of the RAMR is higher than the California observed mortality rate. A hospital's performance is considered "Not Different" from the state average (rating is blank) if the California mortality rate falls within the CI of the RAMR.

** Hospital submitted a comment letter to OSHPD which is located in Appendix C.

Table 3: Hospital Risk-Adjusted Operative Mortality Results by Region, 2003-2004

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State		**49,435**	**40,377**	**1,244**	**3.08**				
Central California (continued)	Doctors Medical Center - Modesto Campus	915	727	27	3.71	2.30	4.97	(3.28, 7.24)	Worse
	Fresno Heart Hospital	322	259	3	1.16	2.39	1.49	(0.31, 4.36)	
	Kaweah Delta Hospital	792	683	32	4.69	4.24	3.41	(2.33, 4.80)	
	Marian Medical Center	255	219	7	3.20	3.22	3.06	(1.23, 6.30)	
	Memorial Medical Center of Modesto	716	591	22	3.72	2.90	3.95	(2.48, 5.99)	
	San Joaquin Community Hospital	237	206	8	3.88	2.67	4.48	(1.93, 8.83)	
	St. Agnes Medical Center	897	772	20	2.59	2.75	2.90	(1.77, 4.48)	
	St. Joseph's Medical Center of Stockton	585	487	13	2.67	2.73	3.01	(1.60, 5.15)	
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara	Antelope Valley Hospital Medical Center	100	89	4	4.49	2.88	4.80	(1.31, 12.31)	
	Community Memorial Hospital of San Buenaventura	374	334	6	1.80	2.26	2.45	(0.90, 5.33)	
	Encino Tarzana Regional Medical Center	332	268	9	3.36	3.72	2.78	(1.27, 5.28)	
	French Hospital Medical Center	170	127	2	1.57	2.97	1.63	(0.20, 5.90)	
	Glendale Adventist Medical Center - Wilson Terrace	301	268	12	4.48	3.32	4.16	(2.15, 7.26)	

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State		**49,435**	**40,377**	**1,244**	**3.08**				
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara (continued)	Glendale Memorial Hospital and Health Center	348	299	14	4.68	3.24	4.45	(2.43, 7.47)	
	Granada Hills Community Hospital	25	25	0	0.00	5.01	0.00	(0.00, 9.07)	
	Lancaster Community Hospital	37	36	1	2.78	4.08	2.10	(0.05, 11.68)	
	Los Robles Regional Medical Center	332	271	13	4.80	3.75	3.94	(2.10, 6.74)	
	Northridge Hospital Medical Center	219	185	8	4.32	3.89	3.42	(1.48, 6.75)	
	Providence Holy Cross Medical Center	251	214	12	5.61	4.07	4.25	(2.19, 7.41)	
	Providence St. Joseph Medical Center	224	162	7	4.32	1.83	7.27	(2.92, 14.98)	
	Santa Barbara Cottage Hospital	493	385	8	2.08	3.18	2.01	(0.87, 3.97)	
	Sierra Vista Regional Medical Center	221	187	4	2.14	3.90	1.69	(0.46, 4.33)	
	St. John's Regional Medical Center	386	331	4	1.21	3.91	0.95	(0.26, 2.44)	Better
	Valley Presbyterian Hospital	68	68	4	5.88	3.06	5.92	(1.61, 15.16)	
	West Hills Regional Medical Center	117	100	3	3.00	3.11	2.97	(0.61, 8.68)	
Greater Los Angeles	Beverly Hospital	57	55	7	12.73	5.01	7.83	(3.15, 16.12)	Worse

* A hospital is classified as "Better" if the upper 95% CI of the RAMR falls below the California observed mortality rate (3.08). A hospital is classified as "Worse" if the lower 95% CI of the RAMR is higher than the California observed mortality rate. A hospital's performance is considered "Not Different" from the state average (rating is blank) if the California mortality rate falls within the CI of the RAMR.

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State		**49,435**	**40,377**	**1,244**	**3.08**				
Greater Los Angeles (continued)	Brotman Medical Center	81	59	2	3.39	2.86	3.65	(0.44, 13.19)	
	Cedars Sinai Medical Center	649	423	10	2.36	2.96	2.46	(1.18, 4.52)	
	Centinela Hospital Medical Center	216	196	10	5.10	3.29	4.77	(2.29, 8.78)	
	Citrus Valley Medical Center - IC Campus	364	323	12	3.72	3.02	3.79	(1.96, 6.62)	
	Downey Regional Medical Center	147	145	7	4.83	3.22	4.62	(1.86, 9.51)	
	Garfield Medical Center	229	194	4	2.06	3.54	1.79	(0.49, 4.59)	
	Good Samaritan Hospital - Los Angeles	671	528	19	3.60	3.97	2.79	(1.68, 4.36)	
	Huntington Memorial Hospital	386	288	6	2.08	2.33	2.75	(1.01, 5.99)	
	Kaiser Foundation Hospital (Sunset Los Angeles)	2,293	1,967	62	3.15	2.75	3.53	(2.71, 4.53)	
	Lakewood Regional Medical Center	299	262	14	5.34	2.85	5.77	(3.16, 9.69)	Worse
	Little Company of Mary Hospital	228	169	5	2.96	4.36	2.09	(0.68, 4.88)	
	Long Beach Memorial Medical Center	752	648	28	4.32	3.10	4.29	(2.85, 6.20)	
	Los Angeles Co Harbor - UCLA Medical Center	284	263	10	3.80	3.39	3.45	(1.66, 6.35)	

* A hospital is classified as "Better" if the upper 95% CI of the RAMR falls below the California observed mortality rate (3.08). A hospital is classified as "Worse" if the lower 95% CI of the RAMR is higher than the California observed mortality rate. A hospital's performance is considered "Not Different" from the state average (rating is blank) if the California mortality rate falls within the CI of the RAMR.

Table 3: Hospital Risk-Adjusted Operative Mortality Results by Region, 2003-2004

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Greater Los Angeles (continued)	Los Angeles Co USC Medical Center	284	231	6	2.60	2.15	3.72	(1.37, 8.10)	
	Methodist Hospital of Southern California	235	216	8	3.70	2.80	4.07	(1.76, 8.03)	
	Presbyterian Intercommunity Hospital	175	158	5	3.16	3.69	2.64	(0.86, 6.16)	
	Santa Monica - UCLA Medical Center	86	70	2	2.86	3.03	2.91	(0.35, 10.49)	
	St. Francis Medical Center	186	174	6	3.45	2.41	4.41	(1.62, 9.59)	
	St. John's Hospital and Health Center	192	150	1	0.67	2.47	0.84	(0.02, 4.63)	
	St. Mary Medical Center	162	137	7	5.11	5.22	3.02	(1.21, 6.21)	
	St. Vincent Medical Center	443	387	10	2.58	3.69	2.15	(1.03, 3.97)	
	Torrance Memorial Medical Center	384	284	5	1.76	3.65	1.49	(0.48, 3.47)	
	UCLA Medical Center	355	205	7	3.41	2.65	3.96	(1.60, 8.18)	
	USC University Hospital	356	224	14	6.25	3.57	5.39	(2.95, 9.05)	
	White Memorial Medical Center	260	239	9	3.77	4.16	2.79	(1.27, 5.29)	
Inland Empire, Riverside & San Bernardino	Desert Regional Medical Center	378	323	15	4.64	3.29	4.34	(2.43, 7.17)	

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State		**49,435**	**40,377**	**1,244**	**3.08**				
Inland Empire, Riverside & San Bernardino (continued)	Eisenhower Memorial Hospital	533	409	13	3.18	3.35	2.92	(1.56, 5.00)	
	Loma Linda University Medical Center	825	628	14	2.23	2.81	2.44	(1.34, 4.10)	
	Pomona Valley Hospital Medical Center	383	322	8	2.48	4.73	1.61	(0.70, 3.19)	
	Riverside Community Hospital	556	497	17	3.42	3.62	2.91	(1.70, 4.66)	
	San Antonio Community Hospital	147	136	3	2.21	5.42	1.26	(0.26, 3.66)	
	St. Bernardine Medical Center	1,148	1,035	25	2.42	3.30	2.26	(1.46, 3.33)	
	St. Mary Regional Medical Center	492	445	12	2.70	3.58	2.32	(1.20, 4.05)	
Orange County	Anaheim Memorial Medical Center	542	480	19	3.96	3.16	3.86	(2.32, 6.02)	
	Fountain Valley Regional Hospital	295	268	4	1.49	4.20	1.09	(0.30, 2.80)	Better
	Hoag Memorial Hospital Presbyterian	615	453	13	2.87	4.10	2.16	(1.15, 3.69)	
	Irvine Regional Hospital and Medical Center	82	75	2	2.67	1.99	4.13	(0.50, 14.91)	
	Mission Hospital Regional Medical Center	457	394	6	1.52	2.22	2.11	(0.78, 4.60)	
	Saddleback Memorial Medical Center	266	227	7	3.08	2.79	3.40	(1.37, 7.01)	

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State		**49,435**	**40,377**	**1,244**	**3.08**				
Orange County (continued)	St. Joseph Hospital - Orange	427	327	3	0.92	2.58	1.10	(0.23, 3.20)	
	St. Jude Medical Center**	423	371	14	3.77	2.51	4.63	(2.53, 7.77)	
	UC Irvine Medical Center	187	153	7	4.58	2.51	5.62	(2.26, 11.57)	
	West Anaheim Medical Center	52	52	4	7.69	3.16	7.50	(2.04, 19.20)	
	Western Medical Center - Santa Ana	233	212	4	1.89	2.57	2.27	(0.62, 5.79)	
	Western Medical Center Hospital - Anaheim	360	333	11	3.30	2.61	3.89	(1.95, 6.97)	
Greater San Diego	Alvarado Hospital Medical Center	212	185	8	4.32	2.57	5.18	(2.24, 10.21)	
	Palomar Medical Center	289	259	11	4.25	2.28	5.74	(2.86, 10.27)	
	Scripps Green Hospital	311	238	9	3.78	2.22	5.25	(2.40, 9.96)	
	Scripps Memorial Hospital - La Jolla	1,023	772	25	3.24	3.67	2.72	(1.76, 4.01)	
	Scripps Mercy Hospital	344	270	14	5.19	3.31	4.83	(2.64, 8.10)	
	Sharp Chula Vista Medical Center	513	446	11	2.47	4.19	1.82	(0.91, 3.24)	
	Sharp Grossmont Hospital	367	315	7	2.22	3.14	2.18	(0.88, 4.49)	

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State		**49,435**	**40,377**	**1,244**	**3.08**				
Greater San Diego (continued)	Sharp Memorial Hospital	535	346	4	1.16	2.24	1.60	(0.43, 4.07)	
	Tri - City Medical Center	320	260	6	2.31	2.53	2.81	(1.03, 6.11)	
	UCSD Medical Center	83	67	1	1.49	4.14	1.11	(0.03, 6.19)	
	UCSD Medical Center - La Jolla	157	109	5	4.59	4.35	3.25	(1.05, 7.58)	

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Figure 1: Hospital Risk-Adjusted Operative Mortality Results by Region, 2003-2004

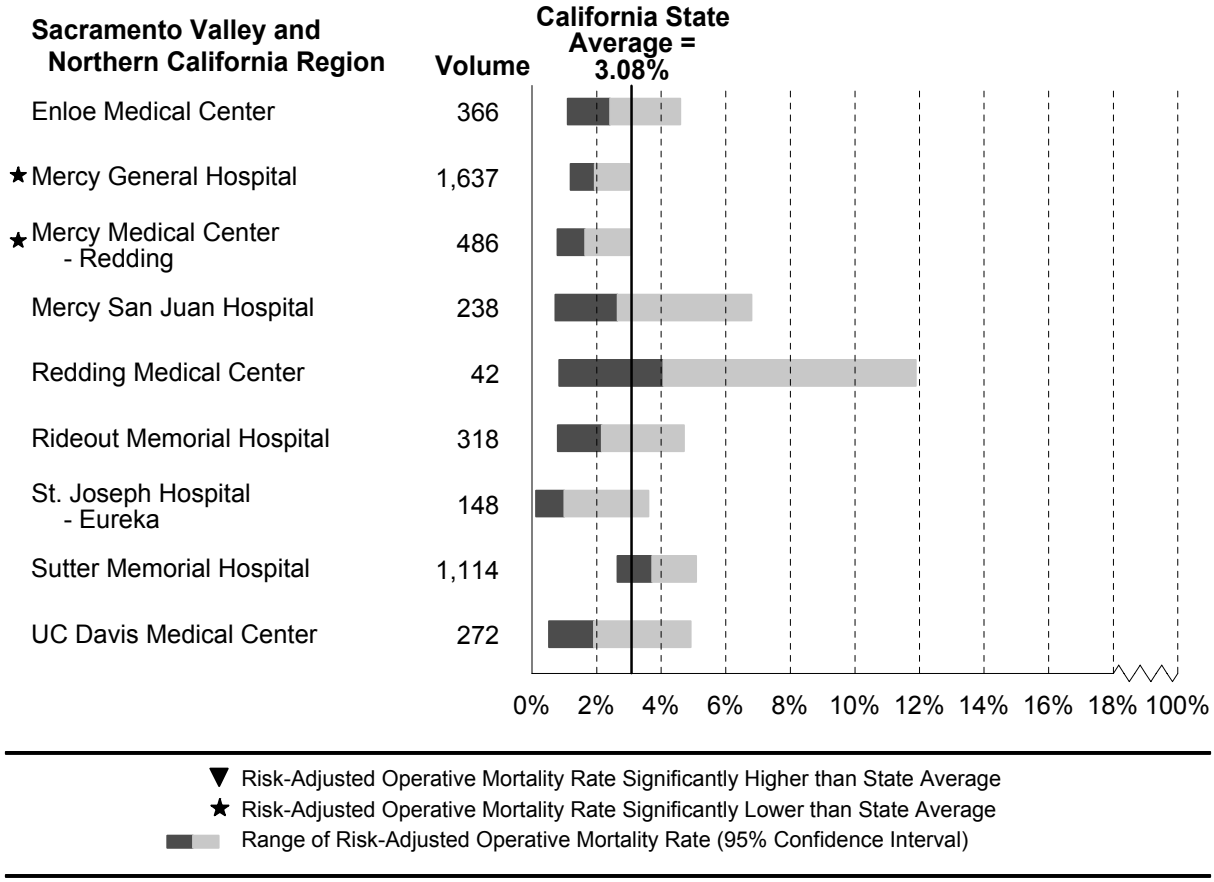


Figure 1: Hospital Risk-Adjusted Operative Mortality Results by Region, 2003-2004 (cont'd)

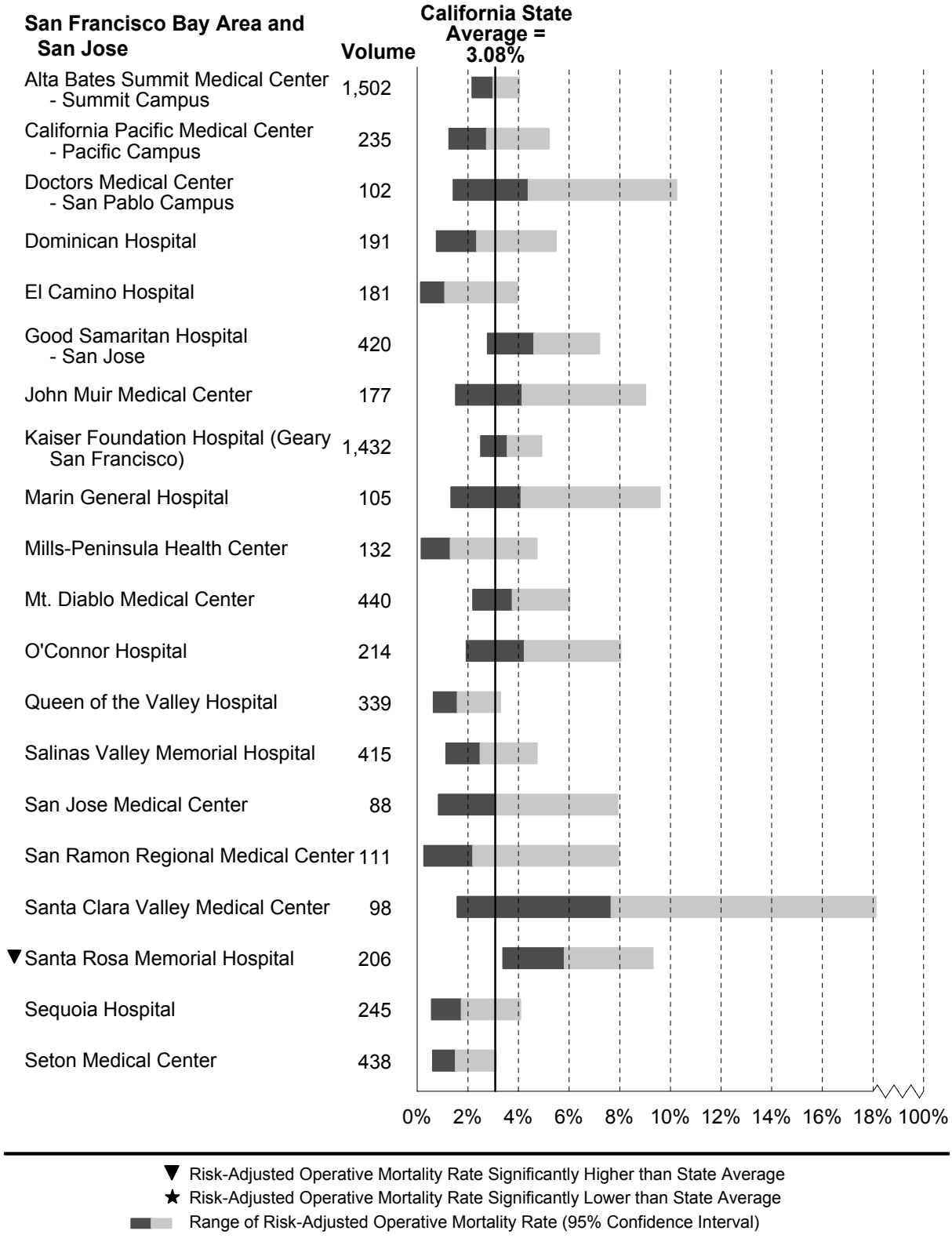
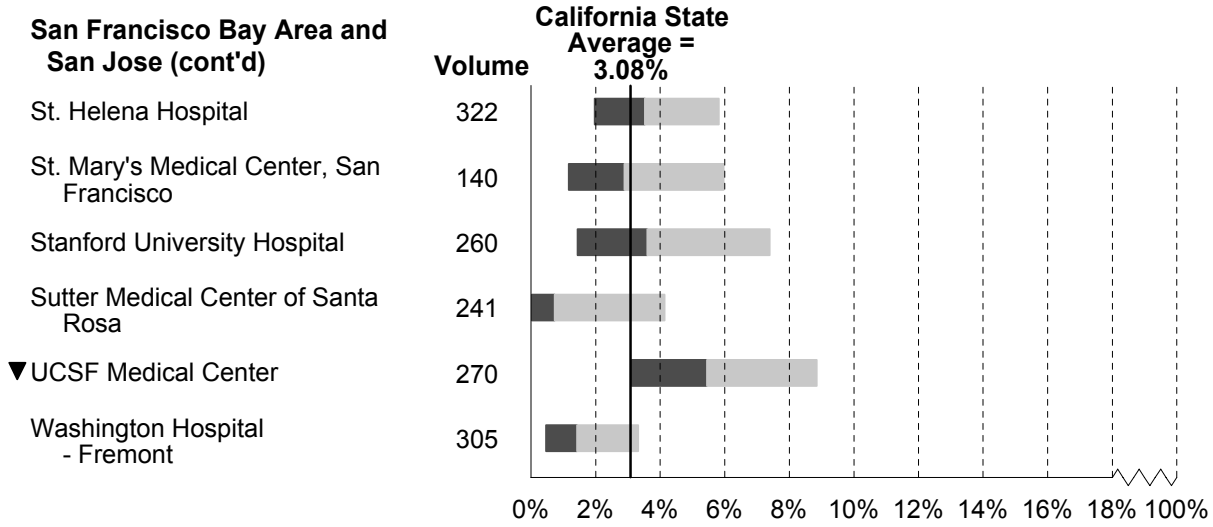


Figure 1: Hospital Risk-Adjusted Operative Mortality Results by Region, 2003-2004 (cont'd)



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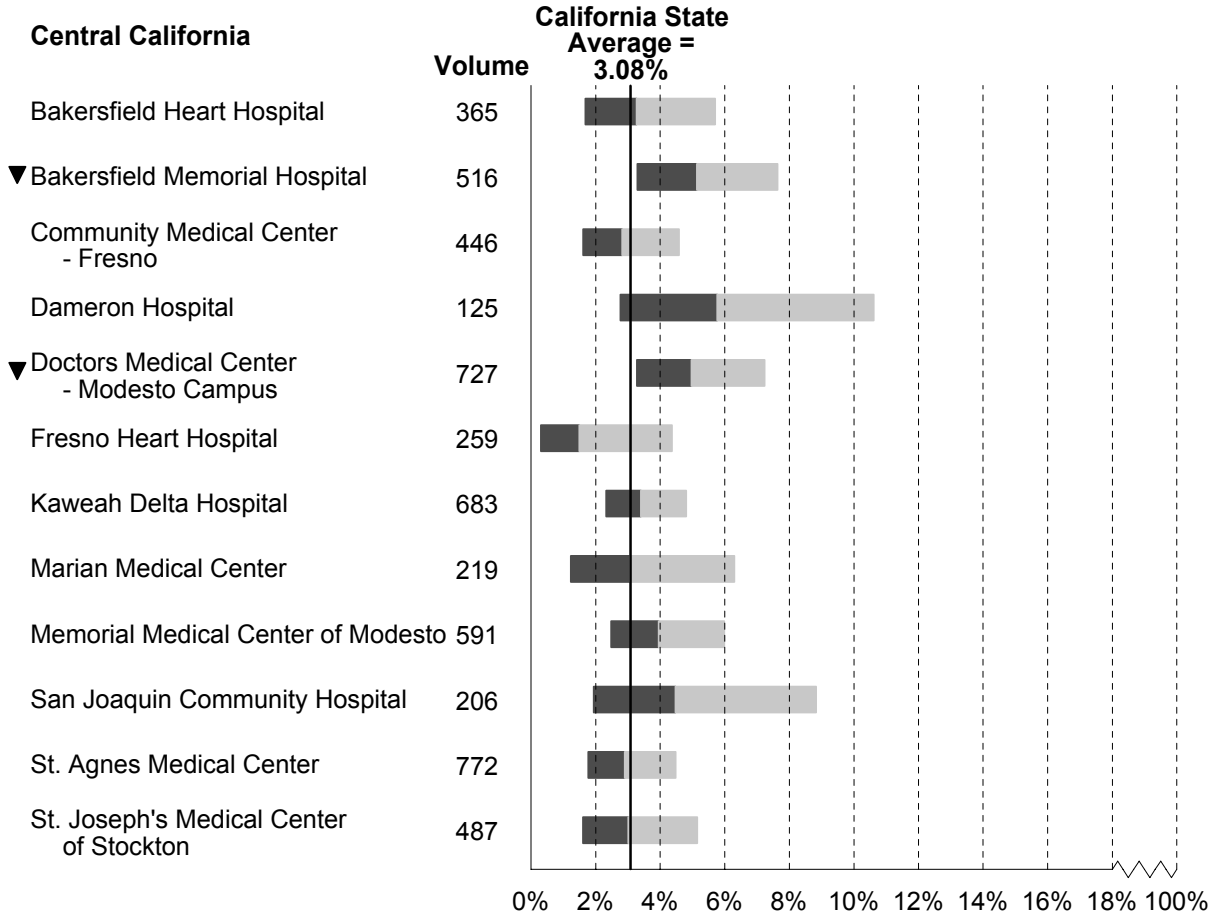

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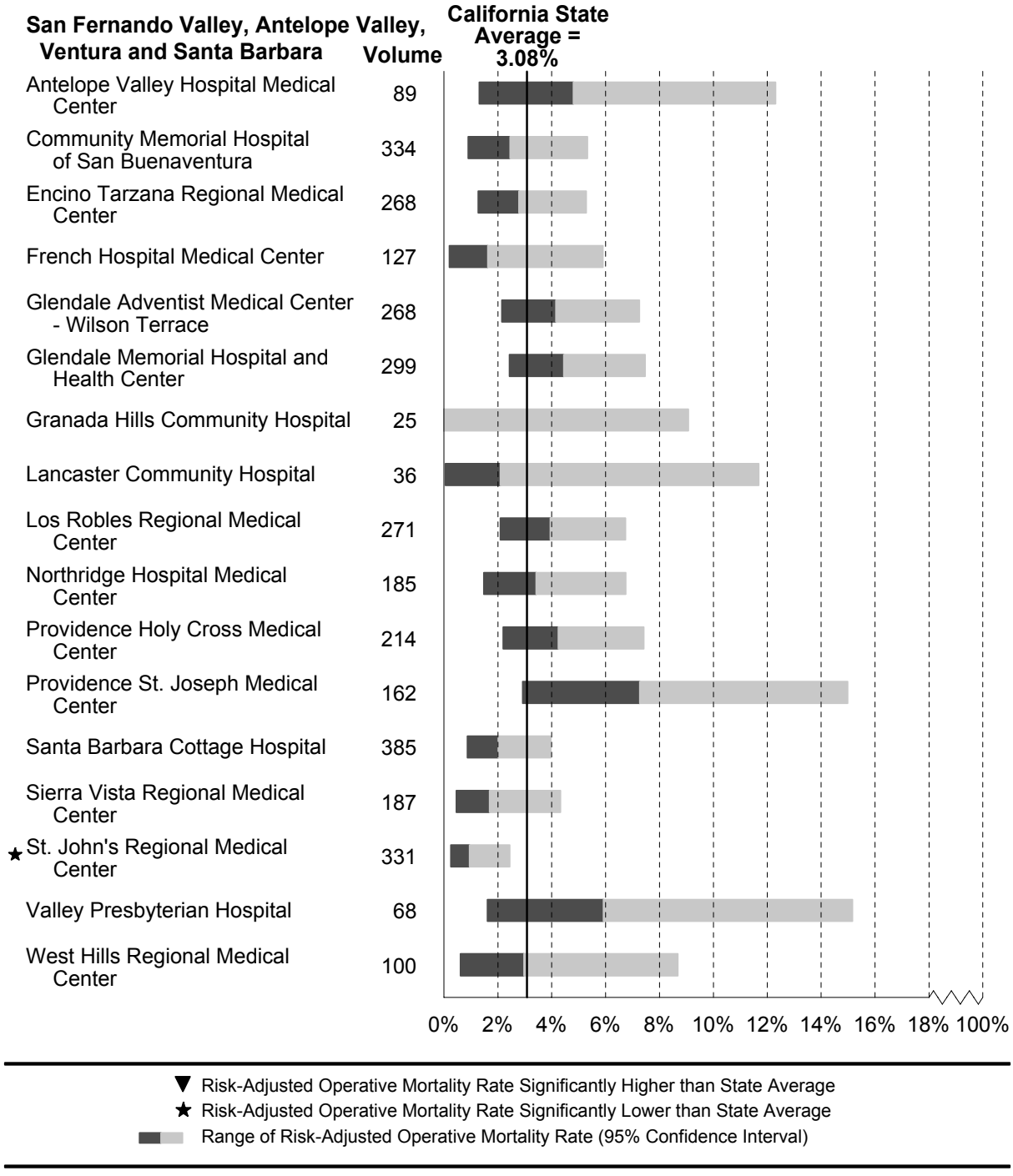

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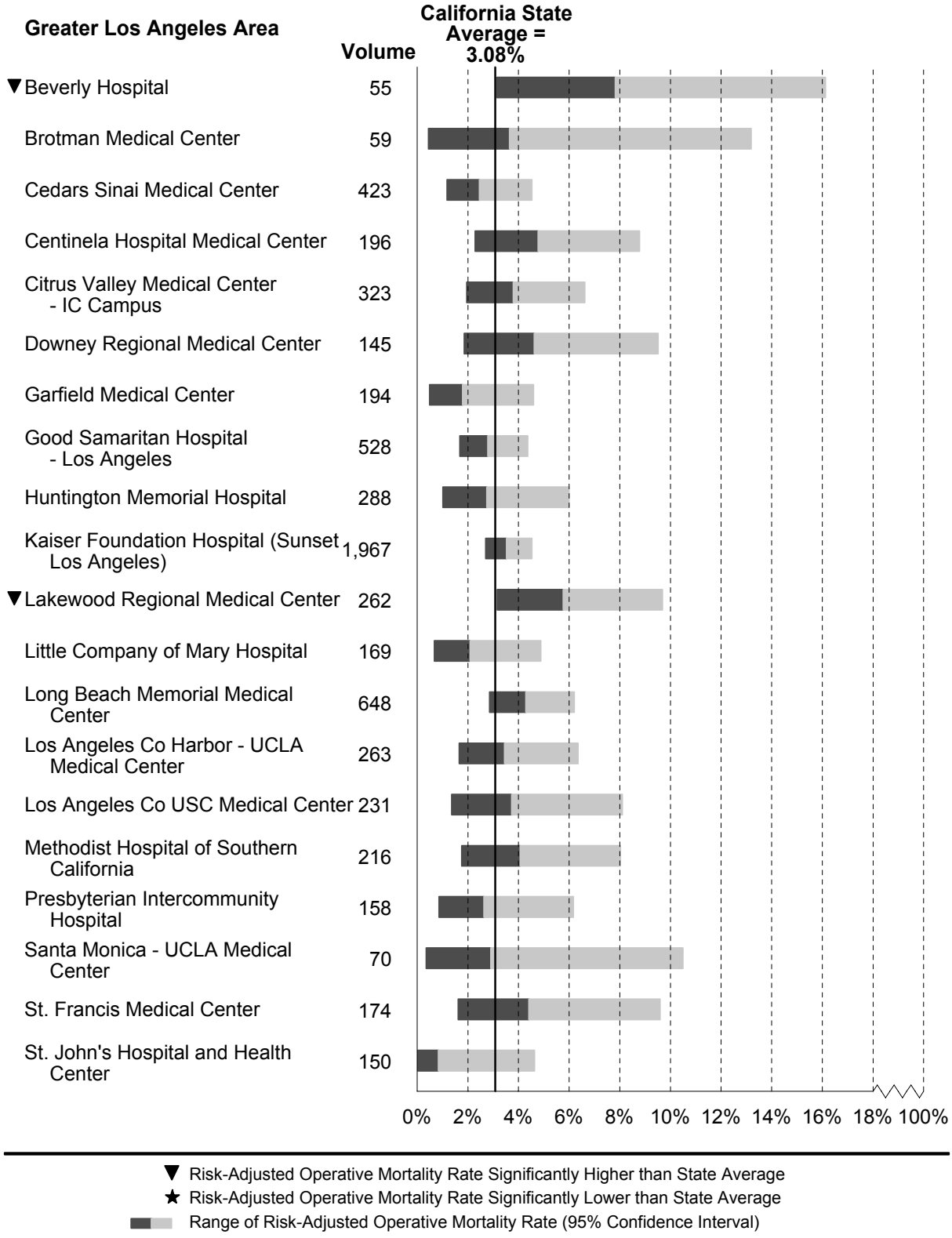


Figure 1: Hospital Risk-Adjusted Operative Mortality Results by Region, 2003-2004 (cont'd)

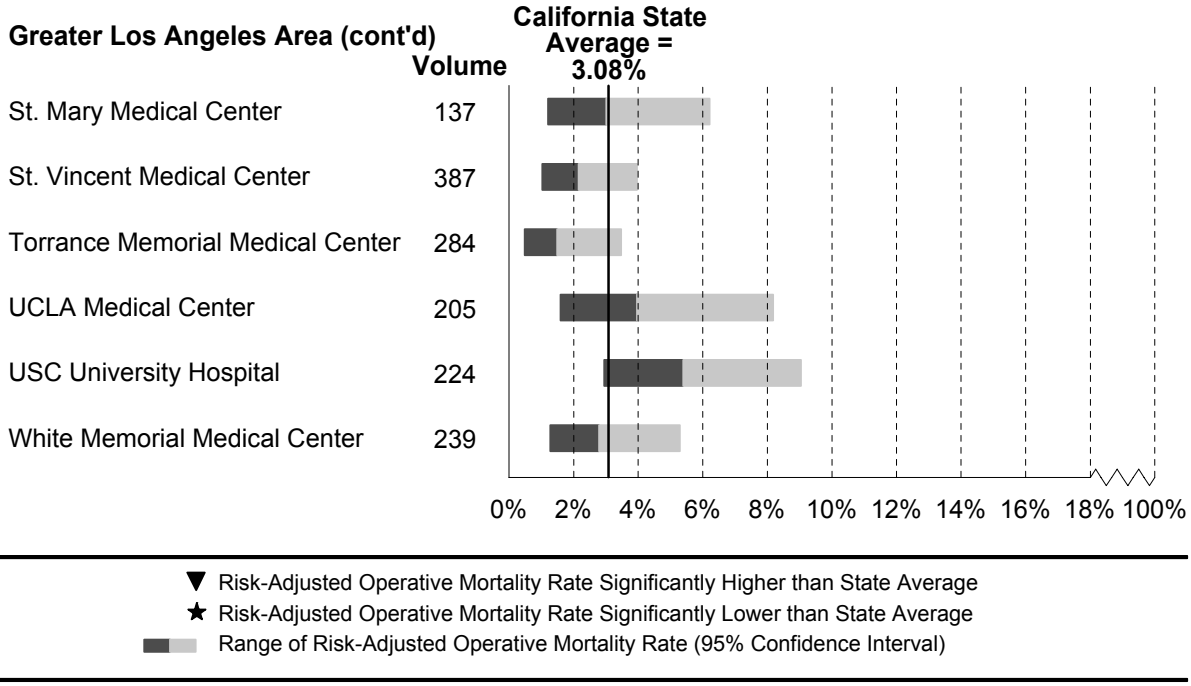
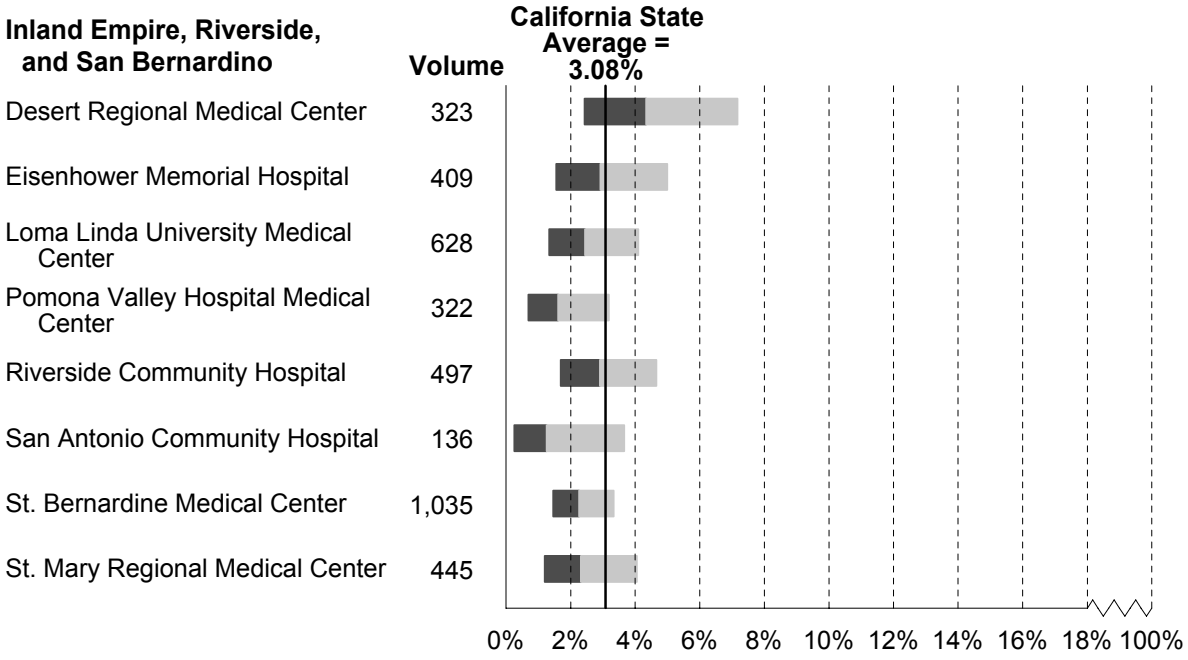


Figure 1: Hospital Risk-Adjusted Operative Mortality Results by Region, 2003-2004 (cont'd)



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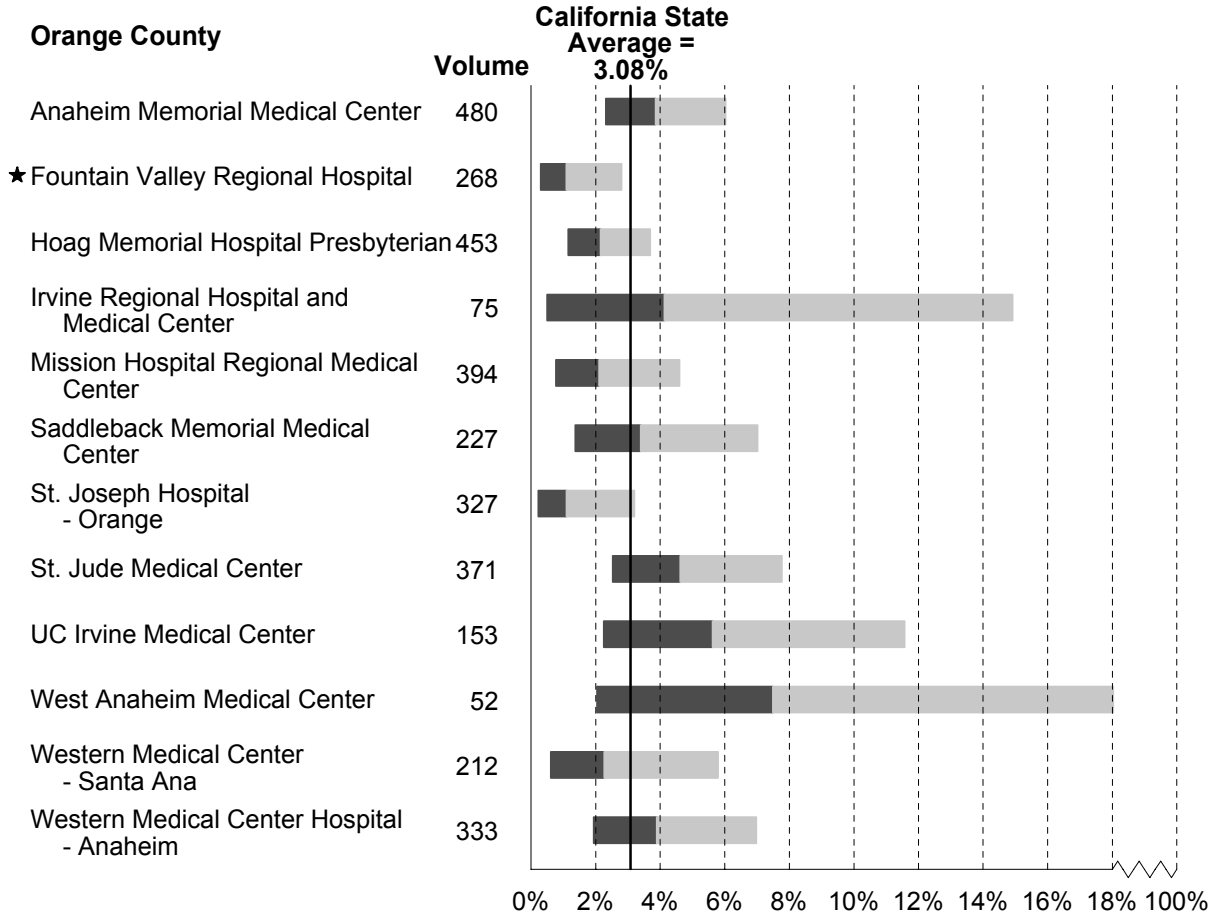
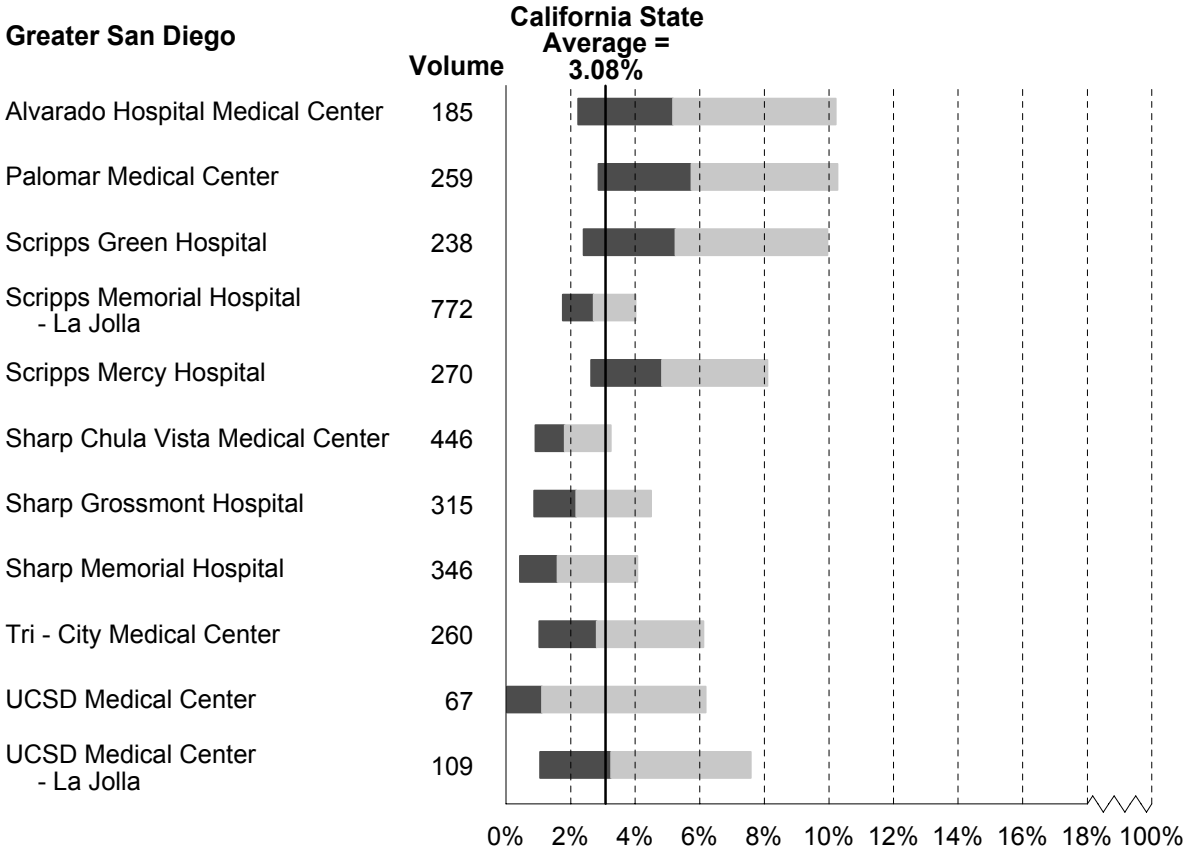


Figure 1: Hospital Risk-Adjusted Operative Mortality Results by Region, 2003-2004 (cont'd)



2004 Hospital Risk-Adjusted Operative Mortality Results

Table 4 presents the risk-adjusted mortality results for each of the 120 hospitals that performed CABG surgery in 2004, the most recent year of data available. The table is sorted by hospital geographic region and contains, for each hospital, the total number of CABG surgeries performed (isolated and non-isolated combined), the number of isolated CABG surgeries, the number of observed isolated CABG deaths, the observed mortality rate, the expected mortality rate predicted by the risk model, the risk-adjusted mortality rate and the 95% Confidence Interval (CI) of the risk-adjusted mortality rate, and the hospital performance rating.

Among the 19,101 isolated CABG surgeries performed in 2004, 628 patients died in-hospital or within 30 days of the surgery date, reflecting an overall operative mortality rate of 3.29% in California. The observed mortality rate among hospitals ranged from 0% to 12.50%. The expected mortality rate, which measures patient severity of illness, ranged from 1.00% and 13.49%. The risk-adjusted mortality rate, which measures hospital performance, ranged from 0% to 12.49%.

Based on the 95% confidence interval of the risk-adjusted mortality rate, 113 of 120 hospitals (94%) performed within the expected range compared to the state's overall mortality rate (denoted by a blank space in the performance rating column of Table 4), four hospitals performed significantly **"Better"** than the state average, and three hospitals performed **"Worse"** than the state average.

Table 4: Hospital Risk-Adjusted Operative Mortality Results by Region, 2004

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**23,668**	**19,101**	**628**	**3.29**				
Sacramento Valley & Northern California Region	Enloe Medical Center	239	191	6	3.14	3.07	3.37	(1.24, 7.33)	
	Mercy General Hospital	1,041	711	10	1.41	2.13	2.18	(1.04, 4.00)	
	Mercy Medical Center - Redding	286	232	3	1.29	3.65	1.17	(0.24, 3.41)	
	Mercy San Juan Hospital	127	85	2	2.35	2.09	3.71	(0.45, 13.38)	
	Redding Medical Center	5	4	0	0.00	13.49	0.00	(0.00, 22.49)	
	Rideout Memorial Hospital	183	160	2	1.25	2.98	1.38	(0.17, 4.99)	
	St. Joseph Hospital - Eureka	82	69	0	0.00	3.95	0.00	(0.00, 4.45)	
	Sutter Memorial Hospital	669	506	17	3.36	2.81	3.94	(2.30, 6.31)	
	UC Davis Medical Center	188	136	4	2.94	2.02	4.80	(1.31, 12.27)	
San Francisco Bay Area & San Jose	Alta Bates Summit Medical Center - Summit Campus	894	750	21	2.80	2.95	3.13	(1.93, 4.77)	
	California Pacific Medical Center - Pacific Campus	148	106	5	4.72	4.89	3.18	(1.03, 7.41)	
	Doctors Medical Center - San Pablo Campus	54	46	0	0.00	2.87	0.00	(0.00, 9.19)	
	Dominican Hospital	93	86	4	4.65	4.41	3.48	(0.95, 8.88)	

* A hospital is classified as "Better" if the upper 95% CI of the RAMR falls below the California observed mortality rate (3.29). A hospital is classified as "Worse" if the lower 95% CI of the RAMR is higher than the California observed mortality rate. A hospital's performance is considered "Not Different" from the state average (rating is blank) if the California mortality rate falls within the CI of the RAMR.

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State		**23,668**	**19,101**	**628**	**3.29**				
San Francisco Bay Area & San Jose (continued)	El Camino Hospital	120	102	1	0.98	3.15	1.03	(0.03, 5.71)	
	Good Samaritan Hospital - San Jose	217	185	8	4.32	3.32	4.30	(1.85, 8.44)	
	John Muir Medical Center	92	67	2	2.99	2.92	3.37	(0.41, 12.15)	
	Kaiser Foundation Hospital (Geary San Francisco)	858	662	18	2.72	2.69	3.33	(1.97, 5.26)	
	Marin General Hospital	70	54	3	5.56	3.61	5.08	(1.04, 14.80)	
	Mt. Diablo Medical Center	243	201	10	4.98	3.34	4.92	(2.35, 9.01)	
	O'Connor Hospital	136	122	7	5.74	2.56	7.38	(2.96, 15.19)	
	Mills-Peninsula Health Center	81	55	1	1.82	2.72	2.20	(0.06, 12.25)	
	Queen of the Valley Hospital	188	170	5	2.94	4.24	2.29	(0.74, 5.33)	
	Salinas Valley Memorial Hospital	221	196	8	4.08	2.71	4.96	(2.14, 9.76)	
	San Jose Medical Center	39	36	2	5.56	5.01	3.66	(0.44, 13.18)	
	San Ramon Regional Medical Center	63	56	0	0.00	2.07	0.00	(0.00, 10.47)	
	Santa Clara Valley Medical Center	44	38	1	2.63	1.00	8.64	(0.22, 48.24)	

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State		**23,668**	**19,101**	**628**	**3.29**				
San Francisco Bay Area & San Jose (continued)	Santa Rosa Memorial Hospital	119	97	10	10.31	4.64	7.33	(3.51, 13.44)	Worse
	Sequoia Hospital	217	113	0	0.00	2.95	0.00	(0.00, 3.64)	
	Seton Medical Center	247	224	6	2.68	3.98	2.22	(0.81, 4.82)	
	St. Helena Hospital	181	171	10	5.85	4.61	4.19	(2.00, 7.68)	
	St. Mary's Medical Center, San Francisco	88	64	6	9.38	6.93	4.46	(1.63, 9.69)	
	Stanford University Hospital	210	121	2	1.65	2.08	2.61	(0.32, 9.44)	
	Sutter Medical Center of Santa Rosa	164	125	1	0.80	2.45	1.08	(0.03, 5.99)	
	UCSF Medical Center**	146	129	10	7.75	2.75	9.30	(4.45, 17.06)	Worse
	Washington Hospital - Fremont	172	146	4	2.74	4.28	2.11	(0.57, 5.39)	
Central California	Bakersfield Heart Hospital	224	183	11	6.01	3.91	5.07	(2.52, 9.05)	
	Bakersfield Memorial Hospital	278	223	11	4.93	2.77	5.88	(2.92, 10.48)	
	Community Medical Center - Fresno	205	162	6	3.70	4.42	2.76	(1.01, 6.00)	
	Dameron Hospital	66	52	5	9.62	5.21	6.09	(1.97, 14.17)	

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State		**23,668**	**19,101**	**628**	**3.29**				
Central California	Doctors Medical Center - Modesto Campus	389	301	11	3.65	2.32	5.20	(2.59, 9.27)	
	Fresno Heart Hospital	284	225	3	1.33	2.59	1.70	(0.35, 4.95)	
	Kaweah Delta Hospital	395	345	20	5.80	4.64	4.12	(2.51, 6.35)	
	Marian Medical Center	120	98	4	4.08	3.97	3.39	(0.92, 8.66)	
	Memorial Medical Center of Modesto	346	285	13	4.56	3.52	4.28	(2.27, 7.29)	
	San Joaquin Community Hospital	112	99	2	2.02	2.44	2.73	(0.33, 9.84)	
	St. Agnes Medical Center	384	329	15	4.56	3.30	4.56	(2.54, 7.50)	
	St. Joseph's Medical Center of Stockton	261	234	3	1.28	2.50	1.69	(0.35, 4.93)	
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara	Antelope Valley Hospital Medical Center	48	44	3	6.82	3.26	6.90	(1.42, 20.11)	
	Community Memorial Hospital of San Buenaventura	176	156	3	1.92	2.57	2.47	(0.51, 7.19)	
	Encino Tarzana Regional Medical Center	139	115	4	3.48	4.37	2.62	(0.71, 6.70)	
	French Hospital Medical Center	67	51	2	3.92	3.23	4.00	(0.48, 14.43)	
	Glendale Adventist Medical Center - Wilson Terrace	140	121	5	4.13	3.78	3.60	(1.17, 8.39)	

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State		**23,668**	**19,101**	**628**	**3.29**				
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara (continued)	Glendale Memorial Hospital and Health Center	144	121	4	3.31	2.59	4.20	(1.14, 10.75)	
	Lancaster Community Hospital	11	11	0	0.00	3.66	0.00	(0.00, 30.15)	
	Los Robles Regional Medical Center	136	108	4	3.70	4.29	2.85	(0.77, 7.27)	
	Northridge Hospital Medical Center	112	93	3	3.23	5.20	2.05	(0.42, 5.96)	
	Providence Holy Cross Medical Center	120	98	7	7.14	4.50	5.23	(2.10, 10.76)	
	Providence St. Joseph Medical Center	86	56	3	5.36	2.04	8.68	(1.78, 25.25)	
	Santa Barbara Cottage Hospital	239	176	3	1.70	3.06	1.83	(0.38, 5.36)	
	Sierra Vista Regional Medical Center	107	90	2	2.22	3.60	2.04	(0.25, 7.34)	
	St. John's Regional Medical Center	183	155	3	1.94	4.06	1.57	(0.32, 4.58)	
	Valley Presbyterian Hospital	33	33	2	6.06	4.19	4.77	(0.58, 17.19)	
	West Hills Regional Medical Center	59	48	1	2.08	2.22	3.09	(0.08, 17.20)	
Greater Los Angeles	Beverly Hospital	27	26	3	11.54	4.48	8.49	(1.75, 24.76)	
	Brotman Medical Center	28	15	0	0.00	1.78	0.00	(0.00, 45.45)	

* A hospital is classified as "Better" if the upper 95% CI of the RAMR falls below the California observed mortality rate (3.29). A hospital is classified as "Worse" if the lower 95% CI of the RAMR is higher than the California observed mortality rate. A hospital's performance is considered "Not Different" from the state average (rating is blank) if the California mortality rate falls within the CI of the RAMR.

Table 4: Hospital Risk-Adjusted Operative Mortality Results by Region, 2004

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**23,668**	**19,101**	**628**	**3.29**				
Greater Los Angeles (continued)	Cedars Sinai Medical Center	285	173	4	2.31	3.71	2.05	(0.56, 5.25)	
	Centinela Hospital Medical Center	93	91	3	3.30	3.94	2.76	(0.57, 8.04)	
	Citrus Valley Medical Center - IC Campus	182	160	4	2.50	3.20	2.58	(0.70, 6.58)	
	Downey Regional Medical Center	69	67	3	4.48	3.50	4.22	(0.87, 12.30)	
	Garfield Medical Center	113	94	1	1.06	3.37	1.04	(0.03, 5.79)	
	Good Samaritan Hospital - Los Angeles	267	194	12	6.19	5.13	3.96	(2.05, 6.93)	
	Huntington Memorial Hospital	205	146	1	0.68	1.95	1.16	(0.03, 6.44)	
	Kaiser Foundation Hospital (Sunset Los Angeles)	1,148	975	26	2.67	2.77	3.18	(2.07, 4.64)	
	Lakewood Regional Medical Center	159	138	8	5.80	3.23	5.91	(2.55, 11.63)	
	Little Company of Mary Hospital	115	90	5	5.56	4.68	3.92	(1.27, 9.11)	
	Long Beach Memorial Medical Center	393	336	17	5.06	3.54	4.71	(2.74, 7.53)	
	Los Angeles Co Harbor - UCLA Medical Center	126	113	3	2.65	2.57	3.41	(0.70, 9.93)	
	Los Angeles Co USC Medical Center	138	108	2	1.85	2.05	2.98	(0.36, 10.74)	

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Table 4: Hospital Risk-Adjusted Operative Mortality Results by Region, 2004

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State		**23,668**	**19,101**	**628**	**3.29**				
Greater Los Angeles (continued)	Methodist Hospital of Southern California	105	96	4	4.17	2.66	5.16	(1.40, 13.20)	
	Presbyterian Intercommunity Hospital	106	89	3	3.37	3.77	2.94	(0.61, 8.60)	
	Santa Monica - UCLA Medical Center	41	36	0	0.00	3.12	0.00	(0.00, 10.81)	
	St. Francis Medical Center	92	88	2	2.27	2.26	3.32	(0.40, 11.95)	
	St. John's Hospital and Health Center	110	81	1	1.23	2.74	1.49	(0.04, 8.26)	
	St. Mary Medical Center	74	65	5	7.69	5.74	4.42	(1.43, 10.29)	
	St. Vincent Medical Center	220	180	9	5.00	3.99	4.14	(1.89, 7.83)	
	Torrance Memorial Medical Center	161	110	3	2.73	4.16	2.16	(0.44, 6.30)	
	UCLA Medical Center	163	92	3	3.26	3.03	3.55	(0.73, 10.35)	
	USC University Hospital	159	90	7	7.78	2.87	8.92	(3.58, 18.37)	Worse
	White Memorial Medical Center	139	130	7	5.38	4.15	4.28	(1.72, 8.80)	
Inland Empire, Riverside & San Bernardino	Desert Regional Medical Center	210	177	6	3.39	3.42	3.27	(1.20, 7.10)	
	Eisenhower Memorial Hospital	239	187	8	4.28	3.79	3.72	(1.60, 7.32)	

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Table 4: Hospital Risk-Adjusted Operative Mortality Results by Region, 2004

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**23,668**	**19,101**	**628**	**3.29**				
Inland Empire, Riverside & San Bernardino (continued)	Loma Linda University Medical Center	425	320	5	1.56	2.71	1.90	(0.62, 4.43)	
	Pomona Valley Hospital Medical Center	200	164	1	0.61	4.08	0.49	(0.01, 2.74)	Better
	Riverside Community Hospital	290	258	7	2.71	4.20	2.13	(0.85, 4.38)	
	San Antonio Community Hospital	78	73	0	0.00	6.82	0.00	(0.00, 2.44)	Better
	St. Bernardine Medical Center	558	508	13	2.56	3.16	2.67	(1.42, 4.56)	
	St. Mary Regional Medical Center	274	247	8	3.24	3.90	2.74	(1.18, 5.38)	
Orange County	Anaheim Memorial Medical Center	291	251	12	4.78	4.07	3.88	(2.00, 6.75)	
	Fountain Valley Regional Hospital	135	128	1	0.78	4.43	0.58	(0.01, 3.23)	Better
	Hoag Memorial Hospital Presbyterian	297	221	8	3.62	4.16	2.87	(1.24, 5.64)	
	Irvine Regional Hospital and Medical Center	48	44	2	4.55	2.64	5.68	(0.69, 20.46)	
	Mission Hospital Regional Medical Center	224	192	5	2.60	2.55	3.37	(1.09, 7.84)	
	Saddleback Memorial Medical Center	130	116	4	3.45	3.48	3.27	(0.89, 8.35)	
	St. Joseph Hospital - Orange	227	156	0	0.00	2.86	0.00	(0.00, 2.72)	Better

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Table 4: Hospital Risk-Adjusted Operative Mortality Results by Region, 2004

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**23,668**	**19,101**	**628**	**3.29**				
Orange County (continued)	St. Jude Medical Center**	202	190	7	3.68	2.63	4.62	(1.85, 9.50)	
	UC Irvine Medical Center	94	72	4	5.56	3.41	5.37	(1.46, 13.72)	
	West Anaheim Medical Center	24	24	3	12.50	3.30	12.49	(2.57, 36.42)	
	Western Medical Center - Santa Ana	94	83	3	3.61	2.81	4.24	(0.87, 12.37)	
	Western Medical Center Hospital - Anaheim	159	146	5	3.42	2.14	5.28	(1.71, 12.29)	
Greater San Diego	Alvarado Hospital Medical Center	117	102	2	1.96	2.34	2.76	(0.33, 9.96)	
	Palomar Medical Center	118	107	5	4.67	2.12	7.28	(2.35, 16.92)	
	Scripps Green Hospital	140	119	6	5.04	2.94	5.64	(2.07, 12.28)	
	Scripps Memorial Hospital - La Jolla	495	366	12	3.28	4.01	2.70	(1.39, 4.70)	
	Scripps Mercy Hospital	152	113	6	5.31	3.69	4.74	(1.74, 10.30)	
	Sharp Chula Vista Medical Center	249	216	5	2.31	4.29	1.78	(0.58, 4.14)	
	Sharp Grossmont Hospital	163	140	3	2.14	3.41	2.08	(0.43, 6.04)	
	Sharp Memorial Hospital	276	171	3	1.75	2.59	2.23	(0.46, 6.51)	

* A hospital is classified as "Better" if the upper 95% CI of the RAMR falls below the California observed mortality rate (3.29). A hospital is classified as "Worse" if the lower 95% CI of the RAMR is higher than the California observed mortality rate. A hospital's performance is considered "Not Different" from the state average (rating is blank) if the California mortality rate falls within the CI of the RAMR.

** Hospital submitted a comment letter to OSHPD which is located in Appendix C.

Table 4: Hospital Risk-Adjusted Operative Mortality Results by Region, 2004

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**23,668**	**19,101**	**628**	**3.29**				
Greater San Diego (continued)	Tri - City Medical Center	142	112	3	2.68	2.22	3.99	(0.82, 11.60)	
	UCSD Medical Center	38	33	0	0.00	4.69	0.00	(0.00, 7.84)	
	UCSD Medical Center - La Jolla	72	54	3	5.56	6.07	3.02	(0.62, 8.80)	

* A hospital is classified as "Better" if the upper 95% CI of the RAMR falls below the California observed mortality rate (3.29). A hospital is classified as "Worse" if the lower 95% CI of the RAMR is higher than the California observed mortality rate. A hospital's performance is considered "Not Different" from the state average (rating is blank) if the California mortality rate falls within the CI of the RAMR.

2003-2004 Surgeon Risk-Adjusted Operative Mortality Results

Table 5 and Figure 2 present the risk-adjusted results for each responsible surgeon for 2003-2004. Table 5 contains, for the surgeon overall and for each hospital where the surgeon performed CABG surgery, the total number of CABG surgeries performed (isolated and non-isolated combined), the number of isolated CABG surgeries, the number of isolated CABG deaths, the observed mortality rate, the expected mortality rate predicted by the risk model, the risk-adjusted mortality rate, the 95% Confidence Interval (CI) of the risk-adjusted mortality rate, and the associated surgeon performance rating.

Figure 2 shows the surgeon overall results graphically, sorted alphabetically by surgeon name. The vertical line on each bar represents the risk-adjusted operative mortality rate for each surgeon across all hospitals where they performed CABG surgery in 2003 and 2004.[11] The entire bar represents the 95% CI of the risk-adjusted mortality rate for each surgeon. If the entire bar is located to the left of the vertical line indicating the state average, we conclude with 95% confidence that the surgeon's risk-adjusted mortality is significantly lower than the state average (**"Better"**). If the entire bar is located to the right of the vertical line indicating the state average, we conclude with 95% confidence that the surgeon's risk-adjusted mortality rate is significantly higher than the state average (**"Worse"**), and if the bar crosses the vertical line, we conclude with 95% confidence that the surgeon's risk-adjusted mortality rate is **"Not Different"** from the state average. The words **"Not Applicable"** denote that a surgeon performed only non-isolated CABG surgeries overall or at a particular hospital.

Among the 40,377 isolated CABG surgeries performed in 2003 and 2004, 1,244 patients died in-hospital or within 30 days of the surgery date, reflecting an overall operative mortality rate of 3.08% in California. Regardless of the number of hospitals where a surgeon performed CABG surgery, the overall observed operative mortality rates ranged from 0% to 66.67%. The surgeon overall expected mortality rate, which measures patient severity of illness, ranged from 0.21% to 15.07%. The surgeon overall risk-adjusted mortality rate, which measures surgeon performance, ranged from 0% to 32.96%. A summary of surgeon performance ratings for 2003-2004 is presented below.

- Surgeon overall performance (i.e., across all hospitals where a surgeon performed surgery): 286 of 302 surgeons (92%) performed within the expected range compared to the state's mortality rate (blanks in performance rating column of Table 5), four surgeons performed significantly **"Better"** than the state average, and 12 surgeons performed **"Worse"** than the state average.

- Hospital-specific surgeon performance: 282 of 302 surgeons (93%) performed within the expected range compared to the state's mortality rate (blanks in performance rating column of Table 5), four surgeons performed significantly **"Better"** than the state average, and 16 surgeons performed **"Worse"** than the state average.

[11] If there is no vertical line on the bar, the risk-adjusted mortality rate for the surgeon is zero.

Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Abolhoda, Amir M.	Surgeon Overall	60	49	2	4.08	2.35	5.38	(0.65, 19.36)	
	Sharp Memorial Hospital	9	8	0	0.00	1.73	0.00	(0.00, 82.02)	
	UC Irvine Medical Center	51	41	2	4.88	2.47	6.12	(0.74, 22.01)	
Abraham, Reginald G.	Surgeon Overall	29	28	0	0.00	2.74	0.00	(0.00, 14.83)	
	Bakersfield Memorial Hospital	3	3	0	0.00	5.42	0.00	(0.00, 69.87)	
	Fountain Valley Regional Hospital	16	16	0	0.00	2.67	0.00	(0.00, 26.55)	
	San Joaquin Community Hospital	10	9	0	0.00	1.95	0.00	(0.00, 64.77)	
Adams, Carl W.	Surgeon Overall	20	17	0	0.00	1.92	0.00	(0.00, 34.83)	
	Mercy Medical Center - Redding	9	7	0	0.00	2.71	0.00	(0.00, 59.87)	
	St. Joseph Hospital - Eureka	11	10	0	0.00	1.36	0.00	(0.00, 83.27)	
Adamson, Robert M.	Surgeon Overall	140	90	0	0.00	2.29	0.00	(0.00, 5.51)	
	Sharp Memorial Hospital	140	90	0	0.00	2.29	0.00	(0.00, 5.51)	
Afifi, Alaa Y.	Surgeon Overall	22	20	1	5.00	2.71	5.70	(0.14, 31.63)	
	St. Jude Medical Center	6	6	1	16.67	4.34	11.86	(0.30, 65.85)	
	Western Medical Center - Santa Ana	3	3	0	0.00	3.56	0.00	(0.00, 100.00)	
	Western Medical Center Hospital - Anaheim	13	11	0	0.00	1.59	0.00	(0.00, 64.84)	
Aharon, Alon S.	Surgeon Overall	12	11	2	18.18	1.71	32.96	(3.98, 100.00)	Worse
	Riverside Community Hospital	3	2	0	0.00	2.21	0.00	(0.00, 100.00)	
	St. Bernardine Medical Center	9	9	2	22.22	1.59	43.10	(5.20, 100.00)	Worse
Allard, Jean R.	Surgeon Overall	1	0	.	.	.	.		Not Applicable
	Centinela Hospital Medical Center	1	0	.	.	.	.		Not Applicable
Alyono, David	Surgeon Overall	348	298	5	1.68	2.80	1.86	(0.60, 4.31)	
	Alta Bates Summit Medical Center - Summit Campus	348	298	5	1.68	2.80	1.86	(0.60, 4.31)	
Amirhamzeh, Mehrdad	Surgeon Overall	196	166	4	2.41	2.60	2.86	(0.78, 7.30)	
	Doctors Medical Center - Modesto Campus	18	11	0	0.00	1.22	0.00	(0.00, 84.53)	

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Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Amirhamzeh, Mehrdad	Memorial Medical Center of Modesto	178	155	4	2.58	2.70	2.95	(0.80, 7.53)	
Anastassiou, Peter T.	Surgeon Overall	52	44	1	2.27	2.30	3.06	(0.08, 16.98)	
	California Pacific Medical Center - Pacific Campus	4	4	0	0.00	5.07	0.00	(0.00, 56.08)	
	Mills-Peninsula Health Center	1	1	0	0.00	1.24	0.00	(0.00, 100.00)	
	Seton Medical Center	10	8	0	0.00	1.56	0.00	(0.00, 90.96)	
	Sutter Medical Center of Santa Rosa	37	31	1	3.23	2.16	4.61	(0.12, 25.58)	
Arcidi, Joseph M.	Surgeon Overall	43	27	1	3.70	5.64	2.02	(0.05, 11.30)	
	Good Samaritan Hospital - Los Angeles	43	27	1	3.70	5.64	2.02	(0.05, 11.30)	
Ardehali, Abbas	Surgeon Overall	95	62	1	1.61	2.99	1.67	(0.04, 9.26)	
	Santa Monica - UCLA Medical Center	50	36	1	2.78	3.39	2.53	(0.06, 14.06)	
	UCLA Medical Center	45	26	0	0.00	2.43	0.00	(0.00, 17.97)	
Askariyah-Yazdy, Hossein	Surgeon Overall	2	2	0	0.00	1.26	0.00	(0.00, 100.00)	
	San Jose Medical Center	2	2	0	0.00	1.26	0.00	(0.00, 100.00)	
Atiya, Azmi W.	Surgeon Overall	164	147	6	4.08	4.25	2.97	(1.09, 6.44)	
	Encino Tarzana Regional Medical Center	3	3	0	0.00	1.54	0.00	(0.00, 100.00)	
	Northridge Hospital Medical Center	89	81	4	4.94	4.27	3.57	(0.97, 9.12)	
	Providence Holy Cross Medical Center	63	54	2	3.70	4.50	2.55	(0.31, 9.17)	
	West Hills Regional Medical Center	9	9	0	0.00	3.51	0.00	(0.00, 36.01)	
Bachir, Ghassan S.	Surgeon Overall	27	20	0	0.00	1.33	0.00	(0.00, 42.71)	
	Community Medical Center - Fresno	14	11	0	0.00	1.30	0.00	(0.00, 79.47)	
	St. Agnes Medical Center	13	9	0	0.00	1.37	0.00	(0.00, 92.34)	
Bailey, Leonard L.	Surgeon Overall	1	1	0	0.00	0.21	0.00	(0.00, 100.00)	
	Loma Linda University Medical Center	1	1	0	0.00	0.21	0.00	(0.00, 100.00)	
Bakhshay, Shahroukh A.	Surgeon Overall	5	5	1	20.00	2.24	27.56	(0.70, 100.00)	
	Memorial Medical Center of Modesto	5	5	1	20.00	2.24	27.56	(0.70, 100.00)	
Baladi, Naoum	Surgeon Overall	168	135	4	2.96	4.29	2.14	(0.58, 5.45)	

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Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Baladi, Naoum	Seton Medical Center	111	97	1	1.03	3.72	0.86	(0.02, 4.76)	
	St. Mary's Medical Center, San Francisco	57	38	3	7.89	5.73	4.26	(0.87, 12.39)	
Baradarian, Sam	Surgeon Overall	59	47	0	0.00	2.67	0.00	(0.00, 9.05)	
	Sharp Memorial Hospital	59	47	0	0.00	2.67	0.00	(0.00, 9.05)	
Baumgartner, Fritz J.	Surgeon Overall	2	2	0	0.00	3.00	0.00	(0.00, 100.00)	
	Mercy Medical Center - Redding	1	1	0	0.00	0.38	0.00	(0.00, 100.00)	
	St. Vincent Medical Center	1	1	0	0.00	5.62	0.00	(0.00, 100.00)	
Becker, Ronald M.	Surgeon Overall	153	131	5	3.82	2.91	4.05	(1.31, 9.42)	
	Enloe Medical Center	153	131	5	3.82	2.91	4.05	(1.31, 9.42)	
Bethencourt, Daniel M.	Surgeon Overall	374	286	11	3.85	2.19	5.43	(2.70, 9.69)	
	Lakewood Regional Medical Center	76	55	5	9.09	2.74	10.24	(3.31, 23.82)	Worse
	Long Beach Memorial Medical Center	298	231	6	2.60	2.06	3.91	(1.43, 8.47)	
Beygui, Ramin E.	Surgeon Overall	26	16	0	0.00	3.22	0.00	(0.00, 22.07)	
	Santa Monica - UCLA Medical Center	3	3	0	0.00	1.21	0.00	(0.00, 100.00)	
	UCLA Medical Center	23	13	0	0.00	3.68	0.00	(0.00, 23.75)	
Birnbaum, Peter L.	Surgeon Overall	298	239	6	2.51	3.28	2.37	(0.87, 5.13)	
	Community Medical Center - Fresno	133	113	5	4.42	4.37	3.13	(1.01, 7.28)	
	Fresno Heart Hospital	115	84	0	0.00	2.20	0.00	(0.00, 6.15)	
	St. Agnes Medical Center	50	42	1	2.38	2.52	2.92	(0.07, 16.22)	
Blanche, Carlos E.	Surgeon Overall	118	83	2	2.41	3.31	2.25	(0.27, 8.09)	
	Cedars Sinai Medical Center	118	83	2	2.41	3.31	2.25	(0.27, 8.09)	
Bleiweis, Mark S.	Surgeon Overall	144	105	2	1.90	2.66	2.22	(0.27, 7.98)	
	Irvine Regional Hospital and Medical Center	16	14	0	0.00	1.29	0.00	(0.00, 62.88)	
	St. Joseph Hospital - Orange	128	91	2	2.20	2.87	2.37	(0.29, 8.53)	
Bogerty, Sharon	Surgeon Overall	12	11	2	18.18	2.81	20.00	(2.41, 71.99)	
	O'Connor Hospital	11	10	2	20.00	2.59	23.85	(2.88, 85.84)	
	San Jose Medical Center	1	1	0	0.00	4.98	0.00	(0.00, 100.00)	
Brewster, Scot A.	Surgeon Overall	209	147	4	2.72	3.73	2.26	(0.61, 5.76)	
	Scripps Memorial Hospital - La Jolla	209	147	4	2.72	3.73	2.26	(0.61, 5.76)	

* A surgeon is classified as "Better" if the upper 95% CI of the RAMR falls below the California observed mortality rate (3.08). A surgeon is classified as "Worse" if the lower 95% CI of the RAMR is higher than the California observed mortality rate. A surgeon's performance is considered "Not Different" from the state average (rating is blank) if the California mortality rate falls within the CI of the RAMR.

Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Bronstein, Merrill H.	Surgeon Overall	142	124	5	4.03	3.42	3.64	(1.18, 8.47)	
	Dominican Hospital	142	124	5	4.03	3.42	3.64	(1.18, 8.47)	
Brusett, Kent A.	Surgeon Overall	38	28	2	7.14	3.11	7.11	(0.86, 25.59)	
	Redding Medical Center	38	28	2	7.14	3.11	7.11	(0.86, 25.59)	
Buehler, Donald L.	Surgeon Overall	243	160	4	2.50	3.56	2.17	(0.59, 5.54)	
	Scripps Memorial Hospital - La Jolla	243	160	4	2.50	3.56	2.17	(0.59, 5.54)	
Burdon, Thomas A.	Surgeon Overall	16	12	0	0.00	2.19	0.00	(0.00, 43.16)	
	El Camino Hospital	16	12	0	0.00	2.19	0.00	(0.00, 43.16)	
Burgess, Nora L.	Surgeon Overall	207	174	6	3.45	2.77	3.85	(1.41, 8.35)	
	Kaiser Foundation Hospital (Geary San Francisco)	207	174	6	3.45	2.77	3.85	(1.41, 8.35)	
Bushnell, Lamar J.	Surgeon Overall	161	144	2	1.39	2.38	1.81	(0.22, 6.50)	
	Community Memorial Hospital of San Buenaventura	161	144	2	1.39	2.38	1.81	(0.22, 6.50)	
Cahill, Anne T.	Surgeon Overall	141	127	10	7.87	4.14	5.88	(2.81, 10.78)	
	Lakewood Regional Medical Center	31	29	1	3.45	4.00	2.66	(0.07, 14.78)	
	Long Beach Memorial Medical Center	110	98	9	9.18	4.18	6.79	(3.09, 12.85)	Worse
Cain, Brian S.	Surgeon Overall	339	311	12	3.86	3.05	3.91	(2.01, 6.81)	
	Alta Bates Summit Medical Center - Summit Campus	339	311	12	3.86	3.05	3.91	(2.01, 6.81)	
Calhoun, Royce F.	Surgeon Overall	62	45	1	2.22	2.05	3.34	(0.08, 18.56)	
	UC Davis Medical Center	62	45	1	2.22	2.05	3.34	(0.08, 18.56)	
Caminha, Sergio D.	Surgeon Overall	273	235	7	2.98	4.29	2.15	(0.86, 4.41)	
	Kaweah Delta Hospital	273	235	7	2.98	4.29	2.15	(0.86, 4.41)	
Canvasser, David A.	Surgeon Overall	225	185	6	3.24	4.10	2.44	(0.89, 5.30)	
	French Hospital Medical Center	60	49	1	2.04	3.19	1.98	(0.05, 10.97)	
	Marian Medical Center	91	74	3	4.05	4.29	2.92	(0.60, 8.50)	
	Sierra Vista Regional Medical Center	74	62	2	3.23	4.59	2.17	(0.26, 7.82)	
Capouya, Eli R.	Surgeon Overall	242	202	7	3.47	3.09	3.47	(1.39, 7.12)	
	Glendale Adventist Medical Center - Wilson Terrace	109	97	6	6.19	4.25	4.50	(1.65, 9.76)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Capouya, Eli R.	Huntington Memorial Hospital	46	36	0	0.00	1.75	0.00	(0.00, 17.99)	
	Methodist Hospital of Southern California	11	10	0	0.00	1.47	0.00	(0.00, 77.38)	
	Providence St. Joseph Medical Center	53	37	1	2.70	1.67	5.00	(0.13, 27.78)	
	St. Vincent Medical Center	23	22	0	0.00	3.29	0.00	(0.00, 15.72)	
Castro, Luis J.	Surgeon Overall	239	155	3	1.94	3.94	1.52	(0.31, 4.42)	
	Sequoia Hospital	239	155	3	1.94	3.94	1.52	(0.31, 4.42)	
Cernilia, James J.	Surgeon Overall	17	17	1	5.88	2.21	8.23	(0.21, 45.68)	
	Downey Regional Medical Center	17	17	1	5.88	2.21	8.23	(0.21, 45.68)	
Chammas, Joseph H.	Surgeon Overall	37	24	3	12.50	3.59	10.75	(2.21, 31.31)	
	Sharp Memorial Hospital	37	24	3	12.50	3.59	10.75	(2.21, 31.31)	
Chaux, Aurelio	Surgeon Overall	25	17	0	0.00	2.33	0.00	(0.00, 28.69)	
	St. John's Hospital and Health Center	25	17	0	0.00	2.33	0.00	(0.00, 28.69)	
Chen, Raymond H.	Surgeon Overall	60	60	1	1.67	1.87	2.75	(0.07, 15.27)	
	Kaiser Foundation Hospital (Sunset Los Angeles)	60	60	1	1.67	1.87	2.75	(0.07, 15.27)	
Cheng, Wen	Surgeon Overall	34	28	1	3.57	6.04	1.83	(0.05, 10.15)	
	Cedars Sinai Medical Center	34	28	1	3.57	6.04	1.83	(0.05, 10.15)	
Cohen, Robbin G.	Surgeon Overall	319	249	5	2.01	2.48	2.50	(0.81, 5.82)	
	Citrus Valley Medical Center - IC Campus	2	1	0	0.00	1.44	0.00	(0.00, 100.00)	
	Huntington Memorial Hospital	192	151	1	0.66	2.32	0.88	(0.02, 4.90)	
	Los Angeles Co USC Medical Center	8	6	0	0.00	1.23	0.00	(0.00, 100.00)	
	Methodist Hospital of Southern California	33	28	0	0.00	2.25	0.00	(0.00, 18.03)	
	USC University Hospital	84	63	4	6.35	3.21	6.09	(1.66, 15.60)	
Cohen, Sheldon E.	Surgeon Overall	44	43	1	2.33	3.37	2.13	(0.05, 11.84)	
	Community Medical Center - Fresno	41	40	1	2.50	3.55	2.18	(0.05, 12.09)	
	St. Agnes Medical Center	3	3	0	0.00	1.00	0.00	(0.00, 100.00)	
Concepcion, Noel L.	Surgeon Overall	262	210	4	1.90	1.95	3.02	(0.82, 7.72)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Concepcion, Noel L.	Doctors Medical Center - Modesto Campus	250	198	4	2.02	1.92	3.26	(0.88, 8.31)	
	Memorial Medical Center of Modesto	12	12	0	0.00	2.42	0.00	(0.00, 39.12)	
Connor, Ann R.	Surgeon Overall	76	70	1	1.43	3.51	1.26	(0.03, 6.99)	
	Downey Regional Medical Center	1	1	0	0.00	5.87	0.00	(0.00, 100.00)	
	Good Samaritan Hospital - Los Angeles	12	12	0	0.00	1.91	0.00	(0.00, 49.68)	
	Long Beach Memorial Medical Center	2	2	0	0.00	5.19	0.00	(0.00, 100.00)	
	White Memorial Medical Center	61	55	1	1.82	3.75	1.50	(0.04, 8.31)	
Cukingnan, Ramon A.	Surgeon Overall	216	146	4	2.74	4.05	2.09	(0.57, 5.33)	
	Little Company of Mary Hospital	67	46	1	2.17	4.91	1.37	(0.03, 7.60)	
	St. Mary Medical Center	3	2	0	0.00	1.42	0.00	(0.00, 100.00)	
	Torrance Memorial Medical Center	146	98	3	3.06	3.70	2.56	(0.53, 7.44)	
Cunningham, Mark J.	Surgeon Overall	174	136	9	6.62	3.98	5.13	(2.34, 9.72)	
	Citrus Valley Medical Center - IC Campus	4	4	0	0.00	2.40	0.00	(0.00, 100.00)	
	Huntington Memorial Hospital	27	24	0	0.00	1.61	0.00	(0.00, 29.49)	
	Los Angeles Co USC Medical Center	33	27	0	0.00	2.10	0.00	(0.00, 20.02)	
	Methodist Hospital of Southern California	3	3	1	33.33	15.04	6.85	(0.17, 38.03)	
	USC University Hospital	83	56	7	12.50	5.26	7.32	(2.94, 15.08)	
	White Memorial Medical Center	24	22	1	4.55	4.45	3.16	(0.08, 17.54)	
D'Amato, Thomas A.	Surgeon Overall	75	63	1	1.59	1.91	2.57	(0.06, 14.29)	
	Tri - City Medical Center	75	63	1	1.59	1.91	2.57	(0.06, 14.29)	
Daggett, Casey W.	Surgeon Overall	31	25	0	0.00	2.84	0.00	(0.00, 15.99)	
	Los Angeles Co USC Medical Center	3	3	0	0.00	1.74	0.00	(0.00, 100.00)	
	UC Davis Medical Center	28	22	0	0.00	2.99	0.00	(0.00, 17.26)	
Daily, Pat O.	Surgeon Overall	1	1	0	0.00	0.92	0.00	(0.00, 100.00)	
	Sharp Memorial Hospital	1	1	0	0.00	0.92	0.00	(0.00, 100.00)	
Dajee, Himmet	Surgeon Overall	152	140	1	0.71	3.36	0.66	(0.02, 3.65)	
	Fountain Valley Regional Hospital	138	127	0	0.00	3.48	0.00	(0.00, 2.57)	Better

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Dajee, Himmet	Saddleback Memorial Medical Center	12	12	1	8.33	2.31	11.15	(0.28, 61.90)	
	Western Medical Center - Santa Ana	2	1	0	0.00	0.49	0.00	(0.00, 100.00)	
Dandekar, Nandkumar V.	Surgeon Overall	93	84	6	7.14	2.82	7.83	(2.86, 16.98)	
	Citrus Valley Medical Center - IC Campus	56	49	3	6.12	3.00	6.30	(1.29, 18.35)	
	Garfield Medical Center	29	27	2	7.41	2.21	10.38	(1.25, 37.35)	
	Methodist Hospital of Southern California	8	8	1	12.50	3.77	10.25	(0.26, 56.91)	
Davtyan, Hakob G.	Surgeon Overall	390	349	15	4.30	3.13	4.25	(2.37, 6.98)	
	Riverside Community Hospital	69	62	3	4.84	3.90	3.84	(0.79, 11.18)	
	St. Bernardine Medical Center	179	160	7	4.38	2.71	4.99	(2.00, 10.25)	
	St. Mary Regional Medical Center	142	127	5	3.94	3.28	3.71	(1.20, 8.63)	
Declusin, Richard J.	Surgeon Overall	218	184	2	1.09	4.27	0.79	(0.09, 2.83)	Better
	St. John's Regional Medical Center	218	184	2	1.09	4.27	0.79	(0.09, 2.83)	Better
Deeik, Ramzi K.	Surgeon Overall	213	187	2	1.07	3.84	0.86	(0.10, 3.10)	
	Queen of the Valley Hospital	213	187	2	1.07	3.84	0.86	(0.10, 3.10)	
Dein, John R.	Surgeon Overall	510	368	5	1.36	1.80	2.33	(0.75, 5.42)	
	Mercy General Hospital	459	327	4	1.22	1.71	2.21	(0.60, 5.64)	
	Mercy San Juan Hospital	51	41	1	2.44	2.51	3.00	(0.08, 16.65)	
DelCampo, Carlos	Surgeon Overall	221	200	4	2.00	1.67	3.70	(1.01, 9.44)	
	Anaheim Memorial Medical Center	1	1	0	0.00	3.36	0.00	(0.00, 100.00)	
	St. Jude Medical Center	130	115	2	1.74	1.73	3.10	(0.37, 11.17)	
	Western Medical Center Hospital - Anaheim	90	84	2	2.38	1.56	4.71	(0.57, 16.94)	
Delaria, Giacomo A.	Surgeon Overall	80	62	2	3.23	2.12	4.70	(0.57, 16.93)	
	Scripps Green Hospital	80	62	2	3.23	2.12	4.70	(0.57, 16.93)	
Delrio, Michael J.	Surgeon Overall	225	208	6	2.88	3.72	2.40	(0.88, 5.20)	
	Riverside Community Hospital	123	114	5	4.39	3.12	4.35	(1.41, 10.12)	
	St. Bernardine Medical Center	102	94	1	1.06	4.45	0.74	(0.02, 4.10)	
Dembitsky, Walter P.	Surgeon Overall	174	76	1	1.32	2.34	1.74	(0.04, 9.63)	
	Sharp Memorial Hospital	174	76	1	1.32	2.34	1.74	(0.04, 9.63)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Derenoncourt, Frantz J.	Surgeon Overall	83	77	1	1.30	2.70	1.49	(0.04, 8.25)	
	Alvarado Hospital Medical Center	35	35	0	0.00	1.90	0.00	(0.00, 17.12)	
	Scripps Mercy Hospital	4	4	0	0.00	1.35	0.00	(0.00, 100.00)	
	Sharp Chula Vista Medical Center	44	38	1	2.63	3.58	2.27	(0.06, 12.60)	
Derrick, Marvin J.	Surgeon Overall	548	451	18	3.99	3.02	4.08	(2.41, 6.43)	
	Bakersfield Heart Hospital	152	119	2	1.68	3.59	1.45	(0.17, 5.21)	
	Bakersfield Memorial Hospital	336	281	14	4.98	2.67	5.76	(3.14, 9.64)	Worse
	San Joaquin Community Hospital	60	51	2	3.92	3.62	3.35	(0.40, 12.07)	
Dhar, Naveen	Surgeon Overall	166	162	6	3.70	3.30	3.47	(1.27, 7.52)	
	Anaheim Memorial Medical Center	7	7	0	0.00	2.27	0.00	(0.00, 71.36)	
	Fountain Valley Regional Hospital	47	44	2	4.55	4.63	3.04	(0.37, 10.93)	
	West Anaheim Medical Center	7	7	0	0.00	4.22	0.00	(0.00, 38.49)	
	Western Medical Center - Santa Ana	2	2	0	0.00	0.70	0.00	(0.00, 100.00)	
	Western Medical Center Hospital - Anaheim	103	102	4	3.92	2.78	4.35	(1.18, 11.10)	
Dharan, Murali	Surgeon Overall	227	195	3	1.54	2.42	1.96	(0.40, 5.71)	
	John Muir Medical Center	69	56	1	1.79	2.03	2.72	(0.07, 15.11)	
	Mt. Diablo Medical Center	48	41	0	0.00	2.40	0.00	(0.00, 11.57)	
	San Ramon Regional Medical Center	110	98	2	2.04	2.66	2.37	(0.29, 8.52)	
Dhillon, Jatinder S.	Surgeon Overall	200	166	5	3.01	3.11	2.99	(0.97, 6.96)	
	John Muir Medical Center	33	26	0	0.00	2.36	0.00	(0.00, 18.49)	
	Mt. Diablo Medical Center	162	135	5	3.70	3.30	3.47	(1.12, 8.08)	
	San Ramon Regional Medical Center	5	5	0	0.00	1.93	0.00	(0.00, 100.00)	
Dox, Hector A.	Surgeon Overall	205	186	2	1.08	2.67	1.24	(0.15, 4.48)	
	Salinas Valley Memorial Hospital	205	186	2	1.08	2.67	1.24	(0.15, 4.48)	
Durzinsky, Dennis S.	Surgeon Overall	232	194	3	1.55	2.43	1.96	(0.40, 5.72)	
	Alta Bates Summit Medical Center - Summit Campus	232	194	3	1.55	2.43	1.96	(0.40, 5.72)	
Edwards, Phyllis A.	Surgeon Overall	72	65	11	16.92	4.34	12.06	(6.00, 21.50)	Worse
	Kaweah Delta Hospital	72	65	11	16.92	4.34	12.06	(6.00, 21.50)	Worse
Ehrman, Walter J.	Surgeon Overall	2	2	0	0.00	0.54	0.00	(0.00, 100.00)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Ehrman, Walter J.	Desert Regional Medical Center	2	2	0	0.00	0.54	0.00	(0.00, 100.00)	
Ellertson, David G.	Surgeon Overall	36	34	1	2.94	2.12	4.30	(0.11, 23.85)	
	Doctors Medical Center - Modesto Campus	5	5	0	0.00	3.05	0.00	(0.00, 74.46)	
	Memorial Medical Center of Modesto	31	29	1	3.45	1.96	5.45	(0.14, 30.27)	
Ellis, Robert J.	Surgeon Overall	114	90	4	4.44	3.68	3.73	(1.01, 9.52)	
	California Pacific Medical Center - Pacific Campus	4	4	0	0.00	2.44	0.00	(0.00, 100.00)	
	Marin General Hospital	48	40	2	5.00	3.32	4.66	(0.56, 16.78)	
	St. Mary's Medical Center, San Francisco	62	46	2	4.35	4.11	3.27	(0.39, 11.77)	
Ennix, Coyness L.	Surgeon Overall	164	136	6	4.41	2.85	4.78	(1.75, 10.36)	
	Alta Bates Summit Medical Center - Summit Campus	163	135	6	4.44	2.87	4.79	(1.75, 10.38)	
	Doctors Medical Center - San Pablo Campus	1	1	0	0.00	0.69	0.00	(0.00, 100.00)	
Esmailian, Fardad	Surgeon Overall	173	129	5	3.88	2.59	4.62	(1.50, 10.75)	
	Santa Monica - UCLA Medical Center	32	30	1	3.33	2.74	3.76	(0.09, 20.85)	
	UCLA Medical Center	141	99	4	4.04	2.54	4.91	(1.33, 12.52)	
Estioko, Manuel R.	Surgeon Overall	230	199	7	3.52	4.28	2.54	(1.02, 5.22)	
	Good Samaritan Hospital - Los Angeles	225	194	7	3.61	4.34	2.57	(1.03, 5.28)	
	St. John's Hospital and Health Center	2	2	0	0.00	1.48	0.00	(0.00, 100.00)	
	St. Vincent Medical Center	3	3	0	0.00	2.45	0.00	(0.00, 100.00)	
Eugene, John	Surgeon Overall	85	81	1	1.23	2.71	1.41	(0.04, 7.83)	
	Anaheim Memorial Medical Center	8	8	0	0.00	2.50	0.00	(0.00, 56.76)	
	Little Company of Mary Hospital	9	7	0	0.00	6.91	0.00	(0.00, 23.48)	
	Torrance Memorial Medical Center	1	1	0	0.00	0.87	0.00	(0.00, 100.00)	
	West Anaheim Medical Center	2	2	0	0.00	0.76	0.00	(0.00, 100.00)	
	Western Medical Center - Santa Ana	1	1	0	0.00	4.99	0.00	(0.00, 100.00)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

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State		**49,435**	**40,377**	**1,244**	**3.08**				
Eugene, John	Western Medical Center Hospital - Anaheim	64	62	1	1.61	2.31	2.16	(0.05, 11.97)	
Faber, Luke A.	Surgeon Overall	172	133	2	1.50	3.36	1.38	(0.17, 4.98)	
	French Hospital Medical Center	58	42	1	2.38	3.00	2.45	(0.06, 13.62)	
	Marian Medical Center	38	28	0	0.00	2.82	0.00	(0.00, 14.38)	
	Sierra Vista Regional Medical Center	76	63	1	1.59	3.84	1.28	(0.03, 7.09)	
Fann, James I.	Surgeon Overall	11	10	0	0.00	1.79	0.00	(0.00, 63.59)	
	El Camino Hospital	11	10	0	0.00	1.79	0.00	(0.00, 63.59)	
Fee, Henry J.	Surgeon Overall	189	164	8	4.88	2.62	5.75	(2.47, 11.29)	
	Good Samaritan Hospital - San Jose	125	109	5	4.59	2.49	5.70	(1.84, 13.25)	
	O'Connor Hospital	55	48	3	6.25	2.67	7.23	(1.49, 21.06)	
	San Jose Medical Center	9	7	0	0.00	4.37	0.00	(0.00, 37.12)	
Felahy, Isam	Surgeon Overall	142	128	7	5.47	2.90	5.82	(2.33, 11.96)	
	Dameron Hospital	14	14	2	14.29	4.49	9.84	(1.19, 35.42)	
	St. Joseph's Medical Center of Stockton	128	114	5	4.39	2.71	5.01	(1.62, 11.64)	
Fishman, Noel H.	Surgeon Overall	70	65	0	0.00	3.43	0.00	(0.00, 5.09)	
	Dominican Hospital	70	65	0	0.00	3.43	0.00	(0.00, 5.09)	
Flachsbart, Keith D.	Surgeon Overall	110	76	3	3.95	2.08	5.88	(1.21, 17.12)	
	Kaiser Foundation Hospital (Geary San Francisco)	110	76	3	3.95	2.08	5.88	(1.21, 17.12)	
Folkerth, Theodore L.	Surgeon Overall	186	150	5	3.33	2.31	4.46	(1.44, 10.37)	
	Tri - City Medical Center	186	150	5	3.33	2.31	4.46	(1.44, 10.37)	
Follette, David M.	Surgeon Overall	75	63	1	1.59	2.20	2.23	(0.06, 12.40)	
	UC Davis Medical Center	75	63	1	1.59	2.20	2.23	(0.06, 12.40)	
Fontana, Gregory P.	Surgeon Overall	78	55	2	3.64	2.49	4.52	(0.54, 16.25)	
	Brotman Medical Center	1	1	0	0.00	3.20	0.00	(0.00, 100.00)	
	Cedars Sinai Medical Center	77	54	2	3.70	2.48	4.62	(0.56, 16.64)	
Freyaldenhoven, Stephen J.	Surgeon Overall	143	122	3	2.46	2.50	3.04	(0.62, 8.86)	
	French Hospital Medical Center	26	16	0	0.00	2.32	0.00	(0.00, 30.62)	
	Marian Medical Center	79	74	3	4.05	2.25	5.57	(1.14, 16.21)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Freyaldenhoven, Stephen J.	Sierra Vista Regional Medical Center	38	32	0	0.00	3.16	0.00	(0.00, 11.22)	
Fung, Lit K.	Surgeon Overall	379	276	16	5.80	3.36	5.34	(3.04, 8.64)	
	Doctors Medical Center - Modesto Campus	40	32	2	6.25	3.25	5.94	(0.72, 21.37)	
	Memorial Medical Center of Modesto	339	244	14	5.74	3.37	5.26	(2.87, 8.79)	
Garcia, Carlos E.	Surgeon Overall	2	2	0	0.00	1.58	0.00	(0.00, 100.00)	
	St. Joseph's Medical Center of Stockton	2	2	0	0.00	1.58	0.00	(0.00, 100.00)	
Gates, Richard N.	Surgeon Overall	129	93	1	1.08	2.78	1.20	(0.03, 6.64)	
	Mission Hospital Regional Medical Center	10	1	0	0.00	2.57	0.00	(0.00, 100.00)	
	Saddleback Memorial Medical Center	5	0	.	.	.	.		Not Applicable
	St. Joseph Hospital - Orange	114	92	1	1.09	2.78	1.21	(0.03, 6.70)	
Gaudiani, Vincent A.	Surgeon Overall	184	71	2	2.82	3.09	2.81	(0.34, 10.13)	
	Sequoia Hospital	184	71	2	2.82	3.09	2.81	(0.34, 10.13)	
Gharavi, Mohammad A.	Surgeon Overall	436	351	15	4.27	3.46	3.82	(2.13, 6.28)	
	Encino Tarzana Regional Medical Center	198	159	5	3.14	3.35	2.90	(0.94, 6.75)	
	Los Robles Regional Medical Center	181	142	9	6.34	4.11	4.77	(2.17, 9.03)	
	West Hills Regional Medical Center	57	50	1	2.00	1.96	3.15	(0.08, 17.51)	
Gheissari, Ali	Surgeon Overall	218	163	6	3.68	2.63	4.33	(1.58, 9.40)	
	Glendale Adventist Medical Center - Wilson Terrace	38	28	1	3.57	2.67	4.13	(0.10, 22.92)	
	Huntington Memorial Hospital	31	19	1	5.26	3.74	4.35	(0.11, 24.13)	
	Methodist Hospital of Southern California	20	17	1	5.88	2.58	7.04	(0.18, 39.09)	
	Providence St. Joseph Medical Center	65	46	2	4.35	1.26	10.63	(1.28, 38.25)	
	St. Vincent Medical Center	64	53	1	1.89	3.40	1.72	(0.04, 9.53)	
Gibson, Christopher F.	Surgeon Overall	489	433	12	2.77	3.96	2.16	(1.11, 3.76)	
	Riverside Community Hospital	106	90	3	3.33	4.26	2.42	(0.50, 7.04)	

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Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Gibson, Christopher F.	St. Bernardine Medical Center	245	219	5	2.28	3.68	1.92	(0.62, 4.45)	
	St. Mary Regional Medical Center	138	124	4	3.23	4.24	2.35	(0.64, 6.00)	
Giritsky, Alexander S.	Surgeon Overall	153	126	0	0.00	3.47	0.00	(0.00, 2.60)	Better
	Scripps Memorial Hospital - La Jolla	153	126	0	0.00	3.47	0.00	(0.00, 2.60)	Better
Gottner, Robert J.	Surgeon Overall	148	134	1	0.75	2.51	0.92	(0.02, 5.09)	
	Glendale Adventist Medical Center - Wilson Terrace	14	14	0	0.00	2.23	0.00	(0.00, 36.44)	
	Huntington Memorial Hospital	12	10	0	0.00	5.18	0.00	(0.00, 21.93)	
	Methodist Hospital of Southern California	90	83	1	1.20	2.24	1.66	(0.04, 9.21)	
	Providence St. Joseph Medical Center	22	18	0	0.00	1.80	0.00	(0.00, 35.13)	
	St. Vincent Medical Center	10	9	0	0.00	3.93	0.00	(0.00, 32.11)	
Gregory, Richard D.	Surgeon Overall	441	386	10	2.59	2.74	2.93	(1.40, 5.36)	
	Community Medical Center - Fresno	220	195	7	3.59	2.73	4.07	(1.63, 8.35)	
	Dominican Hospital	1	1	0	0.00	0.61	0.00	(0.00, 100.00)	
	Fresno Heart Hospital	174	147	3	2.04	2.47	2.55	(0.52, 7.43)	
	St. Agnes Medical Center	46	43	0	0.00	3.71	0.00	(0.00, 7.13)	
Griffith, Patrick K.	Surgeon Overall	175	154	2	1.30	2.86	1.40	(0.17, 5.05)	
	Rideout Memorial Hospital	175	154	2	1.30	2.86	1.40	(0.17, 5.05)	
Gundry, Steven R.	Surgeon Overall	54	38	2	5.26	4.22	3.86	(0.47, 13.88)	
	Desert Regional Medical Center	54	38	2	5.26	4.22	3.86	(0.47, 13.88)	
Gunupati, Venkata C.	Surgeon Overall	1	1	0	0.00	0.71	0.00	(0.00, 100.00)	
	Citrus Valley Medical Center - IC Campus	1	1	0	0.00	0.71	0.00	(0.00, 100.00)	
Habibipour, Saied	Surgeon Overall	66	58	2	3.45	2.25	4.74	(0.57, 17.06)	
	Desert Regional Medical Center	66	58	2	3.45	2.25	4.74	(0.57, 17.06)	
Hall, James D.	Surgeon Overall	205	167	3	1.80	3.47	1.60	(0.33, 4.66)	
	Little Company of Mary Hospital	91	74	2	2.70	3.45	2.42	(0.29, 8.72)	
	St. Mary Medical Center	5	4	0	0.00	2.59	0.00	(0.00, 100.00)	
	Torrance Memorial Medical Center	109	89	1	1.12	3.52	0.99	(0.02, 5.48)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Hanna, Elias S.	Surgeon Overall	31	18	1	5.56	3.47	4.95	(0.12, 27.45)	
	California Pacific Medical Center - Pacific Campus	7	3	1	33.33	10.42	9.89	(0.25, 54.92)	
	Marin General Hospital	10	8	0	0.00	2.52	0.00	(0.00, 56.29)	
	Salinas Valley Memorial Hospital	5	3	0	0.00	1.04	0.00	(0.00, 100.00)	
	St. Mary's Medical Center, San Francisco	9	4	0	0.00	1.99	0.00	(0.00, 100.00)	
Harmon, Adam L.	Surgeon Overall	230	200	3	1.50	3.13	1.48	(0.30, 4.32)	
	Washington Hospital - Fremont	230	200	3	1.50	3.13	1.48	(0.30, 4.32)	
Hasaniya, Nahidh W.	Surgeon Overall	23	22	0	0.00	2.02	0.00	(0.00, 25.52)	
	Loma Linda University Medical Center	21	20	0	0.00	2.07	0.00	(0.00, 27.43)	
	Riverside Community Hospital	2	2	0	0.00	1.55	0.00	(0.00, 100.00)	
Hemp, James R.	Surgeon Overall	77	55	3	5.45	3.23	5.23	(1.07, 15.22)	
	Mercy Medical Center - Redding	1	1	0	0.00	0.90	0.00	(0.00, 100.00)	
	Scripps Green Hospital	16	14	0	0.00	2.74	0.00	(0.00, 29.61)	
	Scripps Mercy Hospital	60	40	3	7.50	3.45	6.71	(1.38, 19.55)	
Hernandez, Jose G.	Surgeon Overall	154	144	5	3.47	4.17	2.58	(0.83, 5.99)	
	Sharp Chula Vista Medical Center	154	144	5	3.47	4.17	2.58	(0.83, 5.99)	
Hill, Arthur C.	Surgeon Overall	89	80	0	0.00	2.92	0.00	(0.00, 4.87)	
	California Pacific Medical Center - Pacific Campus	3	2	0	0.00	3.43	0.00	(0.00, 100.00)	
	UCSF Medical Center	86	78	0	0.00	2.90	0.00	(0.00, 5.02)	
Hood, James S.	Surgeon Overall	293	229	7	3.06	2.59	3.65	(1.46, 7.50)	
	Kaiser Foundation Hospital (Geary San Francisco)	293	229	7	3.06	2.59	3.65	(1.46, 7.50)	
Hoopes, Charles W.	Surgeon Overall	59	53	9	16.98	6.12	8.58	(3.91, 16.23)	Worse
	UCSF Medical Center	59	53	9	16.98	6.12	8.58	(3.91, 16.23)	Worse
Housman, Leland B.	Surgeon Overall	169	140	9	6.43	2.46	8.05	(3.68, 15.28)	Worse
	Scripps Green Hospital	127	106	6	5.66	2.28	7.66	(2.81, 16.67)	
	Scripps Mercy Hospital	42	34	3	8.82	2.99	9.12	(1.87, 26.55)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Howden, Frederick M.	Surgeon Overall	142	119	6	5.04	2.58	6.04	(2.21, 13.11)	
	Alvarado Hospital Medical Center	133	112	6	5.36	2.66	6.23	(2.28, 13.52)	
	Palomar Medical Center	1	1	0	0.00	1.72	0.00	(0.00, 100.00)	
	Sharp Grossmont Hospital	8	6	0	0.00	1.27	0.00	(0.00, 100.00)	
Huang, Mark W.	Surgeon Overall	22	19	0	0.00	6.96	0.00	(0.00, 8.60)	
	Sharp Chula Vista Medical Center	21	18	0	0.00	6.87	0.00	(0.00, 9.19)	
	Sharp Grossmont Hospital	1	1	0	0.00	8.55	0.00	(0.00, 100.00)	
Huang, Ming-Lu	Surgeon Overall	417	361	9	2.49	3.31	2.33	(1.06, 4.41)	
	Citrus Valley Medical Center - IC Campus	176	157	5	3.18	3.01	3.28	(1.06, 7.62)	
	Garfield Medical Center	188	155	2	1.29	3.85	1.04	(0.12, 3.73)	
	Methodist Hospital of Southern California	45	43	2	4.65	2.63	5.47	(0.66, 19.67)	
	USC University Hospital	8	6	0	0.00	1.84	0.00	(0.00, 100.00)	
Hurwitz, Andrew S.	Surgeon Overall	166	141	9	6.38	4.11	4.80	(2.19, 9.08)	
	Glendale Adventist Medical Center - Wilson Terrace	2	2	0	0.00	2.74	0.00	(0.00, 100.00)	
	Glendale Memorial Hospital and Health Center	164	139	9	6.47	4.13	4.84	(2.21, 9.16)	
Husain, Syed A.	Surgeon Overall	171	151	4	2.65	2.55	3.21	(0.87, 8.18)	
	Irvine Regional Hospital and Medical Center	5	4	0	0.00	1.64	0.00	(0.00, 100.00)	
	Mission Hospital Regional Medical Center	113	99	2	2.02	2.57	2.43	(0.29, 8.75)	
	Saddleback Memorial Medical Center	47	42	2	4.76	2.75	5.35	(0.65, 19.24)	
	St. Joseph Hospital - Orange	6	6	0	0.00	1.55	0.00	(0.00, 100.00)	
Huse, Wilfred M.	Surgeon Overall	31	28	0	0.00	2.46	0.00	(0.00, 16.48)	
	St. Helena Hospital	31	28	0	0.00	2.46	0.00	(0.00, 16.48)	
Ihnken, Kai A.	Surgeon Overall	5	5	0	0.00	2.21	0.00	(0.00, 100.00)	
	UCSD Medical Center - La Jolla	2	2	0	0.00	2.53	0.00	(0.00, 100.00)	
	UCSD Medical Center	3	3	0	0.00	1.99	0.00	(0.00, 100.00)	

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State		**49,435**	**40,377**	**1,244**	**3.08**				
Ingram, Michael T.	Surgeon Overall	422	304	8	2.63	2.73	2.98	(1.28, 5.85)	
	Sutter Memorial Hospital	422	304	8	2.63	2.73	2.98	(1.28, 5.85)	
Iverson, Leigh I.	Surgeon Overall	134	118	6	5.08	2.77	5.67	(2.07, 12.30)	
	Alta Bates Summit Medical Center - Summit Campus	101	89	5	5.62	2.69	6.45	(2.09, 15.00)	
	Doctors Medical Center - San Pablo Campus	33	29	1	3.45	3.01	3.54	(0.09, 19.65)	
Iyengar, Sridhara K.	Surgeon Overall	100	85	2	2.35	5.66	1.29	(0.16, 4.63)	
	Fountain Valley Regional Hospital	83	70	1	1.43	5.68	0.78	(0.02, 4.31)	
	Saddleback Memorial Medical Center	5	4	0	0.00	4.30	0.00	(0.00, 66.07)	
	Western Medical Center - Santa Ana	1	1	0	0.00	7.94	0.00	(0.00, 100.00)	
	Western Medical Center Hospital - Anaheim	11	10	1	10.00	5.77	5.35	(0.14, 29.72)	
Jacobson, John G.	Surgeon Overall	207	183	9	4.92	3.62	4.20	(1.91, 7.94)	
	St. Helena Hospital	207	183	9	4.92	3.62	4.20	(1.91, 7.94)	
Jain, Sarika	Surgeon Overall	157	145	2	1.38	3.73	1.14	(0.14, 4.12)	
	Pomona Valley Hospital Medical Center	157	145	2	1.38	3.73	1.14	(0.14, 4.12)	
Jamieson, Stuart W.	Surgeon Overall	26	9	0	0.00	1.24	0.00	(0.00, 100.00)	
	UCSD Medical Center - La Jolla	26	9	0	0.00	1.24	0.00	(0.00, 100.00)	
Joyo, Colin I.	Surgeon Overall	202	170	3	1.76	4.12	1.32	(0.27, 3.86)	
	Hoag Memorial Hospital Presbyterian	202	170	3	1.76	4.12	1.32	(0.27, 3.86)	
Kallin, Kristopher	Surgeon Overall	34	25	0	0.00	1.82	0.00	(0.00, 24.94)	
	Mission Hospital Regional Medical Center	2	0	.	.	.	.		Not Applicable
	Saddleback Memorial Medical Center	17	10	0	0.00	2.18	0.00	(0.00, 52.22)	
	St. Joseph Hospital - Orange	15	15	0	0.00	1.59	0.00	(0.00, 47.75)	
Kapelanski, David P.	Surgeon Overall	11	5	0	0.00	1.51	0.00	(0.00, 100.00)	
	UCSD Medical Center - La Jolla	6	1	0	0.00	2.13	0.00	(0.00, 100.00)	
	UCSD Medical Center	5	4	0	0.00	1.35	0.00	(0.00, 100.00)	
Kaplon, Richard J.	Surgeon Overall	529	437	9	2.06	1.89	3.36	(1.53, 6.36)	

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State		**49,435**	**40,377**	**1,244**	**3.08**				
Kaplon, Richard J.	Mercy General Hospital	478	390	6	1.54	1.95	2.44	(0.89, 5.28)	
	Mercy San Juan Hospital	51	47	3	6.38	1.42	13.93	(2.86, 40.57)	
Kass, Robert M.	Surgeon Overall	127	84	3	3.57	2.15	5.12	(1.05, 14.92)	
	Brotman Medical Center	6	3	0	0.00	1.70	0.00	(0.00, 100.00)	
	Cedars Sinai Medical Center	121	81	3	3.70	2.17	5.27	(1.08, 15.35)	
Kato, Norman S.	Surgeon Overall	3	3	0	0.00	0.72	0.00	(0.00, 100.00)	
	West Hills Regional Medical Center	3	3	0	0.00	0.72	0.00	(0.00, 100.00)	
Kay, Gregory L.	Surgeon Overall	247	153	4	2.61	4.31	1.87	(0.51, 4.78)	
	Good Samaritan Hospital - Los Angeles	247	153	4	2.61	4.31	1.87	(0.51, 4.78)	
Khan, Aziz A.	Surgeon Overall	65	63	7	11.11	4.62	7.43	(2.98, 15.25)	
	Beverly Hospital	57	55	7	12.73	5.07	7.76	(3.11, 15.92)	Worse
	Presbyterian Intercommunity Hospital	8	8	0	0.00	1.53	0.00	(0.00, 92.83)	
Khan, Junaid H.	Surgeon Overall	200	175	6	3.43	3.62	2.93	(1.07, 6.35)	
	Alta Bates Summit Medical Center - Summit Campus	148	129	4	3.10	3.82	2.51	(0.68, 6.40)	
	Doctors Medical Center - San Pablo Campus	52	46	2	4.35	3.04	4.42	(0.53, 15.92)	
Khonsari, Siavosh	Surgeon Overall	25	7	1	14.29	10.62	4.16	(0.10, 23.09)	
	Kaiser Foundation Hospital (Sunset Los Angeles)	25	7	1	14.29	10.62	4.16	(0.10, 23.09)	
Kincade, Robert C.	Surgeon Overall	193	165	10	6.06	2.79	6.70	(3.21, 12.30)	Worse
	Sutter Memorial Hospital	193	165	10	6.06	2.79	6.70	(3.21, 12.30)	Worse
Klingman, Robert R.	Surgeon Overall	167	152	5	3.29	4.04	2.51	(0.81, 5.85)	
	Queen of the Valley Hospital	167	152	5	3.29	4.04	2.51	(0.81, 5.85)	
Kochamba, Gary S.	Surgeon Overall	745	689	23	3.34	2.91	3.54	(2.24, 5.29)	
	Kaiser Foundation Hospital (Sunset Los Angeles)	745	689	23	3.34	2.91	3.54	(2.24, 5.29)	
Korver, Keith F.	Surgeon Overall	287	214	0	0.00	1.62	0.00	(0.00, 3.29)	
	California Pacific Medical Center - Pacific Campus	4	4	0	0.00	0.91	0.00	(0.00, 100.00)	

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State		**49,435**	**40,377**	**1,244**	**3.08**				
Korver, Keith F.	Sequoia Hospital	1	0	.	.	.	.		Not Applicable
	Sutter Medical Center of Santa Rosa	282	210	0	0.00	1.63	0.00	(0.00, 3.32)	
Koumjian, Michael P.	Surgeon Overall	306	269	8	2.97	3.11	2.95	(1.27, 5.80)	
	Alvarado Hospital Medical Center	4	2	0	0.00	7.96	0.00	(0.00, 71.39)	
	Scripps Mercy Hospital	2	2	0	0.00	0.58	0.00	(0.00, 100.00)	
	Sharp Chula Vista Medical Center	35	29	1	3.45	2.00	5.33	(0.13, 29.57)	
	Sharp Grossmont Hospital	265	236	7	2.97	3.23	2.84	(1.14, 5.83)	
Kriett, Jolene M.	Surgeon Overall	16	8	0	0.00	1.17	0.00	(0.00, 100.00)	
	UCSD Medical Center - La Jolla	7	4	0	0.00	1.67	0.00	(0.00, 100.00)	
	UCSD Medical Center	9	4	0	0.00	0.68	0.00	(0.00, 100.00)	
Labourene, Jay I.	Surgeon Overall	168	116	2	1.72	2.37	2.25	(0.27, 8.10)	
	Kaiser Foundation Hospital (Geary San Francisco)	168	116	2	1.72	2.37	2.25	(0.27, 8.10)	
Laks, Hillel	Surgeon Overall	136	63	1	1.59	2.07	2.37	(0.06, 13.15)	
	UCLA Medical Center	136	63	1	1.59	2.07	2.37	(0.06, 13.15)	
Lapunzina, Paul M.	Surgeon Overall	272	201	6	2.99	1.97	4.67	(1.71, 10.14)	
	Kaiser Foundation Hospital (Geary San Francisco)	272	201	6	2.99	1.97	4.67	(1.71, 10.14)	
Laughlin, Lawrence L.	Surgeon Overall	89	80	0	0.00	3.20	0.00	(0.00, 4.43)	
	Citrus Valley Medical Center - IC Campus	67	58	0	0.00	2.53	0.00	(0.00, 7.76)	
	Garfield Medical Center	10	10	0	0.00	3.63	0.00	(0.00, 31.27)	
	Methodist Hospital of Southern California	12	12	0	0.00	6.13	0.00	(0.00, 15.45)	
Lawrence, John M.	Surgeon Overall	71	65	3	4.62	2.60	5.50	(1.13, 16.00)	
	Lakewood Regional Medical Center	59	55	2	3.64	2.04	5.51	(0.66, 19.83)	
	Long Beach Memorial Medical Center	12	10	1	10.00	5.65	5.47	(0.14, 30.37)	
Lee, Anthony W.	Surgeon Overall	250	238	8	3.36	2.55	4.08	(1.76, 8.01)	
	Downey Regional Medical Center	64	64	2	3.13	2.81	3.44	(0.42, 12.38)	
	St. Francis Medical Center	186	174	6	3.45	2.45	4.35	(1.59, 9.44)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Lee, Hon S.	Surgeon Overall	314	263	6	2.28	3.11	2.27	(0.83, 4.92)	
	Alta Bates Summit Medical Center - Summit Campus	314	263	6	2.28	3.11	2.27	(0.83, 4.92)	
Lee, Sang H.	Surgeon Overall	33	27	1	3.70	4.14	2.77	(0.07, 15.37)	
	Washington Hospital - Fremont	33	27	1	3.70	4.14	2.77	(0.07, 15.37)	
Lemire, Guy G.	Surgeon Overall	91	79	2	2.53	2.66	2.94	(0.36, 10.60)	
	Anaheim Memorial Medical Center	61	50	2	4.00	2.53	4.89	(0.59, 17.61)	
	Long Beach Memorial Medical Center	13	12	0	0.00	4.03	0.00	(0.00, 23.51)	
	St. Mary Medical Center	1	1	0	0.00	0.80	0.00	(0.00, 100.00)	
	West Anaheim Medical Center	16	16	0	0.00	2.16	0.00	(0.00, 32.92)	
Lin, Yuan H.	Surgeon Overall	254	226	5	2.21	4.15	1.65	(0.53, 3.83)	
	Alvarado Hospital Medical Center	34	31	2	6.45	2.22	9.00	(1.09, 32.38)	
	Sharp Chula Vista Medical Center	181	160	3	1.88	4.79	1.21	(0.25, 3.52)	
	Sharp Grossmont Hospital	39	35	0	0.00	2.94	0.00	(0.00, 11.03)	
Lindsey, David E.	Surgeon Overall	145	129	5	3.88	3.06	3.91	(1.27, 9.10)	
	John Muir Medical Center	52	46	1	2.17	2.72	2.47	(0.06, 13.70)	
	Mt. Diablo Medical Center	88	78	4	5.13	3.39	4.68	(1.27, 11.95)	
	San Ramon Regional Medical Center	5	5	0	0.00	1.15	0.00	(0.00, 100.00)	
Litchford, Julian B.	Surgeon Overall	115	100	0	0.00	1.60	0.00	(0.00, 7.12)	
	Sharp Memorial Hospital	115	100	0	0.00	1.60	0.00	(0.00, 7.12)	
Longoria, James	Surgeon Overall	430	316	16	5.06	2.91	5.39	(3.07, 8.72)	
	Sutter Memorial Hospital	430	316	16	5.06	2.91	5.39	(3.07, 8.72)	
Louie, Henry W.	Surgeon Overall	288	254	11	4.33	3.19	4.20	(2.09, 7.49)	
	Desert Regional Medical Center	250	221	11	4.98	3.38	4.55	(2.26, 8.11)	
	Eisenhower Memorial Hospital	38	33	0	0.00	1.88	0.00	(0.00, 18.27)	
MacMillan, James C.	Surgeon Overall	199	159	8	5.03	2.59	6.01	(2.59, 11.80)	
	Doctors Medical Center - Modesto Campus	193	154	7	4.55	2.58	5.45	(2.19, 11.20)	
	Memorial Medical Center of Modesto	6	5	1	20.00	2.93	21.07	(0.53, 100.00)	
Madani, Michael M.	Surgeon Overall	68	46	0	0.00	5.91	0.00	(0.00, 4.18)	
	UCSD Medical Center - La Jolla	54	36	0	0.00	6.55	0.00	(0.00, 4.82)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Madani, Michael M.	UCSD Medical Center	14	10	0	0.00	3.59	0.00	(0.00, 31.61)	
Magliato, Kathy E.	Surgeon Overall	23	17	1	5.88	3.38	5.38	(0.14, 29.85)	
	Brotman Medical Center	12	9	0	0.00	1.73	0.00	(0.00, 73.02)	
	Cedars Sinai Medical Center	11	8	1	12.50	5.24	7.37	(0.19, 40.93)	
Mahendra,Tom	Surgeon Overall	66	58	2	3.45	3.51	3.04	(0.37, 10.94)	
	Antelope Valley Hospital Medical Center	48	41	2	4.88	3.66	4.12	(0.50, 14.82)	
	Lancaster Community Hospital	18	17	0	0.00	3.13	0.00	(0.00, 21.35)	
Malekmehr, Farshad	Surgeon Overall	63	59	3	5.08	4.10	3.84	(0.79, 11.17)	
	Glendale Adventist Medical Center - Wilson Terrace	3	3	1	33.33	1.61	64.11	(1.62, 100.00)	
	Valley Presbyterian Hospital	5	5	1	20.00	3.43	18.02	(0.45, 100.00)	
	White Memorial Medical Center	55	51	1	1.96	4.31	1.41	(0.04, 7.81)	
Malki, Alan E.	Surgeon Overall	521	473	12	2.54	3.30	2.38	(1.22, 4.14)	
	Riverside Community Hospital	114	104	4	3.85	3.91	3.04	(0.83, 7.76)	
	St. Bernardine Medical Center	374	338	8	2.37	3.19	2.29	(0.99, 4.50)	
	St. Mary Regional Medical Center	33	31	0	0.00	2.45	0.00	(0.00, 14.98)	
Marchbanks, Marshall V.	Surgeon Overall	122	91	9	9.89	4.46	6.85	(3.12, 12.95)	Worse
	Santa Rosa Memorial Hospital	122	91	9	9.89	4.46	6.85	(3.12, 12.95)	Worse
Marmureanu, Alexandru R.	Surgeon Overall	11	8	1	12.50	2.97	13.01	(0.33, 72.21)	
	Brotman Medical Center	7	4	1	25.00	4.18	18.50	(0.47, 100.00)	
	Centinela Hospital Medical Center	1	1	0	0.00	1.85	0.00	(0.00, 100.00)	
	Santa Monica - UCLA Medical Center	1	1	0	0.00	0.73	0.00	(0.00, 100.00)	
	St. John's Hospital and Health Center	1	1	0	0.00	2.06	0.00	(0.00, 100.00)	
	UCLA Medical Center	1	1	0	0.00	2.43	0.00	(0.00, 100.00)	
Mayer, Frederick W.	Surgeon Overall	383	330	12	3.64	4.29	2.62	(1.35, 4.56)	
	Kaweah Delta Hospital	383	330	12	3.64	4.29	2.62	(1.35, 4.56)	
McAfee, Molly K.	Surgeon Overall	129	112	5	4.46	2.31	5.97	(1.93, 13.87)	
	Loma Linda University Medical Center	124	107	5	4.67	2.18	6.62	(2.14, 15.40)	
	Riverside Community Hospital	5	5	0	0.00	5.13	0.00	(0.00, 44.32)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
McConnell, Douglas H.	Surgeon Overall	133	129	2	1.55	2.36	2.03	(0.25, 7.32)	
	Lakewood Regional Medical Center	58	56	0	0.00	2.35	0.00	(0.00, 8.62)	
	Long Beach Memorial Medical Center	75	73	2	2.74	2.36	3.59	(0.43, 12.92)	
McPherson, James G.	Surgeon Overall	140	121	6	4.96	3.33	4.60	(1.68, 9.98)	
	Brotman Medical Center	4	2	0	0.00	2.45	0.00	(0.00, 100.00)	
	Centinela Hospital Medical Center	95	87	4	4.60	3.36	4.23	(1.15, 10.78)	
	Citrus Valley Medical Center - IC Campus	2	1	0	0.00	0.21	0.00	(0.00, 100.00)	
	Glendale Adventist Medical Center - Wilson Terrace	12	10	1	10.00	3.75	8.25	(0.21, 45.80)	
	Providence St. Joseph Medical Center	3	3	0	0.00	1.72	0.00	(0.00, 100.00)	
	St. Vincent Medical Center	24	18	1	5.56	3.48	4.94	(0.12, 27.40)	
Melikian, Vicken	Surgeon Overall	307	243	3	1.23	1.97	1.94	(0.40, 5.65)	
	Kaiser Foundation Hospital (Geary San Francisco)	307	243	3	1.23	1.97	1.94	(0.40, 5.65)	
Merrick, Scot H.	Surgeon Overall	111	85	5	5.88	2.41	7.55	(2.44, 17.56)	
	UCSF Medical Center	111	85	5	5.88	2.41	7.55	(2.44, 17.56)	
Miller, David C.	Surgeon Overall	20	1	0	0.00	1.36	0.00	(0.00, 100.00)	
	Stanford University Hospital	20	1	0	0.00	1.36	0.00	(0.00, 100.00)	
Milliken, Jeffrey C.	Surgeon Overall	140	107	4	3.74	2.86	4.04	(1.10, 10.31)	
	UC Irvine Medical Center	121	97	3	3.09	2.59	3.69	(0.76, 10.76)	
	Western Medical Center Hospital - Anaheim	19	10	1	10.00	5.50	5.62	(0.14, 31.21)	
Millman, Jeffrey L.	Surgeon Overall	1	1	0	0.00	1.31	0.00	(0.00, 100.00)	
	Valley Presbyterian Hospital	1	1	0	0.00	1.31	0.00	(0.00, 100.00)	
Misbach, Gregory A.	Surgeon Overall	152	135	1	0.74	3.88	0.59	(0.01, 3.28)	
	Riverside Community Hospital	40	37	1	2.70	3.45	2.42	(0.06, 13.46)	
	St. Bernardine Medical Center	58	46	0	0.00	4.16	0.00	(0.00, 5.93)	
	St. Mary Regional Medical Center	54	52	0	0.00	3.93	0.00	(0.00, 5.56)	
Mitchell, Robert L.	Surgeon Overall	95	87	1	1.15	3.42	1.04	(0.03, 5.77)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Mitchell, Robert L.	El Camino Hospital	95	87	1	1.15	3.42	1.04	(0.03, 5.77)	
Mitchell, Robert S.	Surgeon Overall	126	81	4	4.94	1.90	8.01	(2.19, 20.54)	
	Stanford University Hospital	126	81	4	4.94	1.90	8.01	(2.19, 20.54)	
Mitruka, Surindra N.	Surgeon Overall	240	168	10	5.95	3.14	5.87	(2.80, 10.75)	
	Desert Regional Medical Center	1	1	0	0.00	2.37	0.00	(0.00, 100.00)	
	Eisenhower Memorial Hospital	239	167	10	5.99	3.14	5.89	(2.82, 10.80)	
Mittal, Arun K.	Surgeon Overall	19	18	1	5.56	5.88	2.92	(0.07, 16.21)	
	Centinela Hospital Medical Center	3	3	0	0.00	2.84	0.00	(0.00, 100.00)	
	Little Company of Mary Hospital	11	10	1	10.00	8.39	3.69	(0.09, 20.46)	
	Torrance Memorial Medical Center	5	5	0	0.00	2.69	0.00	(0.00, 84.41)	
Mohammadzadeh, Gholam R.	Surgeon Overall	286	242	8	3.31	3.65	2.80	(1.21, 5.50)	
	Encino Tarzana Regional Medical Center	123	101	4	3.96	4.38	2.79	(0.76, 7.13)	
	Los Robles Regional Medical Center	151	129	4	3.10	3.24	2.95	(0.80, 7.54)	
	West Hills Regional Medical Center	12	12	0	0.00	1.79	0.00	(0.00, 53.02)	
Morales, Rodolfo A.	Surgeon Overall	192	160	3	1.88	2.91	1.99	(0.41, 5.80)	
	Good Samaritan Hospital - San Jose	175	146	3	2.05	3.06	2.08	(0.43, 6.05)	
	O'Connor Hospital	15	12	0	0.00	1.30	0.00	(0.00, 73.01)	
	San Jose Medical Center	2	2	0	0.00	1.88	0.00	(0.00, 100.00)	
Moreno-Cabral, Ricardo J.	Surgeon Overall	190	139	2	1.44	3.32	1.34	(0.16, 4.82)	
	Alvarado Hospital Medical Center	6	5	0	0.00	4.24	0.00	(0.00, 53.59)	
	Scripps Mercy Hospital	53	41	1	2.44	3.56	2.12	(0.05, 11.77)	
	Sharp Chula Vista Medical Center	77	56	1	1.79	3.24	1.70	(0.04, 9.46)	
	Sharp Grossmont Hospital	54	37	0	0.00	3.07	0.00	(0.00, 10.01)	
Morris, Allen S.	Surgeon Overall	519	294	2	0.68	1.92	1.10	(0.13, 3.94)	
	Mercy General Hospital	450	248	2	0.81	1.88	1.33	(0.16, 4.77)	
	Mercy San Juan Hospital	69	46	0	0.00	2.12	0.00	(0.00, 11.65)	
Morris, Drewry H.	Surgeon Overall	18	16	0	0.00	1.62	0.00	(0.00, 43.92)	
	Mission Hospital Regional Medical Center	18	16	0	0.00	1.62	0.00	(0.00, 43.92)	
Morrissey, James D.	Surgeon Overall	314	250	5	2.00	2.91	2.12	(0.69, 4.94)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Morrissey, James D.	Dameron Hospital	10	9	0	0.00	1.72	0.00	(0.00, 73.40)	
	St. Joseph's Medical Center of Stockton	304	241	5	2.07	2.95	2.17	(0.70, 5.05)	
Mudge, Devin R.	Surgeon Overall	369	331	4	1.21	2.82	1.32	(0.36, 3.38)	
	Riverside Community Hospital	85	73	1	1.37	2.45	1.73	(0.04, 9.60)	
	St. Bernardine Medical Center	181	169	2	1.18	2.76	1.32	(0.16, 4.77)	
	St. Mary Regional Medical Center	103	89	1	1.12	3.25	1.07	(0.03, 5.94)	
Nathanson, Michael	Surgeon Overall	57	49	2	4.08	1.41	8.96	(1.08, 32.26)	
	Santa Clara Valley Medical Center	57	49	2	4.08	1.41	8.96	(1.08, 32.26)	
Neal, Joe F.	Surgeon Overall	213	154	3	1.95	1.87	3.22	(0.66, 9.37)	
	Doctors Medical Center - Modesto Campus	206	147	3	2.04	1.85	3.40	(0.70, 9.91)	
	Memorial Medical Center of Modesto	7	7	0	0.00	2.21	0.00	(0.00, 73.29)	
Nigro, John J.	Surgeon Overall	29	25	1	4.00	2.52	4.91	(0.12, 27.25)	
	Los Angeles Co USC Medical Center	29	25	1	4.00	2.52	4.91	(0.12, 27.25)	
Nucho, Ramsay C.	Surgeon Overall	154	142	3	2.11	3.87	1.69	(0.35, 4.91)	
	Glendale Adventist Medical Center - Wilson Terrace	77	71	1	1.41	2.93	1.49	(0.04, 8.25)	
	White Memorial Medical Center	77	71	2	2.82	4.82	1.81	(0.22, 6.50)	
Nuno, Ismael N.	Surgeon Overall	227	184	10	5.43	2.50	6.70	(3.21, 12.31)	Worse
	Citrus Valley Medical Center - IC Campus	2	2	0	0.00	1.79	0.00	(0.00, 100.00)	
	Huntington Memorial Hospital	2	2	0	0.00	0.57	0.00	(0.00, 100.00)	
	Los Angeles Co USC Medical Center	173	139	5	3.60	2.18	5.11	(1.65, 11.88)	
	Methodist Hospital of Southern California	4	3	2	66.67	2.30	89.78	(10.83, 100.00)	Worse
	USC University Hospital	7	2	0	0.00	22.03	0.00	(0.00, 25.79)	
	White Memorial Medical Center	39	36	3	8.33	2.77	9.31	(1.91, 27.12)	
Omari, Bassam O.	Surgeon Overall	292	273	12	4.40	3.44	3.95	(2.03, 6.87)	
	Los Angeles Co Harbor - UCLA Medical Center	269	250	10	4.00	3.44	3.59	(1.72, 6.58)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Omari, Bassam O.	St. Mary Medical Center	1	1	0	0.00	0.45	0.00	(0.00, 100.00)	
	St. Mary Regional Medical Center	22	22	2	9.09	3.55	7.92	(0.96, 28.52)	
Ostermiller, William E.	Surgeon Overall	62	50	0	0.00	1.89	0.00	(0.00, 12.05)	
	Irvine Regional Hospital and Medical Center	2	2	0	0.00	0.53	0.00	(0.00, 100.00)	
	St. Joseph Hospital - Orange	60	48	0	0.00	1.94	0.00	(0.00, 12.18)	
Ott, Richard A.	Surgeon Overall	673	608	19	3.13	2.99	3.23	(1.94, 5.02)	
	Anaheim Memorial Medical Center	405	362	14	3.87	3.34	3.58	(1.95, 5.98)	
	Irvine Regional Hospital and Medical Center	56	52	2	3.85	2.21	5.38	(0.65, 19.36)	
	St. Joseph Hospital - Orange	1	1	0	0.00	2.34	0.00	(0.00, 100.00)	
	Western Medical Center - Santa Ana	202	185	3	1.62	2.51	1.99	(0.41, 5.81)	
	Western Medical Center Hospital - Anaheim	9	8	0	0.00	3.50	0.00	(0.00, 40.63)	
Overton, John B.	Surgeon Overall	15	15	1	6.67	2.26	9.13	(0.23, 50.68)	
	Dameron Hospital	15	15	1	6.67	2.26	9.13	(0.23, 50.68)	
Oyer, Philip E.	Surgeon Overall	100	73	0	0.00	1.59	0.00	(0.00, 9.78)	
	Stanford University Hospital	100	73	0	0.00	1.59	0.00	(0.00, 9.78)	
Palafox, Brian A.	Surgeon Overall	109	79	1	1.27	2.56	1.53	(0.04, 8.49)	
	St. Joseph Hospital - Orange	98	69	0	0.00	2.54	0.00	(0.00, 6.48)	
	Western Medical Center - Santa Ana	11	10	1	10.00	2.68	11.51	(0.29, 63.92)	
Panagiotides, George P.	Surgeon Overall	241	222	12	5.41	3.77	4.44	(2.28, 7.72)	
	Lakewood Regional Medical Center	73	66	6	9.09	3.64	7.71	(2.82, 16.72)	
	Long Beach Memorial Medical Center	168	156	6	3.85	3.82	3.11	(1.14, 6.75)	
Park, Soon J.	Surgeon Overall	130	93	5	5.38	5.18	3.21	(1.04, 7.46)	
	California Pacific Medical Center - Pacific Campus	74	52	3	5.77	6.77	2.64	(0.54, 7.67)	
	Marin General Hospital	56	41	2	4.88	3.16	4.77	(0.58, 17.16)	
Paw, Patrick T.	Surgeon Overall	313	282	10	3.55	2.79	3.93	(1.88, 7.20)	
	Bakersfield Heart Hospital	90	81	3	3.70	3.93	2.92	(0.60, 8.49)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Paw, Patrick T.	Bakersfield Memorial Hospital	138	124	5	4.03	2.74	4.54	(1.47, 10.56)	
	San Joaquin Community Hospital	85	77	2	2.60	1.67	4.81	(0.58, 17.32)	
Pelletier, Marc P.	Surgeon Overall	90	74	1	1.35	3.21	1.30	(0.03, 7.22)	
	El Camino Hospital	85	71	1	1.41	3.06	1.42	(0.04, 7.91)	
	Stanford University Hospital	5	3	0	0.00	6.86	0.00	(0.00, 55.20)	
Peng, Rick Y.	Surgeon Overall	1	1	0	0.00	1.32	0.00	(0.00, 100.00)	
	Rideout Memorial Hospital	1	1	0	0.00	1.32	0.00	(0.00, 100.00)	
Perkowski, David J.	Surgeon Overall	194	172	5	2.91	2.68	3.36	(1.09, 7.81)	
	Desert Regional Medical Center	4	3	0	0.00	1.20	0.00	(0.00, 100.00)	
	Irvine Regional Hospital and Medical Center	3	3	0	0.00	2.54	0.00	(0.00, 100.00)	
	Mission Hospital Regional Medical Center	6	6	1	16.67	1.22	42.33	(1.07, 100.00)	
	Saddleback Memorial Medical Center	176	155	4	2.58	2.77	2.88	(0.78, 7.36)	
	St. Joseph Hospital - Orange	5	5	0	0.00	2.57	0.00	(0.00, 88.43)	
Perricone, Anthony	Surgeon Overall	79	73	3	4.11	2.53	5.02	(1.03, 14.61)	
	UCSD Medical Center - La Jolla	51	49	3	6.12	2.22	8.53	(1.75, 24.84)	
	UCSD Medical Center	28	24	0	0.00	3.17	0.00	(0.00, 14.93)	
Petrik, Pavel V.	Surgeon Overall	71	67	3	4.48	2.93	4.72	(0.97, 13.75)	
	Antelope Valley Hospital Medical Center	52	48	2	4.17	2.22	5.81	(0.70, 20.91)	
	Lancaster Community Hospital	19	19	1	5.26	4.73	3.44	(0.09, 19.08)	
Pfeffer, Thomas A.	Surgeon Overall	668	540	27	5.00	3.51	4.40	(2.89, 6.38)	
	Kaiser Foundation Hospital (Sunset Los Angeles)	668	540	27	5.00	3.51	4.40	(2.89, 6.38)	
Pipkin, Robert D.	Surgeon Overall	83	76	1	1.32	3.99	1.02	(0.03, 5.66)	
	Washington Hospital - Fremont	83	76	1	1.32	3.99	1.02	(0.03, 5.66)	
Plunkett, Mark D.	Surgeon Overall	9	3	2	66.67	15.07	13.67	(1.65, 49.21)	
	UCLA Medical Center	9	3	2	66.67	15.07	13.67	(1.65, 49.21)	
Poa, Li	Surgeon Overall	249	192	3	1.56	3.36	1.44	(0.30, 4.19)	
	Enloe Medical Center	249	192	3	1.56	3.36	1.44	(0.30, 4.19)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Poirier, Robert A.	Surgeon Overall	371	303	6	1.98	1.95	3.14	(1.15, 6.80)	
	Fresno Heart Hospital	10	7	0	0.00	1.26	0.00	(0.00, 100.00)	
	St. Agnes Medical Center	361	296	6	2.03	1.97	3.18	(1.16, 6.90)	
Pompili, Mario F.	Surgeon Overall	274	215	5	2.33	1.74	4.13	(1.34, 9.61)	
	Kaiser Foundation Hospital (Geary San Francisco)	274	215	5	2.33	1.74	4.13	(1.34, 9.61)	
Postel, Joachim M.	Surgeon Overall	165	138	2	1.45	4.33	1.03	(0.12, 3.72)	
	St. Joseph Hospital - Eureka	165	138	2	1.45	4.33	1.03	(0.12, 3.72)	
Pottmeyer, Edward W.	Surgeon Overall	577	477	10	2.10	3.80	1.71	(0.82, 3.13)	
	Mercy Medical Center - Redding	577	477	10	2.10	3.80	1.71	(0.82, 3.13)	
Prejean, Curtis A.	Surgeon Overall	153	137	5	3.65	3.19	3.53	(1.14, 8.22)	
	Centinela Hospital Medical Center	94	88	4	4.55	3.39	4.14	(1.12, 10.57)	
	Citrus Valley Medical Center - IC Campus	16	15	0	0.00	3.62	0.00	(0.00, 20.91)	
	Garfield Medical Center	2	2	0	0.00	1.18	0.00	(0.00, 100.00)	
	Huntington Memorial Hospital	1	0	.	.	.	.		Not Applicable
	Los Angeles Co USC Medical Center	23	18	0	0.00	2.16	0.00	(0.00, 29.20)	
	Methodist Hospital of Southern California	4	4	0	0.00	3.51	0.00	(0.00, 80.91)	
	USC University Hospital	13	10	1	10.00	3.16	9.76	(0.25, 54.31)	
Purewal, Sarabjit S.	Surgeon Overall	367	305	13	4.26	2.59	5.09	(2.70, 8.68)	
	Bakersfield Heart Hospital	205	165	7	4.24	2.21	5.93	(2.38, 12.18)	
	Bakersfield Memorial Hospital	121	106	4	3.77	2.92	3.99	(1.08, 10.19)	
	San Joaquin Community Hospital	41	34	2	5.88	3.38	5.38	(0.65, 19.37)	
Raikar, Goya V.	Surgeon Overall	5	4	0	0.00	9.97	0.00	(0.00, 28.48)	
	Redding Medical Center	5	4	0	0.00	9.97	0.00	(0.00, 28.48)	
Raissi, Sharo S.	Surgeon Overall	122	94	1	1.06	3.61	0.91	(0.02, 5.05)	
	Brotman Medical Center	46	35	1	2.86	3.22	2.75	(0.07, 15.25)	
	Cedars Sinai Medical Center	76	59	0	0.00	3.85	0.00	(0.00, 5.00)	
Raney, Aidan A.	Surgeon Overall	195	120	3	2.50	3.33	2.32	(0.48, 6.76)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Raney, Aidan A.	Hoag Memorial Hospital Presbyterian	195	120	3	2.50	3.33	2.32	(0.48, 6.76)	
Rasi, Alfredo L.	Surgeon Overall	209	176	8	4.55	2.81	5.00	(2.15, 9.81)	
	Loma Linda University Medical Center	205	172	8	4.65	2.77	5.19	(2.23, 10.19)	
	Riverside Community Hospital	4	4	0	0.00	4.64	0.00	(0.00, 61.25)	
Razzouk, Anees J.	Surgeon Overall	149	122	1	0.82	3.65	0.69	(0.02, 3.85)	
	Loma Linda University Medical Center	149	122	1	0.82	3.65	0.69	(0.02, 3.85)	
Realyvasquez, Fidel	Surgeon Overall	14	10	1	10.00	9.17	3.37	(0.08, 18.70)	
	Redding Medical Center	14	10	1	10.00	9.17	3.37	(0.08, 18.70)	
Reddy, Kuruganti R.	Surgeon Overall	7	7	2	28.57	3.56	24.80	(2.99, 89.25)	
	Citrus Valley Medical Center - IC Campus	7	7	2	28.57	3.56	24.80	(2.99, 89.25)	
Reichman, Robert T.	Surgeon Overall	273	246	8	3.25	2.22	4.53	(1.95, 8.89)	
	Palomar Medical Center	273	246	8	3.25	2.22	4.53	(1.95, 8.89)	
Reitz, Bruce A.	Surgeon Overall	77	54	2	3.70	3.33	3.43	(0.41, 12.36)	
	El Camino Hospital	1	1	0	0.00	1.49	0.00	(0.00, 100.00)	
	Stanford University Hospital	76	53	2	3.77	3.37	3.46	(0.42, 12.46)	
Rich, Andrew A.	Surgeon Overall	52	43	1	2.33	2.27	3.16	(0.08, 17.54)	
	Enloe Medical Center	52	43	1	2.33	2.27	3.16	(0.08, 17.54)	
Richter, Richard C.	Surgeon Overall	225	178	5	2.81	2.22	3.91	(1.26, 9.09)	
	Kaiser Foundation Hospital (Geary San Francisco)	225	178	5	2.81	2.22	3.91	(1.26, 9.09)	
Riebman, Jerome B.	Surgeon Overall	52	49	1	2.04	1.07	5.90	(0.15, 32.75)	
	Santa Clara Valley Medical Center	52	49	1	2.04	1.07	5.90	(0.15, 32.75)	
Robbins, Robert C.	Surgeon Overall	75	49	1	2.04	2.54	2.49	(0.06, 13.82)	
	Stanford University Hospital	75	49	1	2.04	2.54	2.49	(0.06, 13.82)	
Roberts, Peter F.	Surgeon Overall	29	20	0	0.00	2.69	0.00	(0.00, 21.15)	
	UC Davis Medical Center	29	20	0	0.00	2.69	0.00	(0.00, 21.15)	
Roberts, Randall F.	Surgeon Overall	13	12	0	0.00	1.58	0.00	(0.00, 59.94)	
	Glendale Adventist Medical Center - Wilson Terrace	2	2	0	0.00	0.39	0.00	(0.00, 100.00)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Roberts, Randall F.	Glendale Memorial Hospital and Health Center	10	9	0	0.00	1.91	0.00	(0.00, 66.22)	
	Los Angeles Co USC Medical Center	1	1	0	0.00	1.01	0.00	(0.00, 100.00)	
Robertson, John M.	Surgeon Overall	143	111	1	0.90	2.48	1.12	(0.03, 6.24)	
	St. John's Hospital and Health Center	143	111	1	0.90	2.48	1.12	(0.03, 6.24)	
Romine, K.G.	Surgeon Overall	92	84	1	1.19	3.44	1.07	(0.03, 5.94)	
	O'Connor Hospital	55	52	0	0.00	2.86	0.00	(0.00, 7.64)	
	San Jose Medical Center	37	32	1	3.13	4.38	2.21	(0.06, 12.25)	
Rooney, John P.	Surgeon Overall	107	96	4	4.17	2.03	6.34	(1.72, 16.18)	
	Dameron Hospital	2	2	1	50.00	3.84	40.27	(1.02, 100.00)	
	St. Joseph's Medical Center of Stockton	105	94	3	3.19	1.99	4.95	(1.02, 14.41)	
Rosenburg, Jeffrey M.	Surgeon Overall	14	12	3	25.00	2.72	28.43	(5.84, 82.80)	Worse
	Palomar Medical Center	14	12	3	25.00	2.72	28.43	(5.84, 82.80)	Worse
Rossiter, Stephen J.	Surgeon Overall	618	515	5	0.97	1.76	1.70	(0.55, 3.96)	
	Mercy General Hospital	574	479	5	1.04	1.78	1.82	(0.59, 4.23)	
	Mercy San Juan Hospital	44	36	0	0.00	1.58	0.00	(0.00, 19.95)	
Sakopoulos, Andreas G.	Surgeon Overall	149	141	7	4.96	5.03	3.05	(1.22, 6.26)	
	Glendale Adventist Medical Center - Wilson Terrace	2	2	0	0.00	2.94	0.00	(0.00, 100.00)	
	Glendale Memorial Hospital and Health Center	28	28	1	3.57	5.08	2.17	(0.05, 12.06)	
	St. Helena Hospital	119	111	6	5.41	5.06	3.30	(1.21, 7.17)	
Salem, Fakhri M.	Surgeon Overall	139	116	6	5.17	3.61	4.43	(1.62, 9.61)	
	Scripps Mercy Hospital	138	115	6	5.22	3.61	4.47	(1.63, 9.68)	
	Sharp Chula Vista Medical Center	1	1	0	0.00	3.29	0.00	(0.00, 100.00)	
Saxena, Naresh C.	Surgeon Overall	87	87	3	3.45	3.73	2.86	(0.59, 8.33)	
	Granada Hills Community Hospital	25	25	0	0.00	5.22	0.00	(0.00, 8.71)	
	Valley Presbyterian Hospital	62	62	3	4.84	3.13	4.78	(0.98, 13.92)	
Schuch, Douglas R.	Surgeon Overall	355	305	5	1.64	2.92	1.73	(0.56, 4.03)	
	Sutter Memorial Hospital	355	305	5	1.64	2.92	1.73	(0.56, 4.03)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Schwartz, Daniel S.	Surgeon Overall	76	63	4	6.35	2.94	6.67	(1.81, 17.01)	
	Centinela Hospital Medical Center	19	15	2	13.33	2.95	13.96	(1.68, 50.24)	
	Citrus Valley Medical Center - IC Campus	31	28	2	7.14	3.94	5.60	(0.68, 20.15)	
	Huntington Memorial Hospital	6	4	0	0.00	0.62	0.00	(0.00, 100.00)	
	Los Angeles Co USC Medical Center	14	12	0	0.00	1.99	0.00	(0.00, 47.61)	
	Methodist Hospital of Southern California	1	1	0	0.00	1.15	0.00	(0.00, 100.00)	
	USC University Hospital	5	3	0	0.00	1.09	0.00	(0.00, 100.00)	
Schwartz, Steven M.	Surgeon Overall	159	135	11	8.15	3.11	8.09	(4.02, 14.42)	Worse
	Good Samaritan Hospital - San Jose	113	96	8	8.33	2.97	8.69	(3.74, 17.05)	Worse
	O'Connor Hospital	33	27	2	7.41	2.58	8.88	(1.07, 31.97)	
	San Jose Medical Center	13	12	1	8.33	5.50	4.69	(0.12, 26.01)	
Sellami, Mohammed	Surgeon Overall	139	138	7	5.07	3.14	4.99	(2.00, 10.24)	
	Good Samaritan Hospital - Los Angeles	139	138	7	5.07	3.14	4.99	(2.00, 10.24)	
Shankar, Kuppe G.	Surgeon Overall	231	187	4	2.14	2.52	2.63	(0.71, 6.70)	
	Rideout Memorial Hospital	205	163	4	2.45	2.37	3.21	(0.87, 8.18)	
	Sutter Memorial Hospital	26	24	0	0.00	3.54	0.00	(0.00, 13.38)	
Sharma, Sanjeev K.	Surgeon Overall	157	121	6	4.96	4.26	3.60	(1.32, 7.81)	
	Dameron Hospital	111	85	6	7.06	4.83	4.51	(1.65, 9.79)	
	St. Joseph's Medical Center of Stockton	46	36	0	0.00	2.90	0.00	(0.00, 10.90)	
Sheppard, Barry B.	Surgeon Overall	48	38	0	0.00	6.27	0.00	(0.00, 4.77)	
	Mills-Peninsula Health Center	48	38	0	0.00	6.27	0.00	(0.00, 4.77)	
Shuman, Robert L.	Surgeon Overall	63	56	4	7.14	3.76	5.87	(1.59, 14.98)	
	Long Beach Memorial Medical Center	63	56	4	7.14	3.76	5.87	(1.59, 14.98)	
Silva, Raymond	Surgeon Overall	98	88	4	4.55	3.50	4.01	(1.09, 10.23)	
	Good Samaritan Hospital - San Jose	79	69	3	4.35	3.46	3.88	(0.80, 11.30)	
	O'Connor Hospital	16	16	0	0.00	2.34	0.00	(0.00, 30.30)	
	San Jose Medical Center	3	3	1	33.33	10.60	9.72	(0.25, 53.94)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Sintek, Colleen F.	Surgeon Overall	62	37	1	2.70	2.54	3.29	(0.08, 18.28)	
	Kaiser Foundation Hospital (Sunset Los Angeles)	62	37	1	2.70	2.54	3.29	(0.08, 18.28)	
Skow, James R.	Surgeon Overall	106	93	2	2.15	2.74	2.43	(0.29, 8.73)	
	French Hospital Medical Center	26	20	0	0.00	2.45	0.00	(0.00, 23.15)	
	Marian Medical Center	47	43	1	2.33	2.74	2.62	(0.07, 14.55)	
	Sierra Vista Regional Medical Center	33	30	1	3.33	2.93	3.52	(0.09, 19.53)	
Slachman, Frank N.	Surgeon Overall	433	261	3	1.15	2.40	1.48	(0.30, 4.30)	
	Mercy General Hospital	333	193	3	1.55	2.56	1.87	(0.39, 5.46)	
	Mercy San Juan Hospital	100	68	0	0.00	1.95	0.00	(0.00, 8.56)	
Smith, Larry H.	Surgeon Overall	149	115	8	6.96	4.26	5.04	(2.17, 9.90)	
	Santa Rosa Memorial Hospital	149	115	8	6.96	4.26	5.04	(2.17, 9.90)	
Soltero, Michael J.	Surgeon Overall	185	143	8	5.59	3.89	4.44	(1.91, 8.72)	
	Encino Tarzana Regional Medical Center	8	5	0	0.00	2.54	0.00	(0.00, 89.61)	
	Northridge Hospital Medical Center	83	65	4	6.15	3.73	5.10	(1.38, 13.01)	
	Providence Holy Cross Medical Center	73	58	2	3.45	3.69	2.89	(0.35, 10.40)	
	West Hills Regional Medical Center	21	15	2	13.33	5.85	7.05	(0.85, 25.36)	
Sommerhaug, Rolf G.	Surgeon Overall	231	163	5	3.07	2.73	3.48	(1.13, 8.09)	
	John Muir Medical Center	70	47	3	6.38	2.22	8.88	(1.82, 25.86)	
	Mt. Diablo Medical Center	160	116	2	1.72	2.93	1.82	(0.22, 6.55)	
	San Ramon Regional Medical Center	1	0	.	.	.	.		Not Applicable
Soto-Velasco, Jose M.	Surgeon Overall	43	37	3	8.11	2.95	8.50	(1.75, 24.75)	
	Bakersfield Memorial Hospital	2	2	1	50.00	4.70	32.86	(0.83, 100.00)	
	San Joaquin Community Hospital	41	35	2	5.71	2.85	6.20	(0.75, 22.32)	
Spowart, Gregory S.	Surgeon Overall	264	226	7	3.10	2.72	3.51	(1.41, 7.22)	
	Salinas Valley Memorial Hospital	264	226	7	3.10	2.72	3.51	(1.41, 7.22)	
Stahl, Richard D.	Surgeon Overall	197	149	6	4.03	3.96	3.15	(1.15, 6.82)	
	Scripps Memorial Hospital - La Jolla	197	149	6	4.03	3.96	3.15	(1.15, 6.82)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Stanten, Russell D.	Surgeon Overall	131	109	4	3.67	3.08	3.69	(1.00, 9.40)	
	Alta Bates Summit Medical Center - Summit Campus	101	83	2	2.41	2.57	2.89	(0.35, 10.41)	
	Doctors Medical Center - San Pablo Campus	30	26	2	7.69	4.68	5.08	(0.61, 18.27)	
Starnes, Vaughn A.	Surgeon Overall	232	133	7	5.26	2.58	6.29	(2.53, 12.95)	
	Huntington Memorial Hospital	69	42	4	9.52	2.24	13.14	(3.57, 33.52)	Worse
	Methodist Hospital of Southern California	3	3	0	0.00	3.11	0.00	(0.00, 100.00)	
	USC University Hospital	156	84	2	2.38	2.50	2.93	(0.36, 10.60)	
	White Memorial Medical Center	4	4	1	25.00	7.04	10.97	(0.28, 60.90)	
Stefanacci, Paul R.	Surgeon Overall	191	178	7	3.93	3.20	3.80	(1.52, 7.80)	
	Community Medical Center - Fresno	3	3	0	0.00	15.58	0.00	(0.00, 24.31)	
	Fresno Heart Hospital	7	7	0	0.00	1.28	0.00	(0.00, 100.00)	
	St. Agnes Medical Center	181	168	7	4.17	3.06	4.21	(1.69, 8.65)	
Stein, Alexander G.	Surgeon Overall	179	152	7	4.61	4.90	2.90	(1.16, 5.96)	
	Lakewood Regional Medical Center	2	1	0	0.00	1.99	0.00	(0.00, 100.00)	
	Long Beach Memorial Medical Center	11	10	0	0.00	1.18	0.00	(0.00, 96.58)	
	Los Angeles Co Harbor - UCLA Medical Center	15	13	0	0.00	3.15	0.00	(0.00, 27.76)	
	St. Mary Medical Center	151	128	7	5.47	5.39	3.13	(1.26, 6.43)	
Sterling-Scott, Rosa P.	Surgeon Overall	3	3	0	0.00	3.18	0.00	(0.00, 100.00)	
	Brotman Medical Center	3	3	0	0.00	3.18	0.00	(0.00, 100.00)	
Stewart, Robert D.	Surgeon Overall	345	296	9	3.04	4.24	2.22	(1.01, 4.19)	
	Community Medical Center - Fresno	101	84	3	3.57	5.93	1.86	(0.38, 5.42)	
	Fresno Heart Hospital	16	14	0	0.00	3.42	0.00	(0.00, 23.73)	
	San Antonio Community Hospital	10	10	0	0.00	2.69	0.00	(0.00, 42.31)	
	St. Agnes Medical Center	218	188	6	3.19	3.63	2.72	(0.99, 5.89)	
Stoneburner, John M.	Surgeon Overall	174	124	2	1.61	3.36	1.49	(0.18, 5.35)	
	Little Company of Mary Hospital	50	32	1	3.13	3.37	2.86	(0.07, 15.90)	
	St. Mary Medical Center	1	1	0	0.00	6.00	0.00	(0.00, 100.00)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Stoneburner, John M.	Torrance Memorial Medical Center	123	91	1	1.10	3.32	1.02	(0.03, 5.68)	
Suda, Richard W.	Surgeon Overall	148	125	4	3.20	2.08	4.77	(1.29, 12.16)	
	Glendale Adventist Medical Center - Wilson Terrace	2	2	0	0.00	5.53	0.00	(0.00, 100.00)	
	Glendale Memorial Hospital and Health Center	146	123	4	3.25	2.02	4.98	(1.35, 12.70)	
Swanson, Michael J.	Surgeon Overall	64	53	2	3.77	3.59	3.25	(0.39, 11.70)	
	Kaweah Delta Hospital	64	53	2	3.77	3.59	3.25	(0.39, 11.70)	
Sweezer, William P.	Surgeon Overall	91	75	7	9.33	3.27	8.82	(3.53, 18.10)	Worse
	John Muir Medical Center	3	2	1	50.00	13.26	11.66	(0.29, 64.70)	
	Mt. Diablo Medical Center	85	70	6	8.57	3.10	8.53	(3.12, 18.51)	Worse
	San Ramon Regional Medical Center	3	3	0	0.00	0.53	0.00	(0.00, 100.00)	
Sywak, Alexander	Surgeon Overall	85	80	3	3.75	4.37	2.65	(0.54, 7.72)	
	O'Connor Hospital	53	49	2	4.08	4.36	2.89	(0.35, 10.41)	
	San Jose Medical Center	30	29	1	3.45	4.17	2.55	(0.06, 14.18)	
	Washington Hospital - Fremont	2	2	0	0.00	7.58	0.00	(0.00, 74.96)	
Talieh, Yahya J.	Surgeon Overall	153	149	3	2.01	2.69	2.31	(0.47, 6.72)	
	Doctors Medical Center - Modesto Campus	18	18	2	11.11	4.57	7.52	(0.91, 27.05)	
	Memorial Medical Center of Modesto	135	131	1	0.76	2.44	0.97	(0.02, 5.37)	
Tang, Eddie	Surgeon Overall	89	75	6	8.00	6.39	3.87	(1.41, 8.39)	
	California Pacific Medical Center - Pacific Campus	46	41	3	7.32	6.78	3.34	(0.69, 9.71)	
	Marin General Hospital	11	10	1	10.00	5.98	5.17	(0.13, 28.68)	
	St. Mary's Medical Center, San Francisco	32	24	2	8.33	5.90	4.37	(0.53, 15.73)	
Tedesco, Dominic J.	Surgeon Overall	213	190	4	2.11	2.13	3.05	(0.83, 7.78)	
	Community Memorial Hospital of San Buenaventura	213	190	4	2.11	2.13	3.05	(0.83, 7.78)	
Thibault, William N.	Surgeon Overall	321	283	3	1.06	2.11	1.56	(0.32, 4.53)	

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Thibault, William N.	Mission Hospital Regional Medical Center	308	272	3	1.10	2.10	1.63	(0.33, 4.74)	
	Saddleback Memorial Medical Center	4	4	0	0.00	2.90	0.00	(0.00, 97.88)	
	Western Medical Center - Santa Ana	9	7	0	0.00	2.08	0.00	(0.00, 78.14)	
Thistlethwaite, Patricia A.	Surgeon Overall	35	30	3	10.00	8.45	3.66	(0.75, 10.65)	
	UCSD Medical Center - La Jolla	11	8	2	25.00	12.55	6.16	(0.74, 22.17)	
	UCSD Medical Center	24	22	1	4.55	6.97	2.02	(0.05, 11.20)	
Tobin, Hugh M.	Surgeon Overall	188	165	9	5.45	2.54	6.64	(3.02, 12.55)	
	Doctors Medical Center - Modesto Campus	185	162	9	5.56	2.54	6.77	(3.08, 12.80)	Worse
	Memorial Medical Center of Modesto	3	3	0	0.00	2.76	0.00	(0.00, 100.00)	
Toporoff, Bruce M.	Surgeon Overall	168	147	2	1.36	3.54	1.19	(0.14, 4.28)	
	St. John's Regional Medical Center	168	147	2	1.36	3.54	1.19	(0.14, 4.28)	
Tovar, Eduardo A.	Surgeon Overall	260	224	4	1.79	2.49	2.21	(0.60, 5.65)	
	Presbyterian Intercommunity Hospital	70	61	1	1.64	2.49	2.04	(0.05, 11.31)	
	St. Jude Medical Center	190	163	3	1.84	2.50	2.28	(0.47, 6.64)	
Trento, Alfredo	Surgeon Overall	212	110	1	0.91	1.91	1.47	(0.04, 8.18)	
	Cedars Sinai Medical Center	212	110	1	0.91	1.91	1.47	(0.04, 8.18)	
Trivedi, Rohitkumar R.	Surgeon Overall	226	177	6	3.39	5.50	1.90	(0.70, 4.13)	
	Pomona Valley Hospital Medical Center	226	177	6	3.39	5.50	1.90	(0.70, 4.13)	
Tseng, Elaine E.	Surgeon Overall	59	54	2	3.70	2.72	4.21	(0.51, 15.17)	
	UCSF Medical Center	59	54	2	3.70	2.72	4.21	(0.51, 15.17)	
Tyner, John J.	Surgeon Overall	133	90	2	2.22	2.30	2.99	(0.36, 10.76)	
	Scripps Green Hospital	88	56	1	1.79	2.10	2.63	(0.07, 14.58)	
	Scripps Mercy Hospital	45	34	1	2.94	2.62	3.47	(0.09, 19.25)	
Tzeng, Thomas S.	Surgeon Overall	308	286	20	6.99	3.79	5.69	(3.48, 8.81)	Worse
	Anaheim Memorial Medical Center	13	11	0	0.00	2.63	0.00	(0.00, 39.42)	
	Downey Regional Medical Center	65	63	4	6.35	3.89	5.03	(1.37, 12.90)	
	Presbyterian Intercommunity Hospital	97	89	4	4.49	4.46	3.11	(0.85, 7.97)	
	St. Jude Medical Center	97	87	8	9.20	3.24	8.75	(3.78, 17.27)	Worse

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Table 5: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Tzeng, Thomas S.	UC Irvine Medical Center	15	15	2	13.33	2.21	18.63	(2.26, 67.45)	
	West Anaheim Medical Center	15	15	2	13.33	3.56	11.55	(1.40, 41.80)	
	Western Medical Center - Santa Ana	2	2	0	0.00	1.87	0.00	(0.00, 100.00)	
	Western Medical Center Hospital - Anaheim	4	4	0	0.00	9.98	0.00	(0.00, 28.56)	
Uppal, Kanti M.	Surgeon Overall	24	19	0	0.00	2.79	0.00	(0.00, 21.44)	
	Sequoia Hospital	24	19	0	0.00	2.79	0.00	(0.00, 21.44)	
Vazquez, Demetrio J.	Surgeon Overall	221	190	11	5.79	3.59	4.99	(2.48, 8.90)	
	Scripps Memorial Hospital - La Jolla	221	190	11	5.79	3.59	4.99	(2.48, 8.90)	
Versteeg, Frank A.	Surgeon Overall	21	18	1	5.56	2.12	8.09	(0.20, 44.92)	
	Glendale Adventist Medical Center - Wilson Terrace	20	17	1	5.88	2.03	8.95	(0.23, 49.71)	
	Methodist Hospital of Southern California	1	1	0	0.00	3.68	0.00	(0.00, 100.00)	
Vunnamadala, Syam P.	Surgeon Overall	117	106	8	7.55	2.74	8.51	(3.66, 16.70)	Worse
	Anaheim Memorial Medical Center	47	41	3	7.32	2.71	8.33	(1.71, 24.26)	
	Fountain Valley Regional Hospital	11	11	1	9.09	2.73	10.30	(0.26, 57.20)	
	West Anaheim Medical Center	12	12	2	16.67	3.99	12.90	(1.56, 46.44)	
	Western Medical Center Hospital - Anaheim	47	42	2	4.76	2.42	6.10	(0.74, 21.94)	
Wang, Nan	Surgeon Overall	330	210	0	0.00	2.71	0.00	(0.00, 2.00)	Better
	Loma Linda University Medical Center	325	206	0	0.00	2.70	0.00	(0.00, 2.05)	Better
	Riverside Community Hospital	5	4	0	0.00	3.37	0.00	(0.00, 84.39)	
Waterford, Robert R.	Surgeon Overall	25	23	0	0.00	2.07	0.00	(0.00, 23.90)	
	St. Agnes Medical Center	25	23	0	0.00	2.07	0.00	(0.00, 23.90)	
West, Phillip N.	Surgeon Overall	255	209	4	1.91	3.03	1.96	(0.53, 4.99)	
	Santa Barbara Cottage Hospital	255	209	4	1.91	3.03	1.96	(0.53, 4.99)	
Westerman, G. Richard	Surgeon Overall	238	176	4	2.27	3.32	2.11	(0.57, 5.39)	
	Santa Barbara Cottage Hospital	238	176	4	2.27	3.32	2.11	(0.57, 5.39)	
Wilson, Joseph W.	Surgeon Overall	257	209	3	1.44	3.67	1.21	(0.25, 3.52)	

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Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Wilson, Joseph W.	Desert Regional Medical Center	1	0	.	.	.	.		Not Applicable
	Eisenhower Memorial Hospital	256	209	3	1.44	3.67	1.21	(0.25, 3.52)	
Wood, Michael K.	Surgeon Overall	78	55	2	3.64	2.57	4.38	(0.53, 15.75)	
	Mills-Peninsula Health Center	78	55	2	3.64	2.57	4.38	(0.53, 15.75)	
Wood, Michael N.	Surgeon Overall	137	126	3	2.38	5.54	1.33	(0.27, 3.87)	
	San Antonio Community Hospital	137	126	3	2.38	5.54	1.33	(0.27, 3.87)	
Yacoubian, Vahe S.	Surgeon Overall	25	24	1	4.17	2.55	5.06	(0.13, 28.07)	
	Glendale Adventist Medical Center - Wilson Terrace	20	20	1	5.00	2.44	6.34	(0.16, 35.19)	
	Good Samaritan Hospital - Los Angeles	5	4	0	0.00	3.09	0.00	(0.00, 91.92)	
Yap, Alexander G.	Surgeon Overall	297	276	4	1.45	3.79	1.18	(0.32, 3.01)	Better
	California Pacific Medical Center - Pacific Campus	1	1	0	0.00	1.18	0.00	(0.00, 100.00)	
	Seton Medical Center	272	252	4	1.59	3.40	1.44	(0.39, 3.68)	
	St. Mary's Medical Center, San Francisco	24	23	0	0.00	8.21	0.00	(0.00, 6.01)	
Yasuda, Roderick K.	Surgeon Overall	177	152	8	5.26	3.92	4.15	(1.78, 8.14)	
	Northridge Hospital Medical Center	47	39	0	0.00	3.47	0.00	(0.00, 8.39)	
	Providence Holy Cross Medical Center	115	102	8	7.84	4.04	6.01	(2.58, 11.79)	
	West Hills Regional Medical Center	15	11	0	0.00	4.48	0.00	(0.00, 23.05)	
Yee, Edward S.	Surgeon Overall	9	8	0	0.00	4.29	0.00	(0.00, 33.09)	
	California Pacific Medical Center - Pacific Campus	2	2	0	0.00	4.35	0.00	(0.00, 100.00)	
	Marin General Hospital	6	6	0	0.00	4.27	0.00	(0.00, 44.34)	
	St. Mary's Medical Center, San Francisco	1	0	.	.	.	.		Not Applicable
Yokoyama,Taro	Surgeon Overall	399	339	12	3.54	3.56	3.07	(1.58, 5.34)	

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Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR) and 95% CI		Performance Rating*
State		**49,435**	**40,377**	**1,244**	**3.08**				
Yokoyama,Taro	Providence St. Joseph Medical Center	81	58	4	6.90	2.34	9.12	(2.48, 23.27)	
	St. Vincent Medical Center	318	281	8	2.85	3.82	2.30	(0.99, 4.53)	
Young, John A.	Surgeon Overall	60	47	0	0.00	3.67	0.00	(0.00, 6.58)	
	Palomar Medical Center	1	0	.	.	.	.		Not Applicable
	Tri - City Medical Center	59	47	0	0.00	3.67	0.00	(0.00, 6.58)	
Young, Joseph N.	Surgeon Overall	193	122	2	1.64	2.43	2.09	(0.25, 7.52)	
	UC Davis Medical Center	193	122	2	1.64	2.43	2.09	(0.25, 7.52)	
Yun, Kwok L.	Surgeon Overall	733	634	9	1.42	1.93	2.27	(1.04, 4.30)	
	Kaiser Foundation Hospital (Sunset Los Angeles)	733	634	9	1.42	1.93	2.27	(1.04, 4.30)	
Zalez, James P.	Surgeon Overall	21	19	0	0.00	2.21	0.00	(0.00, 27.09)	
	St. John's Hospital and Health Center	21	19	0	0.00	2.21	0.00	(0.00, 27.09)	
Zapolanski, Alex	Surgeon Overall	336	247	4	1.62	2.40	2.09	(0.57, 5.32)	
	California Pacific Medical Center - Pacific Campus	174	122	2	1.64	2.44	2.08	(0.25, 7.48)	
	Dominican Hospital	2	1	0	0.00	0.76	0.00	(0.00, 100.00)	
	Mills-Peninsula Health Center	50	38	0	0.00	2.35	0.00	(0.00, 12.74)	
	Seton Medical Center	105	81	2	2.47	2.47	3.09	(0.37, 11.13)	
	St. Mary's Medical Center, San Francisco	5	5	0	0.00	1.00	0.00	(0.00, 100.00)	
Zubiate, Pablo	Surgeon Overall	5	4	0	0.00	2.12	0.00	(0.00, 100.00)	
	Brotman Medical Center	2	2	0	0.00	1.15	0.00	(0.00, 100.00)	
	Centinela Hospital Medical Center	3	2	0	0.00	3.08	0.00	(0.00, 100.00)	
Zusman, Douglas R.	Surgeon Overall	218	163	7	4.29	4.53	2.93	(1.17, 6.02)	
	Hoag Memorial Hospital Presbyterian	218	163	7	4.29	4.53	2.93	(1.17, 6.02)	

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Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004

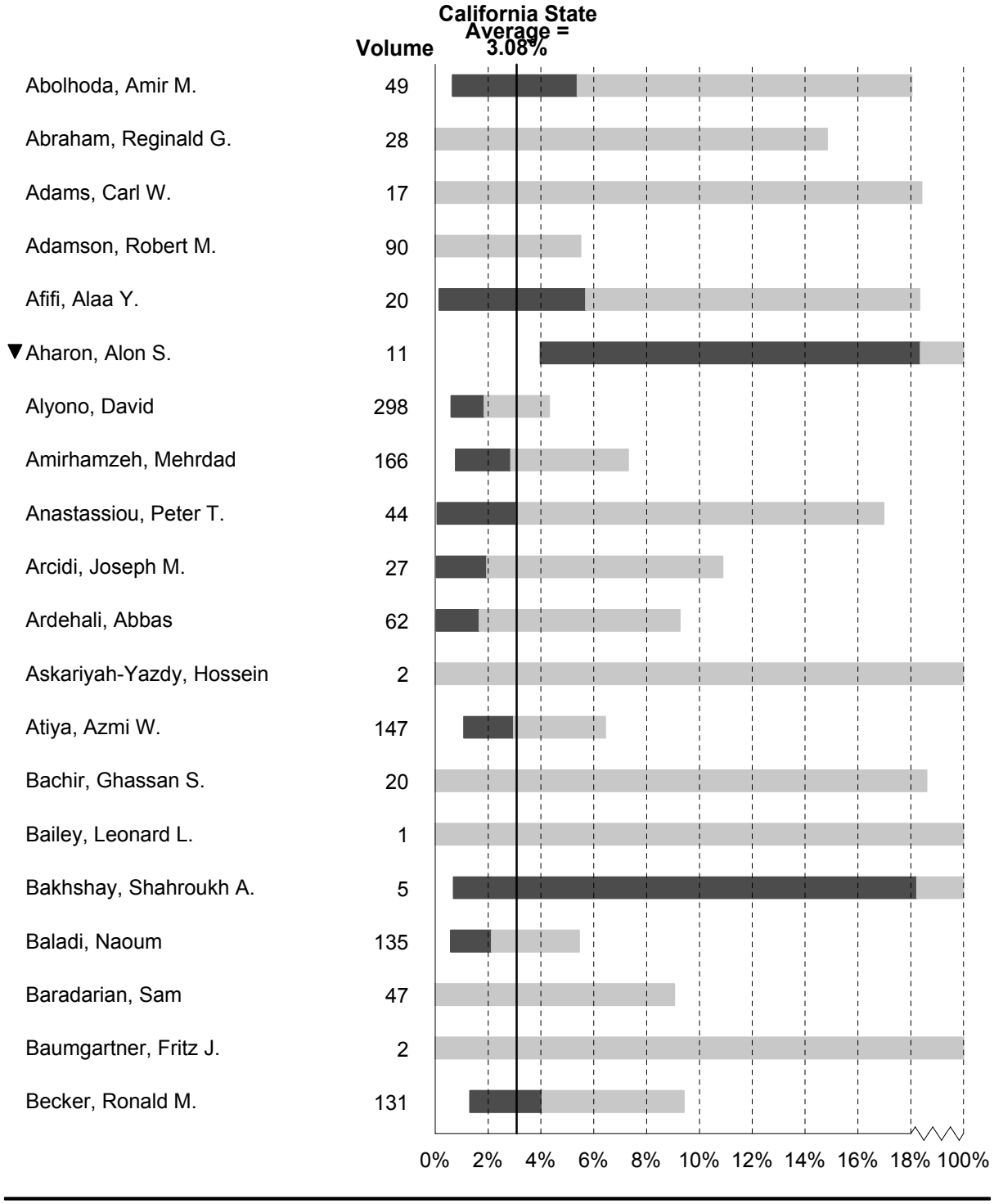


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

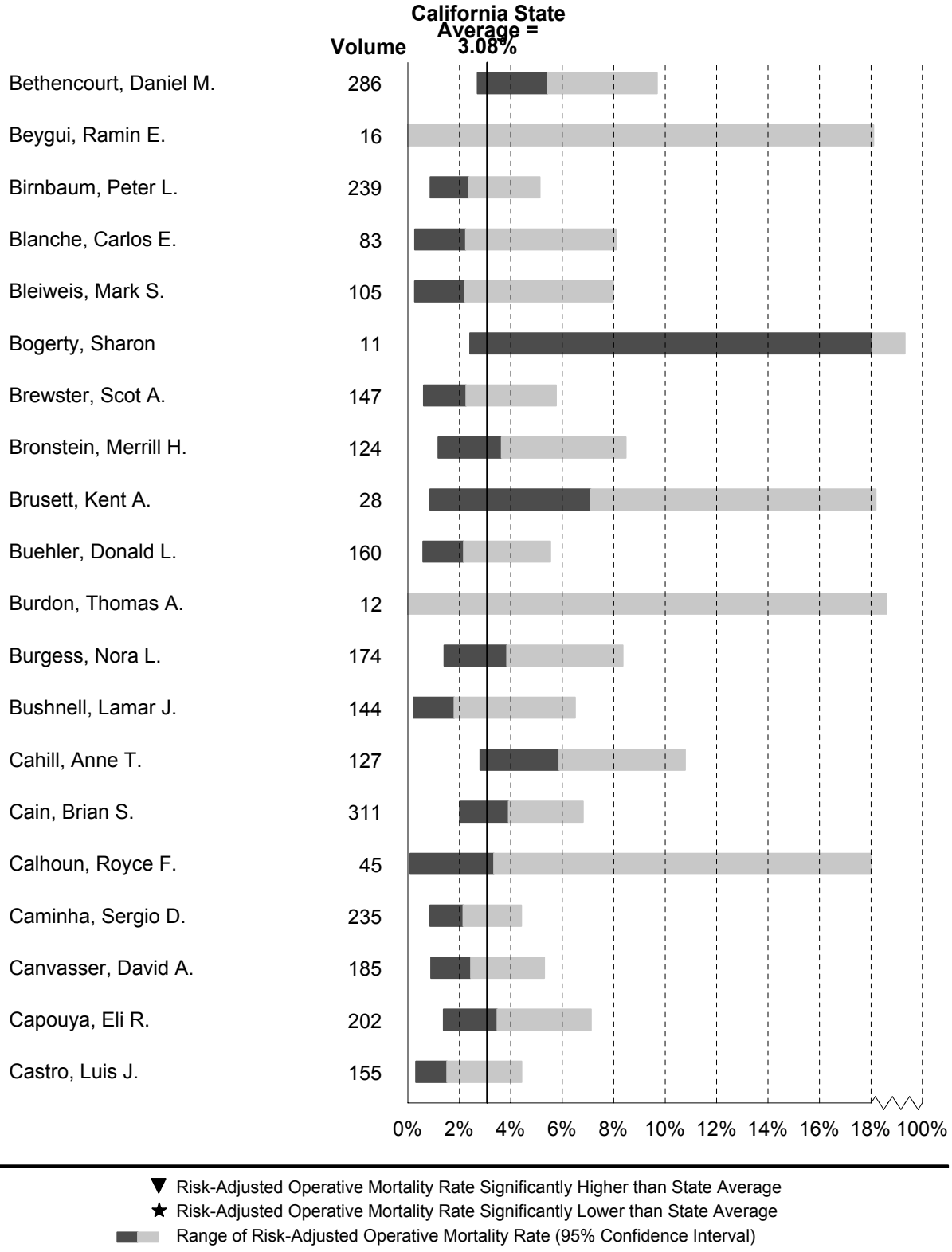


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

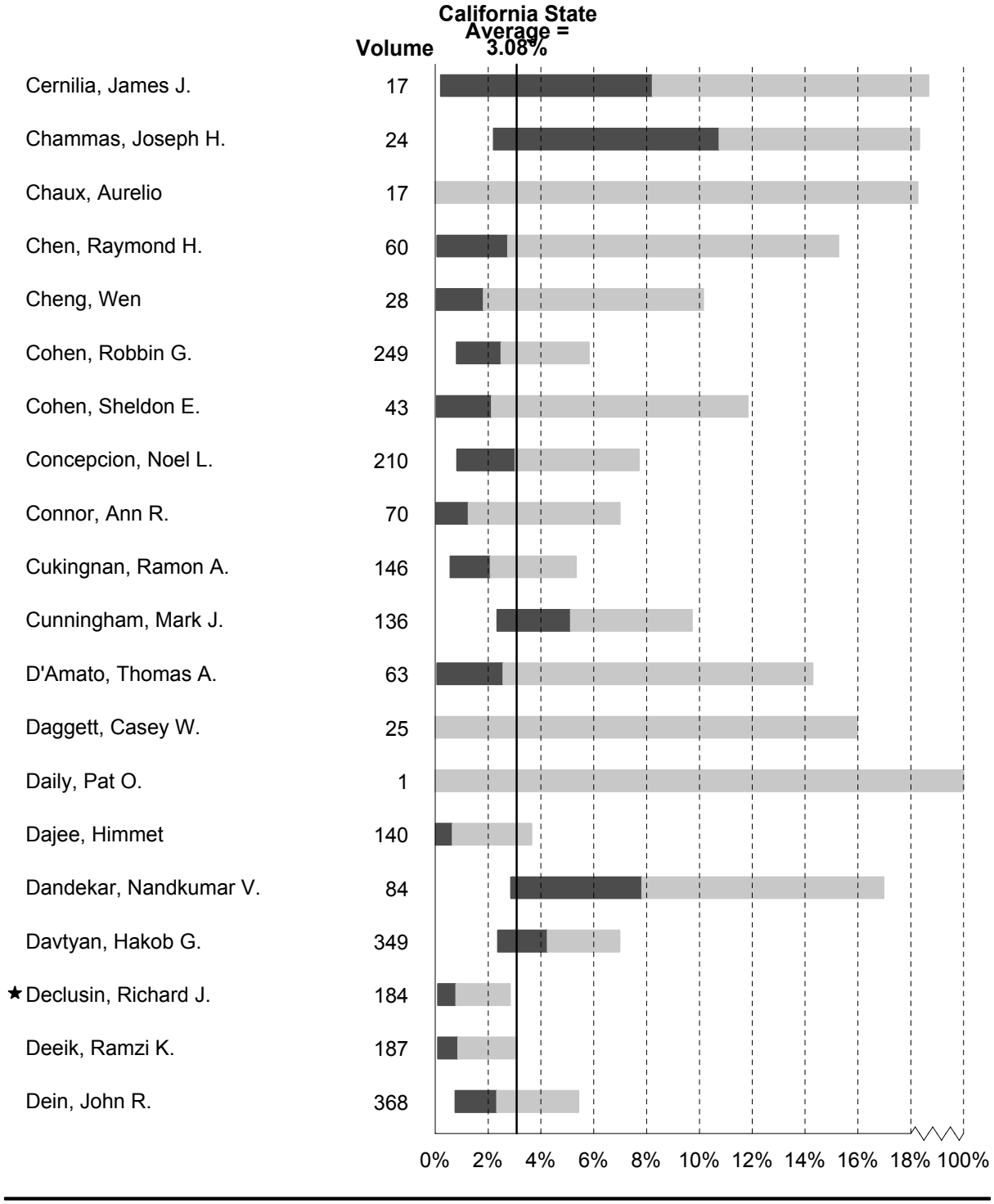


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

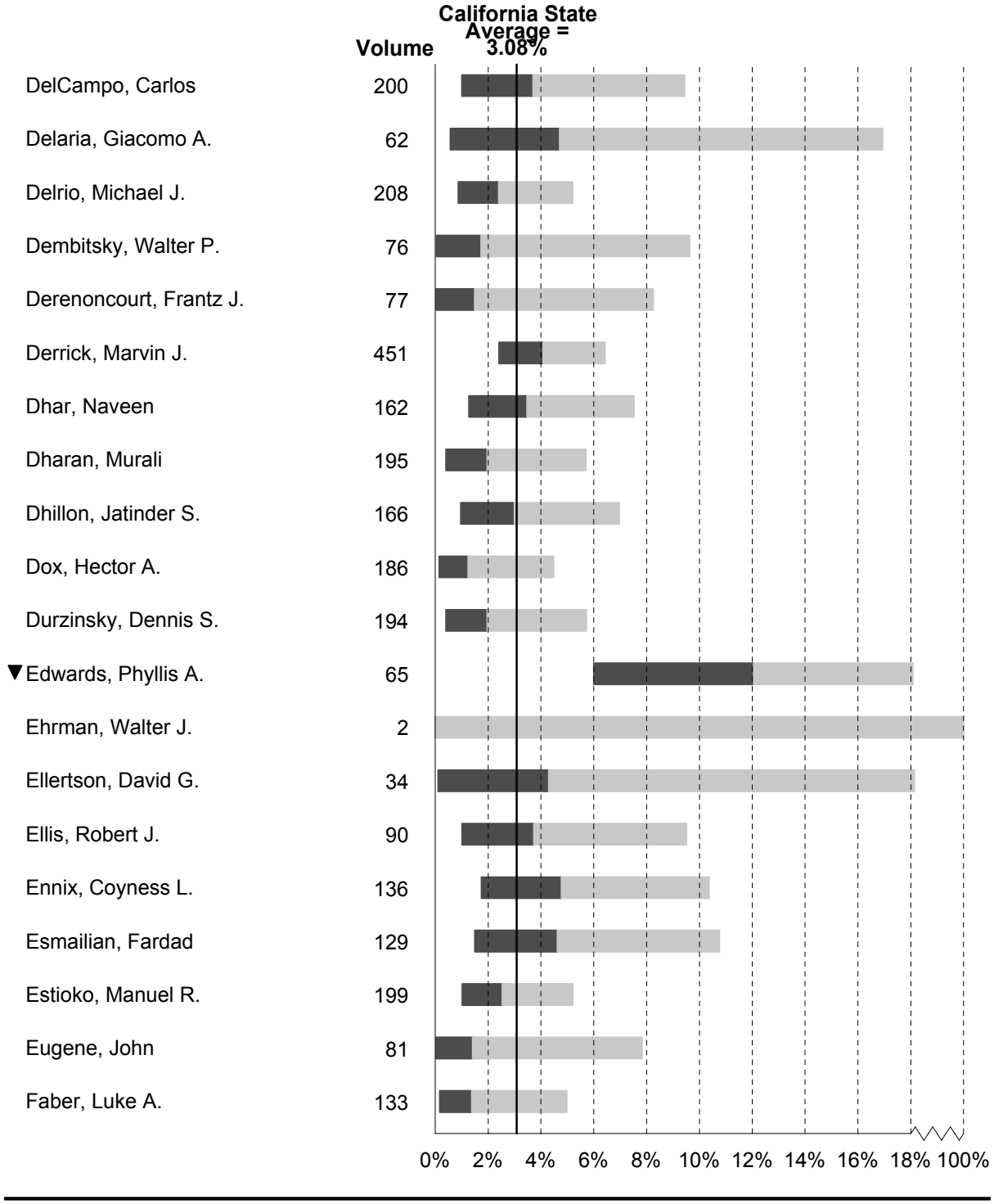


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

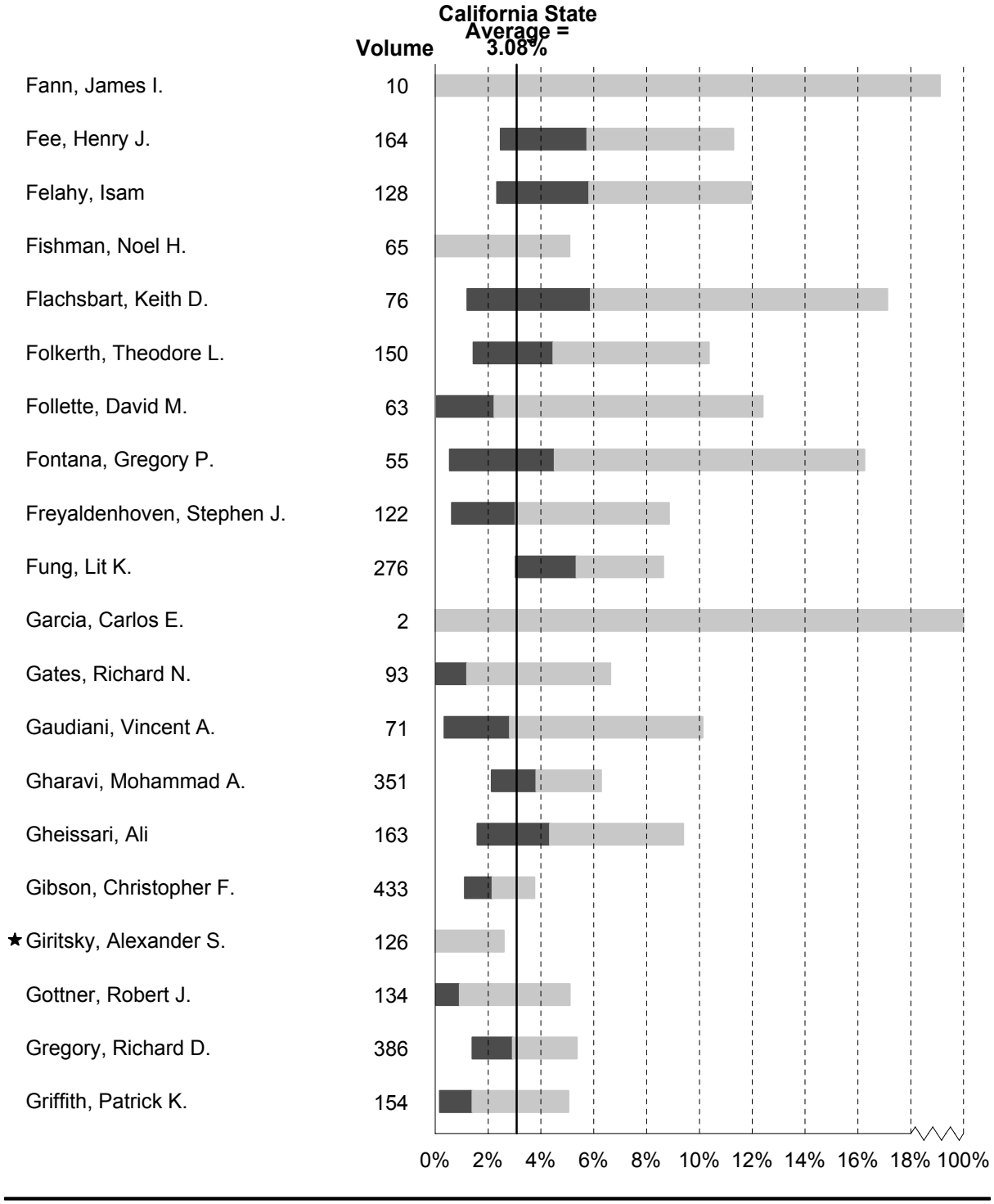


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

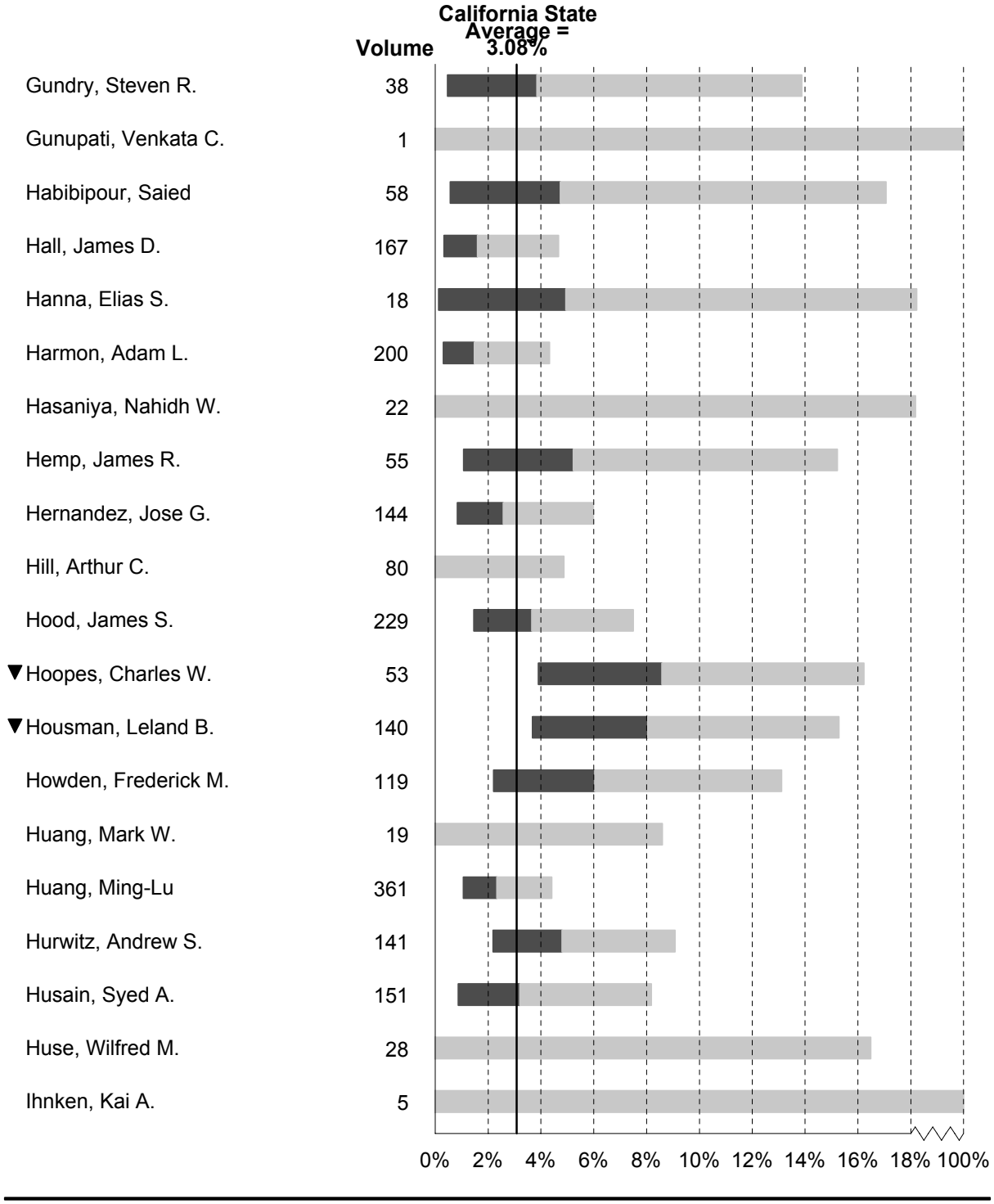


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

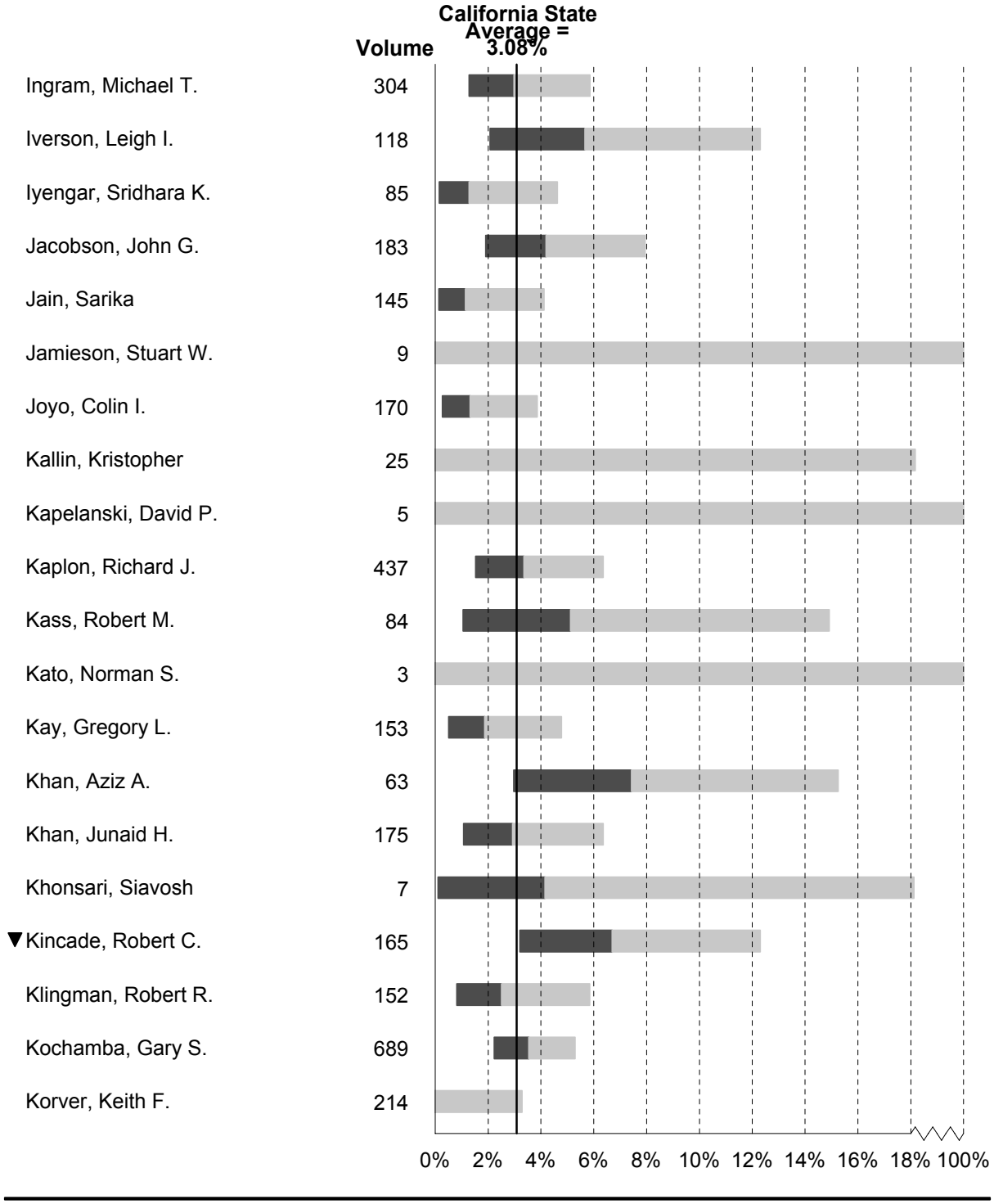


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

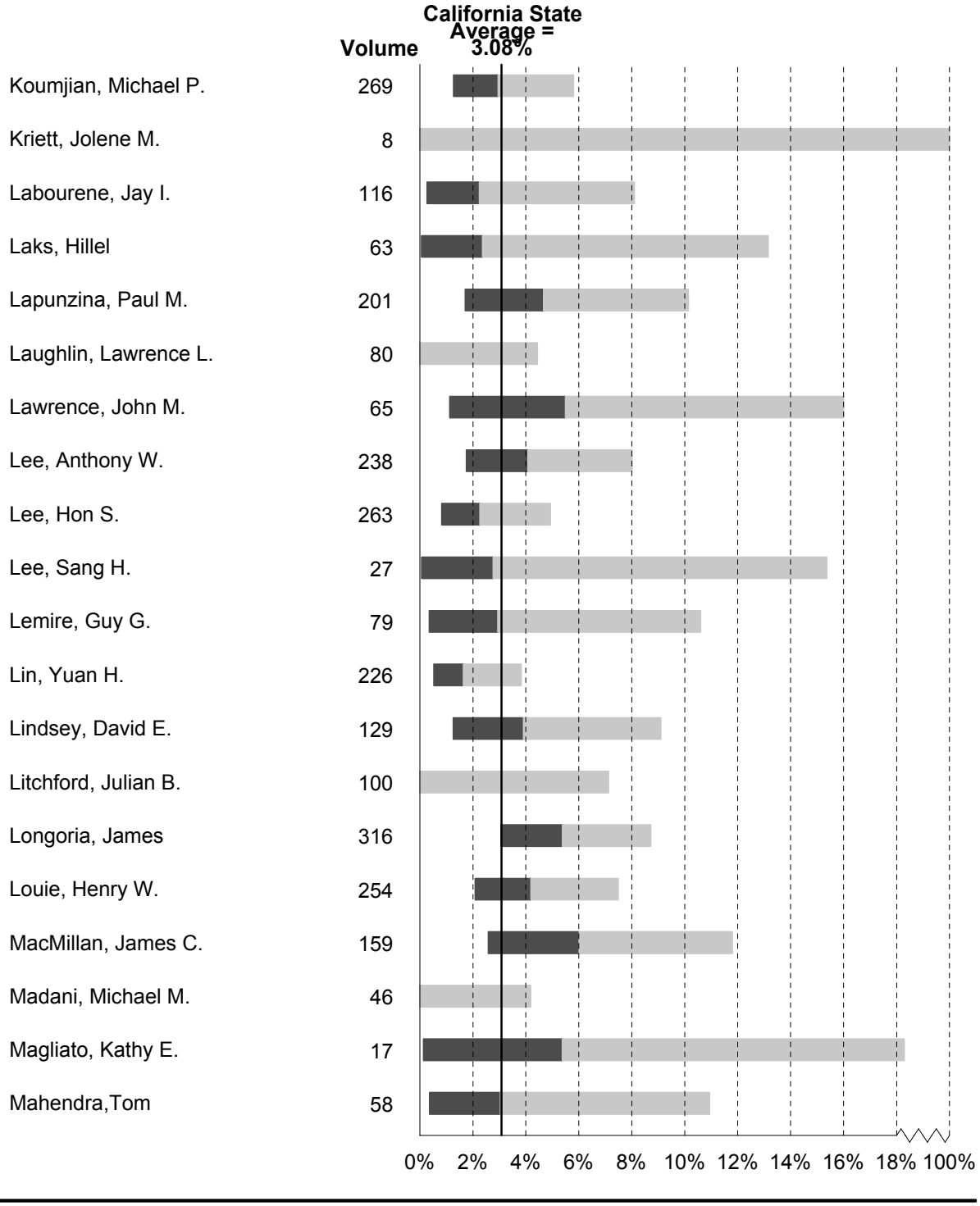


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

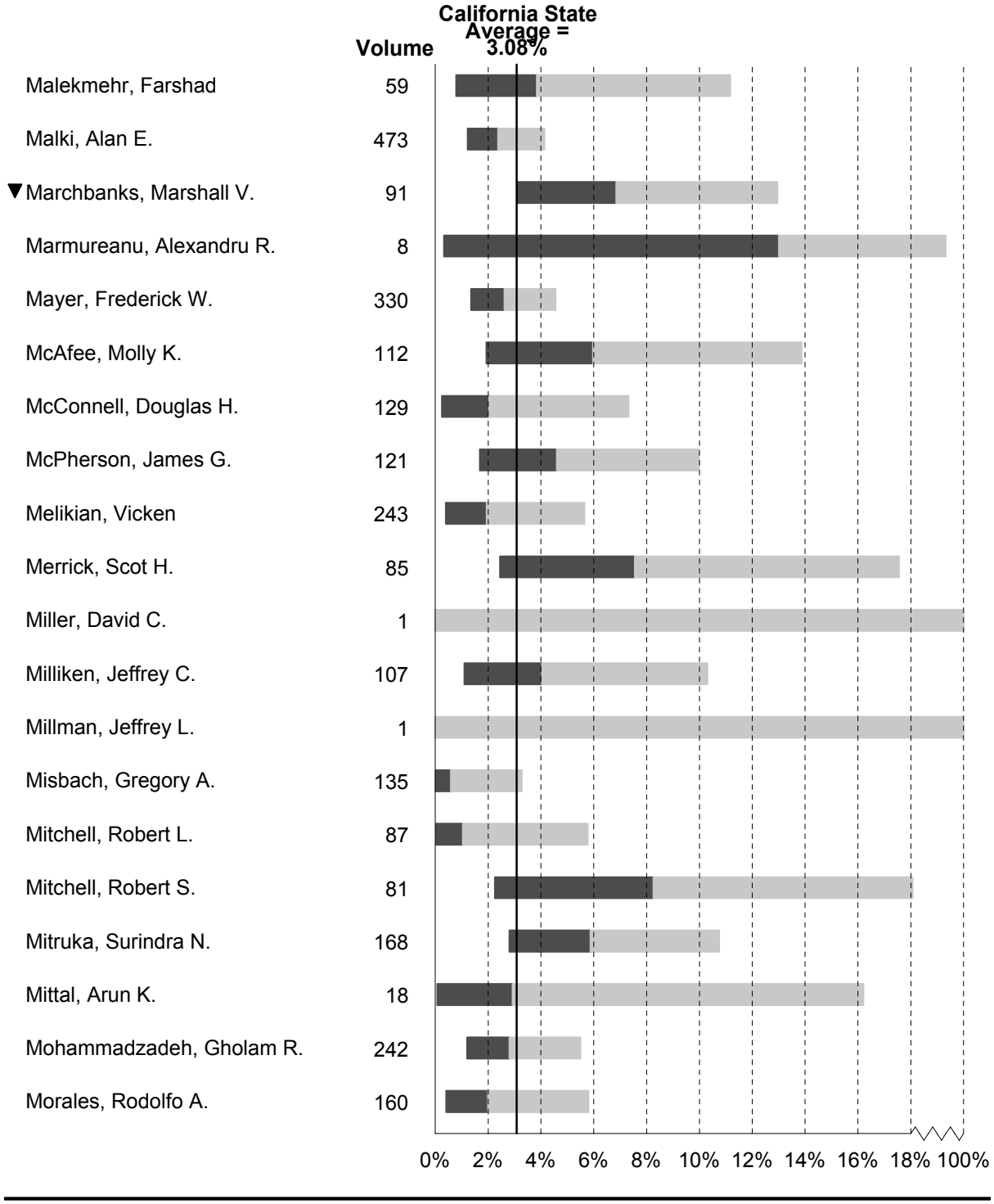


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

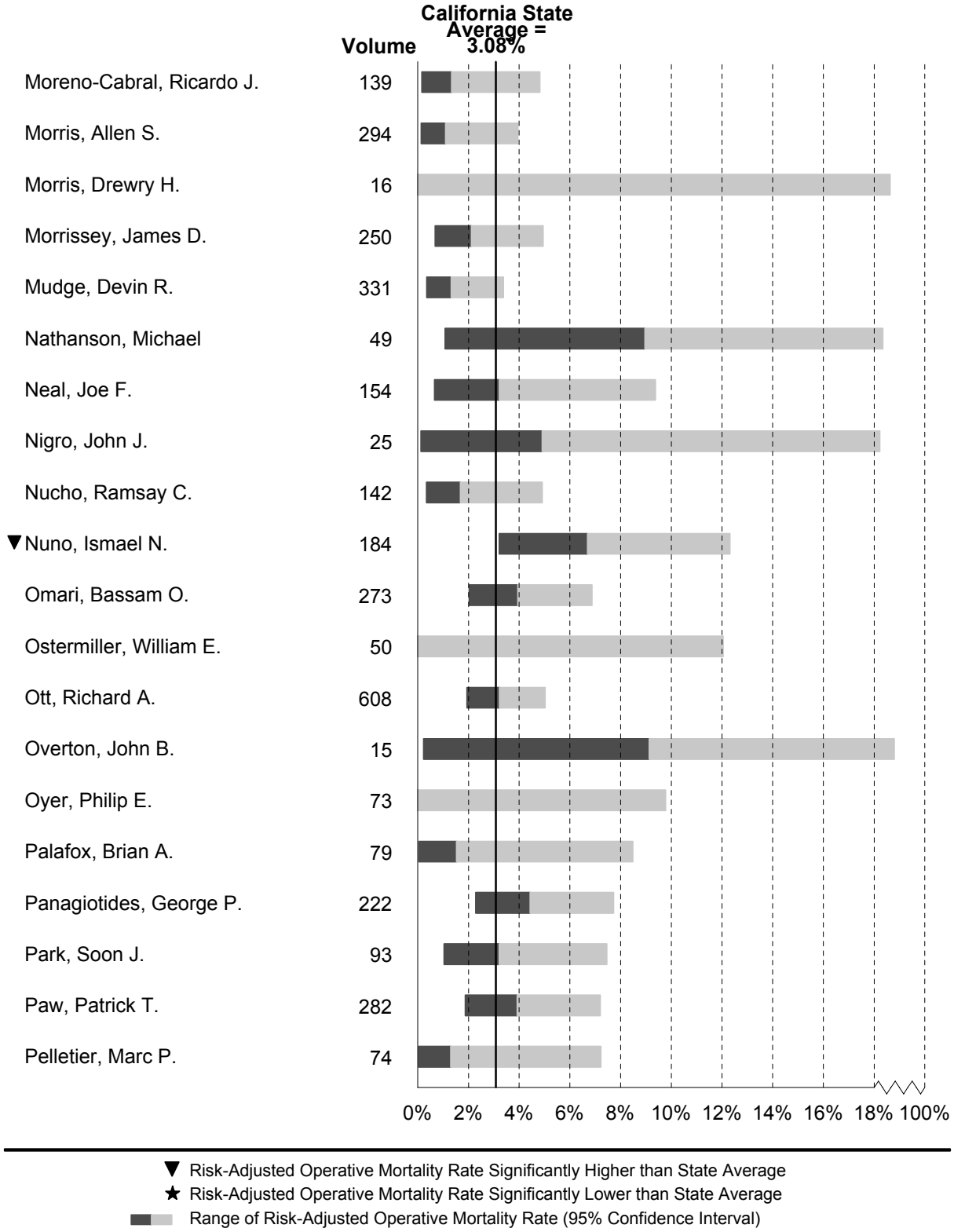


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

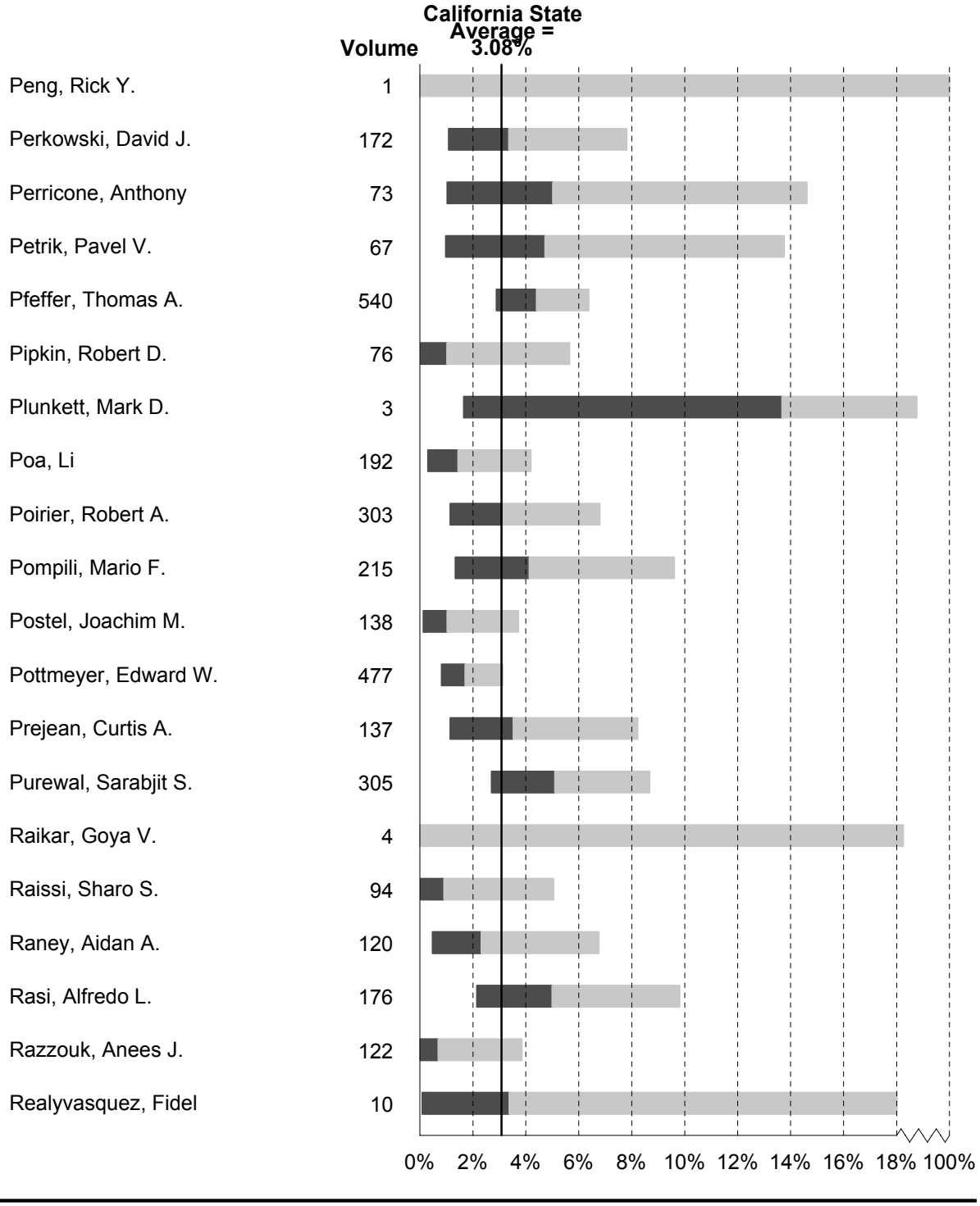


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

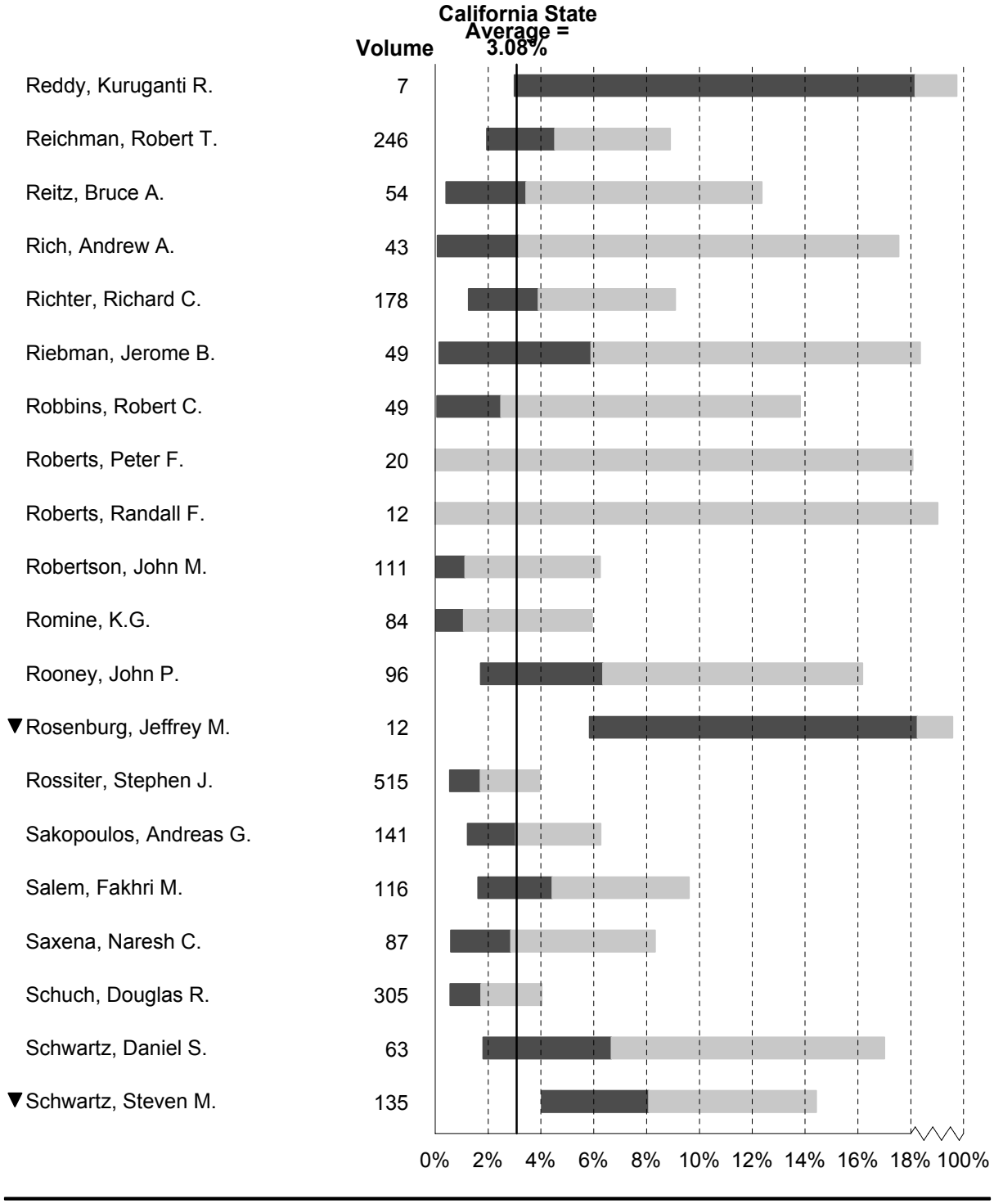


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

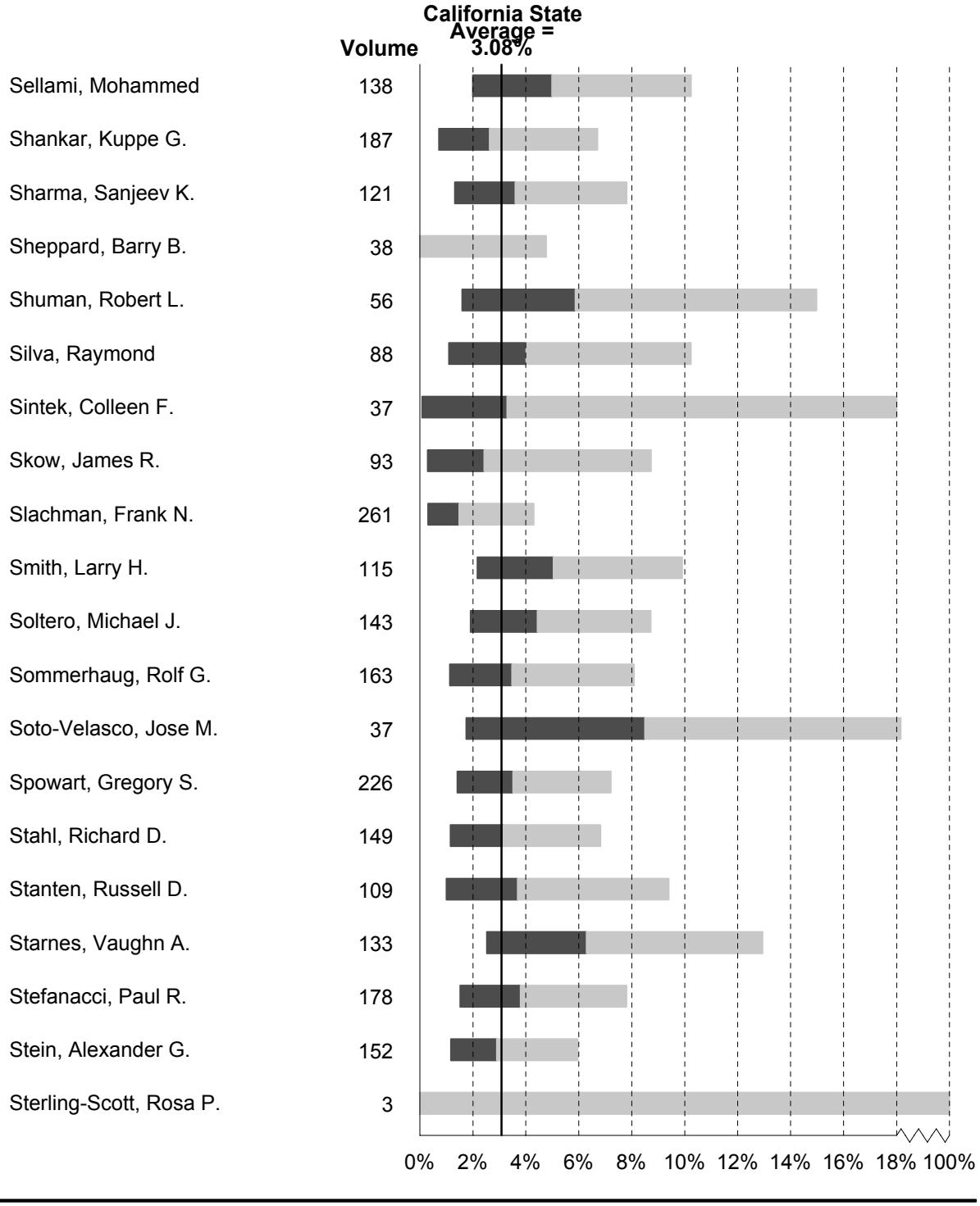


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

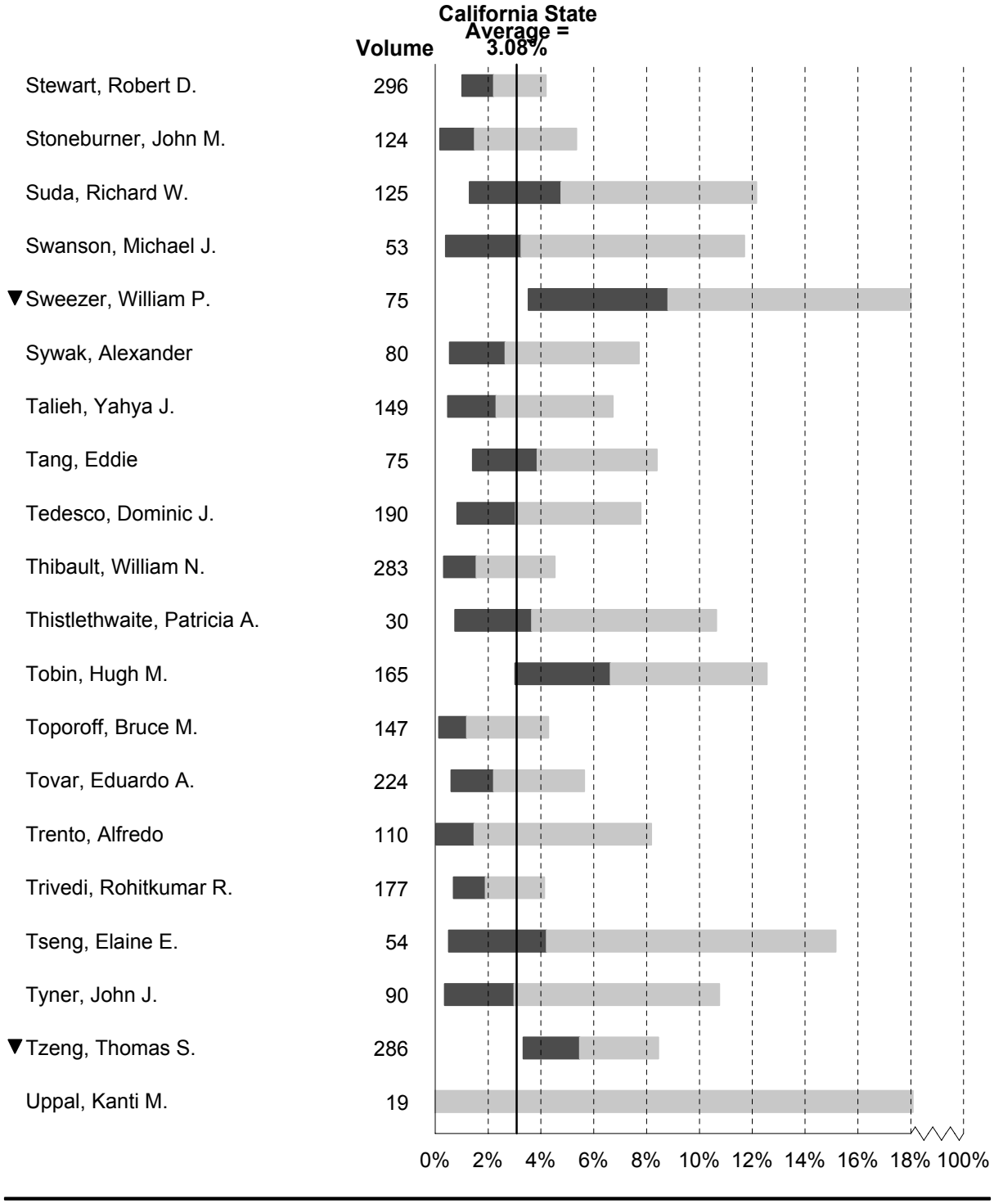


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)

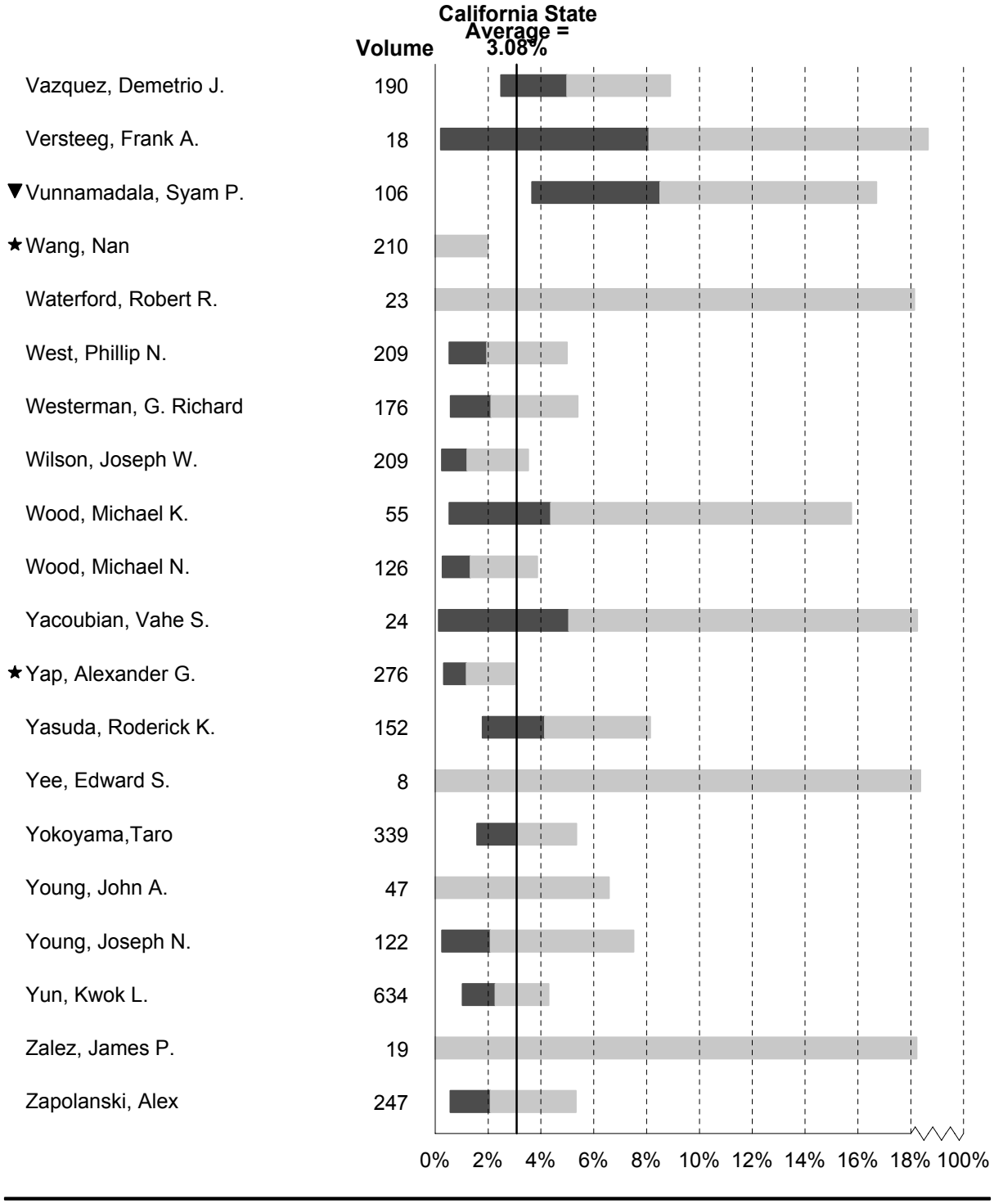
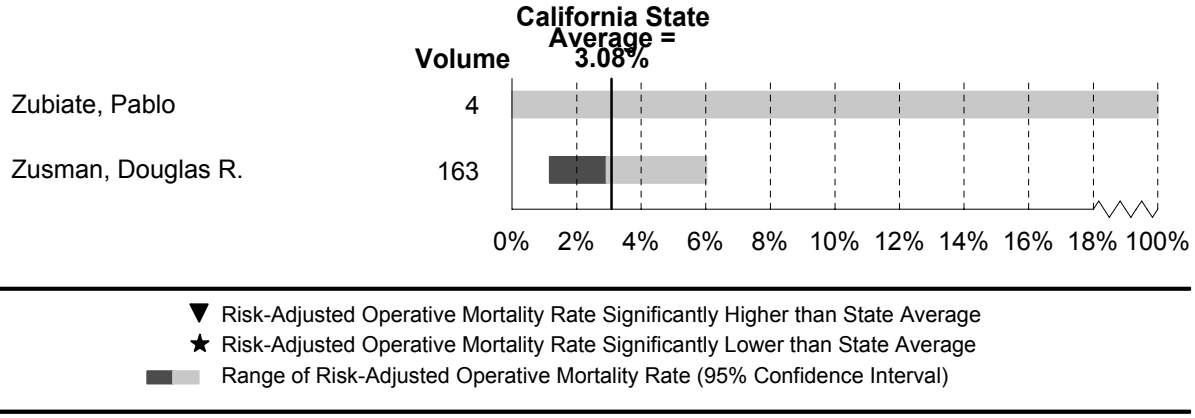


Figure 2: Surgeon Risk-Adjusted Operative Mortality Results, 2003-2004 (cont'd)



VI. 2003-2004 INTERNAL MAMMARY ARTERY USAGE BY HOSPITAL: A PROCESS MEASURE OF QUALITY

A widely accepted definition of healthcare quality regards quality as having three dimensions: process, structure, and outcomes.[12] In the past, OSHPD has focused on the outcome of mortality in its public reporting. Risk-adjusted mortality rates provide a benchmark for provider performance comparison and can be used for investigation of internal processes and structures that contribute to high rates. However, benchmarking processes of care provides a more immediate path to improvement in patient care since it involves measurement of the care patients actually receive. If diagnostic and therapeutic strategies with clear links to outcome are monitored, some quality problems can be detected long before demonstrable outcome differences occur.

In most cases of first-time isolated CABG surgery where the operative status is elective or urgent, the surgeon has the option of using the internal mammary artery (IMA, also known as the internal thoracic artery) The IMA and especially the left IMA is considered the preferred conduit for CABG surgery of the left anterior descending (LAD) coronary artery. A number of healthcare quality advocates recommend public reporting of IMA usage rates for CABG surgery.

Currently, the Leapfrog Evidence-Based Hospital Referral program endorses 80% hospital adherence to IMA use. The National Quality Forum does not endorse a specific rate but states that the goal is to raise the rate of hospitals with low utilization. The Society of Thoracic Surgeons states that the IMA should be given primary consideration in every CABG surgery patient.

Table 6 provides hospital results for IMA use for during 2003-2004. Only first-time isolated CABG surgeries, where the operative status is elective or urgent, are included for IMA usage computation. A low rating indicates that a hospital had less than 70.9% IMA utilization (2 standard deviations (0.095 x 1.96) below the hospital statewide average IMA usage rate of 89.56%). No high ratings were provided since there is no consensus on what constitutes an optimal rate of usage.

The clinical literature strongly supports use of the IMA to promote long-term graft patency and patient survival, but recent research also suggests a reduction in immediate, operative mortality associated with use of the internal mammary artery as opposed to saphenous vein revascularization[13]. Multivariable analyses performed by CCORP also confirmed use of the IMA as an independent predictor of operative survival for first-time isolated CABG surgery patients whose status was not emergent. In addition, there is a negative correlation between hospital risk-adjusted operative mortality rates (r=-0.14, p=0.13), and IMA usage rates which, while not significant, points in the expected causal direction, where hospitals with lower mortality rates have higher IMA usage rates on average.

[12] Donabedian A. Evaluating the Quality of Medical Care. The Milbank Quarterly, Vol 83, No.4, 2005 (pp. 691-729).

[13] Ferguson TB Jr, Coombs LP, Peterson ED. Internal thoracic artery grafting in the elderly patient undergoing coronary artery bypass grafting: room for process improvement? J Thoracic Cardiovascular Surgery 2002: 123(5): 869-80.

GUIDE TO INTERPRETING IMA USAGE RESULTS	
Isolated CABG surgeries	Includes only first-time isolated CABG surgeries where the operative status was elective or urgent. This number will generally be smaller than the total isolated CABG cases performed by the hospital.
IMA Usage Rate	The ratio of the number of CABG surgeries with IMA grafts (including left IMA, right IMA and bilateral IMA) and selected first-time isolated CABG cases multiplied by 100: Percent IMA use = (Number of IMA grafts used for first-time isolated CABG surgeries/Number of first-time isolated CABG cases) x 100.
Rating	A blank rating indicates that the IMA Usage Rate is acceptable. A Low rating indicates that the IMA Usage Rate for a hospital is less than 70.9%, i.e., two standard deviations (0.095 x 1.96) below the hospital statewide average IMA use rate (89.56%). No high ratings are provided since there is no consensus on what constitutes an optimal rate of usage.

Table 6: Hospital Results for Usage of the Internal Mammary Artery by Region, 2003-2004

Region	Hospital	Isolated CABG surgeries*	IMA Usage Rate	Rating**
State		**35,960**	**89.56%**	
Sacramento Valley & Northern California Region	Enloe Medical Center	315	90.48%	
	Mercy General Hospital	1,529	95.62%	
	Mercy Medical Center - Redding	386	98.96%	
	Mercy San Juan Hospital	218	96.79%	
	Redding Medical Center	30	90.00%	
	Rideout Memorial Hospital	296	98.99%	
	St. Joseph Hospital - Eureka	133	87.22%	
	Sutter Memorial Hospital	1,011	93.18%	
	UC Davis Medical Center	251	94.82%	
San Francisco Bay Area & San Jose	Alta Bates Summit Medical Center - Summit Campus	1,375	97.16%	
	California Pacific Medical Center - Pacific Campus	200	92.50%	
	Doctors Medical Center - San Pablo Campus	100	97.00%	
	Dominican Hospital	164	96.95%	
	El Camino Hospital	164	88.41%	
	Good Samaritan Hospital - San Jose	341	99.41%	
	John Muir Medical Center	152	87.50%	
	Kaiser Foundation Hospital (Geary San Francisco)	1,344	93.38%	
	Marin General Hospital	92	94.57%	
	Mt. Diablo Medical Center	365	87.95%	
	O'Connor Hospital	188	86.17%	
	Mills-Peninsula Health Center	121	91.74%	
	Queen of the Valley Hospital	297	96.63%	
	Salinas Valley Memorial Hospital	382	91.10%	
	San Jose Medical Center	75	70.67%	Low
	San Ramon Regional Medical Center	95	95.79%	
	Santa Clara Valley Medical Center	98	98.98%	
	Santa Rosa Memorial Hospital	178	91.01%	
	Sequoia Hospital	199	98.49%	
	Seton Medical Center	414	92.51%	
	St. Helena Hospital	287	86.06%	
	St. Mary's Medical Center, San Francisco	118	94.07%	
	Stanford University Hospital	217	91.71%	
	Sutter Medical Center of Santa Rosa	225	61.33%	Low

* Only includes first-time isolated CABG surgeries where the operative status was elective or urgent.
** Low rank: IMA Usage Rate for a hospital is less than 70.9%, i.e., two standard deviations (0.095 x 1.96) below the hospital statewide average IMA usage rate (89.56%).

Table 6: Hospital Results for Usage of the Internal Mammary Artery by Region, 2003-2004

Region	Hospital	Isolated CABG surgeries*	IMA Usage Rate	Rating**
State		**35,960**	**89.56%**	
San Francisco Bay Area & San Jose (continued)	UCSF Medical Center	247	89.88%	
	Washington Hospital - Fremont	261	92.34%	
Central California	Bakersfield Heart Hospital	332	93.67%	
	Bakersfield Memorial Hospital	453	89.85%	
	Community Medical Center - Fresno	388	90.46%	
	Dameron Hospital	111	81.08%	
	Doctors Medical Center - Modesto Campus	654	89.60%	
	Fresno Heart Hospital	239	95.82%	
	Kaweah Delta Hospital	644	94.88%	
	Marian Medical Center	196	93.37%	
	Memorial Medical Center of Modesto	496	72.98%	
	San Joaquin Community Hospital	191	90.58%	
	St. Agnes Medical Center	674	87.24%	
	St. Joseph's Medical Center of Stockton	439	86.79%	
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara	Antelope Valley Hospital Medical Center	81	76.54%	
	Community Memorial Hospital of San Buenaventura	302	99.67%	
	Encino Tarzana Regional Medical Center	205	93.17%	
	French Hospital Medical Center	113	92.92%	
	Glendale Adventist Medical Center - Wilson Terrace	250	97.20%	
	Glendale Memorial Hospital and Health Center	285	95.09%	
	Granada Hills Community Hospital	24	66.67%	Low
	Lancaster Community Hospital	31	54.84%	Low
	Los Robles Regional Medical Center	230	96.52%	
	Northridge Hospital Medical Center	157	98.09%	
	Providence Holy Cross Medical Center	161	93.79%	
	Providence St. Joseph Medical Center	147	95.92%	
	Santa Barbara Cottage Hospital	369	94.31%	
	Sierra Vista Regional Medical Center	163	98.16%	
	St. John's Regional Medical Center	301	98.34%	
	Valley Presbyterian Hospital	58	56.90%	Low

* Only includes first-time isolated CABG surgeries where the operative status was elective or urgent.
** Low rank: IMA Usage Rate for a hospital is less than 70.9%, i.e., two standard deviations (0.095 x 1.96) below the hospital statewide average IMA usage rate (89.56%).

Table 6: Hospital Results for Usage of the Internal Mammary Artery by Region, 2003-2004

Region	Hospital	Isolated CABG surgeries*	IMA Usage Rate	Rating**
State		**35,960**	**89.56%**	
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara (continued)	West Hills Regional Medical Center	80	100.00%	
Greater Los Angeles	Beverly Hospital	51	84.31%	
	Brotman Medical Center	55	98.18%	
	Cedars Sinai Medical Center	355	99.72%	
	Centinela Hospital Medical Center	176	89.20%	
	Citrus Valley Medical Center - IC Campus	277	79.42%	
	Downey Regional Medical Center	134	79.10%	
	Garfield Medical Center	186	81.72%	
	Good Samaritan Hospital - Los Angeles	462	83.98%	
	Huntington Memorial Hospital	258	87.21%	
	Kaiser Foundation Hospital (Sunset Los Angeles)	1,848	96.70%	
	Lakewood Regional Medical Center	240	90.83%	
	Little Company of Mary Hospital	148	95.95%	
	Long Beach Memorial Medical Center	581	90.88%	
	Los Angeles Co Harbor - UCLA Medical Center	234	90.17%	
	Los Angeles Co USC Medical Center	219	81.28%	
	Methodist Hospital of Southern California	199	88.44%	
	Presbyterian Intercommunity Hospital	148	58.78%	Low
	Santa Monica - UCLA Medical Center	58	96.55%	
	St. Francis Medical Center	159	78.62%	
	St. John's Hospital and Health Center	124	93.55%	
	St. Mary Medical Center	118	84.75%	
	St. Vincent Medical Center	335	96.72%	
	Torrance Memorial Medical Center	231	99.13%	
	UCLA Medical Center	165	98.79%	
	USC University Hospital	172	81.98%	
	White Memorial Medical Center	205	86.34%	
Inland Empire, Riverside & San Bernardino	Desert Regional Medical Center	282	98.23%	
	Eisenhower Memorial Hospital	372	94.89%	
	Loma Linda University Medical Center	543	90.06%	

* Only includes first-time isolated CABG surgeries where the operative status was elective or urgent.
** Low rank: IMA Usage Rate for a hospital is less than 70.9%, i.e., two standard deviations (0.095 x 1.96) below the hospital statewide average IMA usage rate (89.56%).

Table 6: Hospital Results for Usage of the Internal Mammary Artery by Region, 2003-2004

Region	Hospital	Isolated CABG surgeries*	IMA Usage Rate	Rating**
State		**35,960**	**89.56%**	
Inland Empire, Riverside & San Bernardino (continued	Pomona Valley Hospital Medical Center	253	93.28%	
	Riverside Community Hospital	390	89.23%	
	San Antonio Community Hospital	108	80.56%	
	St. Bernardine Medical Center	891	92.37%	
	St. Mary Regional Medical Center	389	88.69%	
Orange County	Anaheim Memorial Medical Center	434	87.10%	
	Fountain Valley Regional Hospital	237	83.54%	
	Hoag Memorial Hospital Presbyterian	383	84.07%	
	Irvine Regional Hospital and Medical Center	65	93.85%	
	Mission Hospital Regional Medical Center	354	99.44%	
	Saddleback Memorial Medical Center	212	97.17%	
	St. Joseph Hospital - Orange	286	98.60%	
	St. Jude Medical Center	339	61.36%	Low
	UC Irvine Medical Center	143	94.41%	
	West Anaheim Medical Center	48	70.83%	Low
	Western Medical Center - Santa Ana	198	90.91%	
	Western Medical Center Hospital - Anaheim	306	75.82%	
Greater San Diego	Alvarado Hospital Medical Center	169	96.45%	
	Palomar Medical Center	236	88.98%	
	Scripps Green Hospital	226	94.69%	
	Scripps Memorial Hospital - La Jolla	700	78.14%	
	Scripps Mercy Hospital	247	97.17%	
	Sharp Chula Vista Medical Center	399	74.69%	
	Sharp Grossmont Hospital	304	90.79%	
	Sharp Memorial Hospital	299	89.63%	
	Tri - City Medical Center	228	92.11%	
	UCSD Medical Center	58	100.00%	
	UCSD Medical Center - La Jolla	81	93.83%	
	UCSD Medical Center - La Jolla	81	93.83%	

* Only includes first-time isolated CABG surgeries where the operative status was elective or urgent.
** Low rank: IMA Usage Rate for a hospital is less than 70.9%, i.e., two standard deviations (0.095 x 1.96) below the hospital statewide average IMA usage rate (89.56%).

VII. THE RELATIONSHIP BETWEEN CORONARY ARTERY BYPASS GRAFT SURGERY VOLUME AND OUTCOMES

The "volume-outcome" association refers to the relationship between the quantity of care that a hospital or physician provides and the quality of care that patients receive. In general, researchers have found that the higher the number of patients a hospital or physician treats with a specific condition, the better, on average, are the patients' health outcomes. This volume-outcome relationship has been extensively studied for patients receiving coronary artery bypass graft (CABG) surgery. While most studies have found that hospitals and surgeons performing more CABG surgeries have better outcomes, more recent data and analyses are less consistent in their support of a clinically relevant relationship.[14,15,16] Further, in the previous CCORP report (February 2006), no relationship was found between hospital CABG surgery volume and risk-adjusted CABG surgery mortality.[17] This is possibly because CABG surgery mortality has declined overall in recent years and the procedure has become more standardized based on practice guidelines.

CCORP 2003-2004 Provider Volume-Outcome Analyses

The following analyses were conducted to examine the hospital and surgeon volume-outcome relationship in CABG surgery using the combined CCORP data from 2003 and 2004. The primary goal of these analyses is to use the most current methodological techniques to determine whether hospitals and surgeons performing more procedures have lower risk-adjusted operative mortality than hospitals and surgeons performing fewer procedures in California.

To accomplish this, a patient-level risk-adjusted mortality prediction model was first developed using a hierarchical or multi-level technique. Hierarchical models are increasingly used in health services research to analyze multi-level data, particularly when analyses are intended to assess the impact of hospital's or surgeon's CABG volume on patient-level outcomes. All of the independent variables included in the patient-level risk adjustment model were included in the hospital and surgeon analyses.

Two definitions of volume were considered for both the hospital and surgeon volume-outcome analyses. First, "isolated CABG volume" was analyzed to assess whether there was an association between isolated CABG volume and isolated CABG mortality. Second, "total CABG volume," which includes both isolated and non-isolated CABG surgeries, was analyzed to assess whether there was an association between total CABG volume and isolated CABG mortality.

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[14] Peterson ED, Coombs LP, DeLong ER, Haan CK, Ferguson TB. Procedural volume as a marker of quality for CABG surgery. JAMA 2004;291(2):195-201.

[15] Shahian DM, Normand SL, Torchiana DF, Lewis SM, Pastore JO, Kuntz RE, et al. Cardiac surgery report cards: comprehensive review and statistical critique. Ann Thorac Surg 2001;72(6):2155-68.

[16] Glance LG, Dick AW, Mukamel DB, Osler TM. Is the hospital volume-mortality relationship in coronary artery bypass surgery the same for low-risk versus high-risk patients? Ann Thorac Surg 2003;76(4):1155-62.

[17] Parker JP, Li Z, Danielsen B, Marcin J, Dai J, Mahendra G, Steimle AE. ***The California Report on Coronary Artery Bypass Graft Surgery 2003 Hospital Data,*** Sacramento, CA: California Office of Statewide Health Planning and Development, February 2006.

Annualized hospital and surgical volumes were used in these analyses since not every hospital and surgeon conducted CABG procedures during 2003 and 2004. If CABG surgeries were performed in both 2003 and 2004, the two-year average was considered the annualized volume. If CABG surgeries were performed in only one of the two years, the single year's volume was considered the annualized volume.

The first analyses evaluated whether a linear relationship existed between hospital and surgeon CABG volume and mortality. In these analyses, annualized hospital and surgeon volumes (both isolated and total volume) were separately included as continuous independent variables in the hierarchical logistic regression models. Second, to evaluate whether different threshold volumes or volume categories were associated with higher or lower mortality, hospitals and surgeons were grouped into volume categories depending on their annualized number of isolated and total CABG procedures. Then, these hospital and surgeon volume categories were included as indicator variables in separate analyses.

Results

Hospital Volume-Outcome Relationship: The 2003-2004 CCORP CABG database contains detailed patient-level clinical data on 40,377 isolated CABG surgery procedures in 121 hospitals. The average annualized hospital isolated CABG surgery volume was 167 cases, with a range among individual hospitals of 18 to 984. The overall operative mortality rate was 3.08%, and the average annualized hospital operative mortality rate was 3.37%, with a range among individual hospitals of 0% to 12.73%.

In the hierarchical model, when hospital isolated CABG volume was entered into the analysis as a continuous variable, there was no association with risk-adjusted operative mortality (coefficient = -0.006, standard error = 0.025, p-value = 0.808, OR = 0.994, and 95% confidence interval = 0.947-1.043 for every additional 100 patients). Similarly, when hospital total CABG volume was entered into the analysis as a continuous variable, there was no association with risk-adjusted operative mortality (coefficient = -0.008, standard error = 0.020, p-value = 0.704, OR = 0.992, and 95% confidence interval = 0.954-1.031 for every additional 100 patients).

Table 7 presents the summary statistics when annualized hospital isolated CABG volume was categorized into quartiles (<200, 200-299, 300-599, >=600) and dichotomized (>=450 and <450; >=250 and <250; and >=100 and <100). The quartiles were chosen because these volumes were used in the previous California volume-outcome reports. The split point of 450 procedures per year was chosen because of the past volume recommendations by The Leapfrog Group (www.leapfroggroup.org), and the split point of 100 was chosen because of the past volume recommendations by the American College of Cardiology and the American Heart Association (ACC/AHA Practical Guidelines). These data show that patients have a similar risk of dying from a CABG procedure regardless of the hospital's annual volume.

Table 7: Hospital Isolated CABG Volume Groups and Predicted Mortality Outcomes, 2003-2004

Volume Group	Hospitals (n=121) N (%)	Patients (n=40,377) N (%)	OR (95% CI)
>=600	4 (3)	6,538 (16)	0.998 (0.680, 1.466)
300-599	8 (7)	6,379 (16)	1.084 (0.804, 1.458)
200-299	17 (14)	7,920 (20)	0.925 (0.731, 1.172)
<200	92 (76)	19,540 (48)	Reference
>=450	6 (5)	8,687 (22)	0.990 (0.725, 1.353)
<450	115 (95)	31,690 (78)	Reference
>=250	15 (12)	14,552 (36)	1.132 (0.910, 1.408)
<250	106 (88)	25,825 (64)	Reference
>=100	91 (75)	35,474 (88)	0.941 (0.755, 1.173)
<100	30 (25)	4,903 (12)	Reference

Table 8 presents the summary statistics when annualized hospital total CABG volume was categorized into quartiles (<200, 200-299, 300-599, >=600) and dichotomized (>=450 and <450; >=250 and <250; and >=100 and <100). These data also show that patients have a similar risk of dying from a CABG procedure regardless of the hospital's total CABG surgery annual volume.

Table 8: Hospital Total CABG Volume Groups and Predicted Mortality Outcomes, 2003-2004

Volume Group	Hospitals (n=121) N (%)	Patients (n=40,377) N (%)	OR (95% CI)
>=600	5 (4)	7,652 (19)	1.005 (0.714, 1.413)
300-599	12 (10)	7,776 (19)	1.011 (0.783, 1.305)
200-299	22 (18)	8,855 (22)	0.801 (0.639, 1.003)
<200	82 (68)	16,094 (40)	Reference
>=450	8 (7)	10,186 (25)	1.051 (0.797, 1.387)
<450	113 (93)	30,191 (75)	Reference
>=250	26 (21)	19,465 (48)	0.992 (0.820, 1.200)
<250	95 (79)	20,912 (52)	Reference
>=100	91 (75)	37,301 (92)	0.919 (0.711, 1.188)
<100	30 (25)	3,076 (8)	Reference

Surgeon Volume-Outcome Relationship: During 2003 and 2004, 40,377 isolated CABG surgery procedures were conducted by 302 surgeons. The average annualized number of CABG surgeries conducted by surgeons was 69, with a range among individual surgeons of 1 to 345. The overall operative mortality rate was 3.08%, and the average annualized surgeon operative mortality rate was 3.59%, with a range among individual surgeons of 0% to 66.67%.

When surgeon isolated CABG volume was entered into the hierarchical model as a continuous variable, there was no association with risk-adjusted operative mortality (coefficient = -0.052, standard error = 0.040, p-value = 0.138, OR = 0.950, and 95% confidence interval = 0.879-1.027 for every additional 50 patients). When surgeon total CABG volume was entered into the model as a continuous variable, a trend of higher volume and lower risk-adjusted operative mortality resulted but was not statistically significant (coefficient = -0.053, standard error = 0.030, p value = 0.073, OR = 0.948, and 95% confidence interval = 0.895-1.005 for every additional 50 patients).

Table 9 presents the summary statistics when annualized surgeon isolated volume was categorized into quartiles (<25, 25-49, 50-99, >=100) and dichotomized (>=100 and <100; >=50 and <50; and >=25 and <25). The data show that patients have a similar risk of dying from a CABG procedure when operated on by surgeons with lower annual isolated CABG surgery volumes as compared to higher annual isolated CABG surgery volumes.

Table 9: Surgeon Isolated CABG Volume Groups and Predicted Mortality Outcomes, 2003-2004

Volume Group	Surgeons (n=302) N (%)	Patients (n=40,377) N (%)	OR (95% CI)
>=100	65 (22)	19,760 (49)	0.830 (0.552, 1.247)
50-99	105 (35)	15,017 (37)	0.932 (0.623, 1.393)
25-49	68 (23)	4,574 (11)	1.022 (0.664, 1.573)
<25	64 (21)	1,026 (3)	Reference
>=100	65 (22)	19,760 (49)	0.865 (0.726, 1.031)
<100	237 (78)	20,617 (51)	Reference
>=50	170 (56)	34,777 (86)	0.870 (0.711, 1.064)
<50	132 (44)	5,600 (14)	Reference
>=25	238 (79)	39,351 (97)	0.907 (0.613, 1.342)
<25	64 (21)	1,026 (3)	Reference

Table 10 presents the summary statistics when annualized surgeon total CABG volume was categorized into quintiles (<50, 50-99, 100-149, 150-199, >=200) and dichotomized (>=200 and <200; >=150 and <150; >=100 and <100; and >=50 and <50). The data suggest a modest association between higher surgeon total CABG volume and lower risk-adjusted isolated CABG surgery operative mortality. Only one of these analyses demonstrated a statistically significant association, where patients receiving isolated CABG surgery by surgeons conducting more than 100 CABG surgeries per year had lower odds of operative mortality (OR=0.817, 95% CI: 0.693-0.964, p=0.017).

Table 10: Surgeon Total CABG Volume Groups and Predicted Mortality Outcomes, 2003-2004

Volume Group	Surgeons (n=302) N (%)	Patients (n=40,377) N (%)	OR (95% CI)
>=200	19 (6)	8,237 (20)	0.794 (0.567, 1.093)
150-199	22 (7)	6,126 (15)	0.799 (0.580, 1.101)
100-149	58 (19)	11,187 (28)	0.780 (0.599, 1.015)
50-99	93 (31)	10.995 (27)	0.948 (0.738, 1.219)
<50	110 (36)	3,832 (9)	Reference
>=200	19 (6)	8,237 (20)	0.899 (0.691, 1.170)
<200	283 (94)	32,140 (80)	Reference
>=150	41 (14)	14,363 (36)	0.888 (0.728, 1.084)
<150	261 (86)	26,014 (64)	Reference
>=100	99 (33)	25,550 (63)	0.817 (0.693, 0.964)
<100	203 (67)	14,827 (37)	Reference
>=50	192 (64)	36,545 (91)	0.849 (0.676, 1.066)
<50	110 (36)	3,832 (9)	Reference

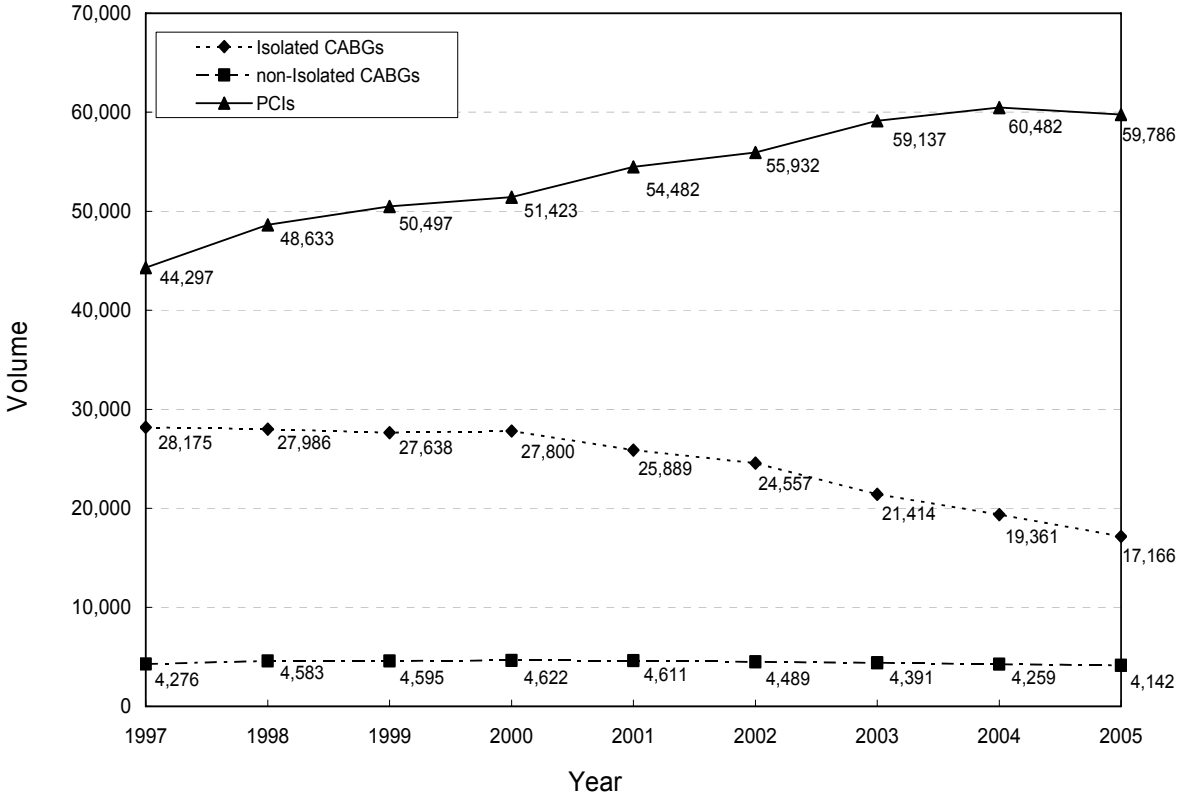
Utilization of Cardiac Intervention Procedures

Isolated CABG volume has declined in recent years while Percutaneous Coronary Intervention (PCI) volume has increased. Nationally, the rate of coronary stent insertion increased by 147% from 1996 to 2000—from 66 per 100,000 cardiac procedures in 1996 to 163 per 100,000 in 2000.[18] As shown in Figure 3, utilization of PCIs in California has grown from 44,297 procedures in 1997 to 59,786 procedures in 2005—an increase of 35%. Meanwhile the number of isolated CABG surgeries has dropped from 28,175 to 17,166—a decrease of 39%. However, non-isolated CABG surgery volume has remained constant at roughly 4,200 cases per year.

Medical innovations such as the CABG procedure, Percutaneous Transluminal Coronary Angioplasty (PTCA), and intra-coronary stents perfected during the past 30 years have contributed to improved survival for heart attack patients. The introduction of the intra-coronary stent insertion procedure (small wire cylinders that hold a narrow artery open) in clogged arteries is rapidly replacing angioplasty without stents because of lower rates of re-narrowing of opened arteries (restenosis) associated with intracoronary stents. New technologies and improved adjunctive medical therapy are making PCI a viable alternative to CABG. The advantages associated with PCI have been widely noted: PCI involves a shorter hospital stay, is suitable for most patients, and can be repeated and performed without anesthesia by a cardiologist or surgeon. On the other hand, the CABG surgery has lower rates of repeat revascularization, less overall angina, and lower long-term mortality. A more comprehensive approach to examining the quality of revascularization procedures in California would include PCI and its outcomes.

[18] Bernstein AB, Hing E, Moss AJ, Allen KF, Siller AB, Tiggle RB. *Health Care in America: Trends in Utilization,* Hyattesville, Maryland; National Center for Health Statistics, 2003.

Figure 3: California Isolated CABG, Non-Isolated CABG, PCI Volume, 1997-2005



APPENDIX A: CLINICAL DEFINITION OF ISOLATED CABG FOR 2003-2004

Definition/Description:
When any of the procedures listed in Section A is performed concurrently with the coronary artery bypass surgery, the surgery will be considered non-isolated and the data element coded "No." It is not possible to list all procedures because cases can be complex and clinical definitions are not always precise. When in doubt, the data abstractor should first seek an opinion from the responsible surgeon and then consult CCORP.

Section A (Excluded):

- Any aortic aneurysm repair (abdominal or thoracic)
- Aorta-iliac-femoral bypass
- Aorta-renal bypass
- Aorta-subclavian-carotid bypass
- Caval-pulmonary artery anastomosis
- Coronary artery fistula
- Endarterectomy of aorta
- Excision of aneurysm of heart
- Extracranial-intracranial (EC-IC) vascular bypass
- Head and neck, intracranial endarterectomy
- Heart transplantation
- Implantation of cardiomyostimulation system (Note: Refers to cardiomyoplasty systems only, not other heart-assist systems such as pacemakers or internal cardiac defibrillators (ICDs))
- Mastectomy for breast cancer (not simple breast biopsy)
- Full surgical Maze procedures. Requires that the left atrium be opened to create the "maze" with incisions. Does not include "mini" Maze procedures limited to pulmonary vein isolation and/or amputation of the left atrial appendage.
- Operations on structures adjacent to heart valves (papillary muscle, chordae tendineae, traebeculae carneae cordis, annuloplasty, infundibulectomy)
- Other open heart surgeries, such as aortic arch repair, pulmonary endarterectomy
- Repair of atrial and ventricular septa, excluding closure of patent foramen ovale
- Repair of certain congenital cardiac anomalies, excluding closure of patent foramen ovale (e.g., tetralogy of fallot, atrial septal defect (ASD), ventricular septal defect (VSD), valvular abnormality)
- Resection of a lobe or segment of the lung (e.g., lobectomy or segmental resection of lung). Does not include simple biopsy of lung nodule in which surrounding lung is not resected, biopsy of a thoracic lymph node, or excision or stapling of an emphysematous bleb.
- Thoracic endarterectomy (endarterectomy on an artery outside the heart)
- Amputation of any extremity (e.g., foot or toe)
- Valve repairs or replacements
- Ventriculectomy

If a procedure listed in Section B is performed concurrently with the coronary artery bypass surgery, the surgery will be considered an isolated CABG and the data element coded "Yes," unless a procedure listed in Section A is performed during the same surgery. These particular

procedures are listed because the Office has received frequent questions regarding their coding.

Section B (Included):

- Coronary endarterectomy
- Internal cardiac defibrillators (ICDs)
- Fem-fem cardiopulmonary bypass (a form of cardiopulmonary bypass that should not be confused with aortofemoral bypass surgery listed in Section A)
- Pacemakers
- Pericardiectomy and excision of lesions of heart
- Repair/restoration of the heart or pericardium
- Transmyocardial laser revascularization (TMR)
- Thymectomy
- Thyroidectomy

APPENDIX B: CCORP DATA ELEMENT DEFINITIONS

Data Element	Definition
Facility Identification Number	The six-digit facility identification number assigned by the Office of Statewide Health Planning and Development.
Isolated CABG: Yes; No.	Answer 'No' if any of the procedures listed below were performed during coronary artery bypass graft surgery. *(See Appendix A for full definition)*
Responsible Surgeon Name (3 separate fields): Surgeon Last Name; Surgeon First Name; Surgeon Middle Initial	Responsible surgeon means the principle surgeon who performs a coronary artery bypass procedure. If a trainee performs this procedure, then the responsible surgeon is the physician responsible for supervising this procedure performed by the trainee. In situations in which a responsible surgeon cannot otherwise be determined, the responsible surgeon is the surgeon who bills for the coronary artery bypass procedure.
Responsible Surgeon CA License Number	California physician license number of responsible surgeon, assigned by the Medical Board of California of the Department of Consumer Affairs.
Medical Record Number	Patient medical record number at the hospital where surgery occurred.
Date of Birth: mm/dd/yyyy	Patient date of birth.
Date of Surgery: mm/dd/yyyy	Patient date of surgery for the CABG procedure.
Date of Discharge: mm/dd/yyyy	Patient date of discharge.
Discharge Status: Alive; Dead.	Patient status upon discharge from the hospitalization in which surgery occurred.
Date of Death: mm/dd/yyyy	Patient date of death.
Race: Caucasian; Black; Hispanic; Asian; Native American; Other.	Patient race or ethnicity.
Gender: Male; Female.	Patient gender.
Patient Age (calculated)	Patient age in years, at time of surgery. This should be calculated from the Date of Birth and

Data Element	Definition
	the Date of Surgery, according to convention used in the USA (the number of birth date anniversaries reached by the date of surgery).
Height: Real number 3.2 digits (e.g., 999.99)	Height of the patient in centimeters. Valid values are between 20 and 251 cm.
Weight: Real number 3.2 digits (e.g., 999.99)	Weight of the patient in kilograms. Valid values are between 10 and 250 kg.
Status of the Procedure: Emergent/Salvage; Emergent; Urgent; Elective.	The status that best describes the clinical status of the patient at the time of surgery. **Emergent/Salvage:** The patient is undergoing cardiopulmonary resuscitation en route to the operating room or prior to anesthesia induction. **Emergent:** The patient's clinical status includes any of the following: a. Ischemic dysfunction (any of the following): (A) Ongoing ischemia including rest angina despite maximal medical therapy (medical and/or intra-aortic balloon pump (IABP)); (B) Acute Evolving Myocardial Infarction within 24 hours before surgery; or (C) pulmonary edema requiring intubation. b. Mechanical dysfunction (either of the following): (A) shock with circulatory support; or (B) shock without circulatory support. **Urgent:** ALL of the following conditions are met: a. Not elective status b. Not emergent status c. Procedure required during same hospitalization in order to minimize chance of further clinical deterioration. d. Worsening, sudden chest pain; congestive heart failure (CHF); acute myocardial infarction (AMI); coronary anatomy; (IABP); unstable angina (USA) with intravenous (IV) nitroglycerin; rest angina, valve dysfunction; or aortic dissection. **Elective:** The patient's status has been stable in the days or weeks prior to the operation. The procedure could be deferred without increased risk of compromised cardiac outcome.
Last Creatinine Level Preop (mg/dl): Real number 2.1 digits (e.g., 99.9)	The most recent creatinine level prior to surgery. A creatinine level should be collected on all patients for consistency, even if they have no prior history. Valid values are between 0.1 and 30 mg/dl.
Dialysis: Yes; No.	The patient is on dialysis preoperatively.
Diabetes: Yes; No.	The patient has a history of diabetes, regardless

Data Element	Definition
	of duration of disease or need for anti-diabetic agents.
Peripheral Vascular Disease: Yes; No.	The patient has a history at any time prior to surgery of Peripheral Vascular Disease, as indicated by claudication either with exertion or rest; amputation for arterial insufficiency; aorto-iliac occlusive disease reconstruction; peripheral vascular bypass surgery, angioplasty, or stent; documented abdominal aortic aneurysm (AAA), AAA repair, or stent; positive non-invasive testing documented. Excludes Cerebrovascular Disease.
Cerebrovascular Disease: Yes; No.	The patient has a history at any time prior to surgery of Cerebrovascular Disease, documented by any one of the following: unresponsive coma > 24 hours; cerebrovascular accident (CVA) (symptoms > 72 hours after onset); reversible ischemic neurological deficit (RIND) (recovery within 72 hours of onset); transient ischemic attack (TIA) (recovery within 24 hours of onset); non-invasive carotid test with > 75% occlusion; or prior carotid surgery.
Cerebrovascular Accident: Yes; No.	The patient has a history, at any time prior to surgery, of a central neurologic deficit persisting more than 72 hours. (i.e., extremity weakness or loss of motion, loss of consciousness, loss of speech, field cuts). Chart documentation of a prior diagnosis of CVA or stroke is sufficient.
Cerebrovascular Accident Timing: Recent (<=2 weeks); Remote (>2 weeks).	Events occurring within two weeks of the surgical procedure are considered recent; all others are considered remote.
Chronic Lung Disease: No; Mild; Moderate; Severe.	Specify if the patient has chronic lung disease and the severity level according to the following classification: **No**: No chronic lung disease present. **Mild**: Forced expiratory volume in one second (FEV1) 60% to 75% of predicted, and/or on chronic inhaled or oral bronchodilator therapy. **Moderate**: FEV1 50-59% of predicted, and/or on chronic steroid therapy aimed at lung disease. **Severe**: FEV1 <50% predicted, and/or room air partial pressure of oxygen (pO2) < 60 or room air partial pressure of carbon dioxide (pCO2) > 50.
Hypertension: Yes; No.	The patient has a diagnosis of hypertension, documented by one of the following: a.

Data Element	Definition
	Documented history of hypertension diagnosed and treated with medication, diet and/or exercise. b. Blood pressure > 140 systolic or > 90 diastolic on at least 2 occasions. c. Currently on antihypertensive medication.
Immunosuppressive Treatment: Yes; No.	Patient has used any form of immunosuppressive therapy (i.e., systemic steroid therapy) within 30 days preceding the operative procedure. Does not include topical applications and inhalers.
Hepatic Failure: Yes; No.	The patient has cirrhosis, hepatic failure, acute hepatitis or "shock liver" and has a bilirubin greater than 2 mg/dl and a serum albumin less than 3.5 grams/dl.
Arrhythmia: Yes; No.	A preoperative arrhythmia present within two weeks of the procedure, by clinical documentation of any one of the following: Atrial fibrillation/flutter requiring medication; Heart block; Sustained Ventricular Tachycardia; or Ventricular Fibrillation requiring cardioversion and/or intravenous amiodarone.
Arrhythmia Type: Sust VT/VF; Heart Block; AFib/Flutter.	The type of arrhythmia is present within two weeks of the procedure is: Sustained Ventricular Tachycardia or Ventricular Fibrillation requiring cardioversion and/or intravenous amiodarone; Heart Block; and Atrial fibrillation/flutter requiring medication.
Myocardial Infarction: Yes; No.	Refers to any myocardial infarction (MI) in the past. **For MIs prior to the current hospitalization** for which detailed records are not available, chart documentation in which a clinician caring for the patient diagnosed an MI is sufficient. **For MIs during the current hospitalization** for which detailed records are available, conditions A and B below must all be met: A) The patient must have been diagnosed with a myocardial infarction (ST elevation or non ST elevation) by a clinician caring for patient. B) At least 1 of the 3 following biochemical indicators for detecting myocardial necrosis must be present: 1) Troponin T or I: a. Maximal concentration of troponin T or I exceeding the MI diagnostic limit (99th percentile of the values for

Data Element	Definition
	a reference control group, as defined in section C) on at least one occasion during the first 24 hours after the index clinical event. 2) CK-MB: a. Maximal value of CK-MB more than two times the upper limit of normal on at least one occasion during the first 24 hours after the index clinical event. b. Maximal value of CK-MB, preferable CK-MB mass, exceeding 99th percentile of the values for a reference control group, as defined in section C, on two successive samples during the first 24 hours after the index clinical event. 3) Total CK: a. In the absence of availability of a troponin or CK-MB assay, total CK more than two times the upper limit of normal (99th percentile of the values for a reference control group, as defined in *), or the B fraction of CK may be employed, but these last two biomarkers are considerably less satisfactory than CK-MB. * Reference control values (MI diagnostic limit and upper limit of normal): 1) Reference values must be determined in each laboratory by studies using specific assays with appropriate quality control, as reported in peer-reviewed journals. Acceptable imprecision (coefficient of variation) at the 99th percentile for each assay should be defined as less than or equal to 10 percent. Each individual laboratory should confirm the range of reference values in their specific setting.
Myocardial Infarction Timing: <=6 Hrs; >6 Hrs but <24 Hrs; 1 to 7 Days; 8 to 21 Days; >21 Days.	Time period between the last documented myocardial infarction and the CABG surgery.
Cardiogenic Shock: Yes; No.	The patient, at the time of procedure, is in a clinical state of hypoperfusion according to either of the following criteria: 1. Systolic blood pressure (BP) < 80 mm hg and/or Cardiac Index (CI) < 1.8 despite maximal treatment. 2. Intravenous inotropes and/or intra-aortic balloon pump (IABP) necessary to maintain Systolic BP > 80 mm hg and/or CI > 1.8.
Angina: Yes; No.	The patient has ever had angina pectoris.
Angina Type: Stable; Unstable.	The type of angina present within 24 hours prior to CABG surgery is: Stable: Angina not meeting unstable criteria below. Unstable: Requires continuous hospitalization from the episode until surgery and one of the following: 1) Angina at

Data Element	Definition
	rest. 2) New onset angina in past 2 months of at least Canadian Cardiovascular Society (CCS) Class III. 3) Increasing angina in past 2 months - angina that has become more frequent, longer in duration, or lower in threshold; and increased by greater than or equal to 1 CCS class to at least CCS Class III severity.
CCS Classification: No Angina = Class 0; Class I; Class II; Class III; Class IV.	Canadian Cardiovascular Society (CCS) Classification. This classification represents level of functional status related to frequency and intensity of angina. The CCS may not be the same as the NYHA classification for the same evaluation time period. Code the highest class leading to episode of hospitalization and/or intervention: **0**=No angina. **I=** Ordinary physical activity, such as walking or climbing the stairs does not cause angina. Angina may occur with strenuous, rapid or prolonged exertion at work or recreation. **II=** There is a slight limitation of ordinary activity. Angina may occur with moderate activity such as walking or climbing stairs rapidly, walking uphill, walking or stair climbing after meals or in the cold, in the wind, or under emotional stress, or walking more than two blocks on the level, and climbing more than one flight of stairs at normal pace under normal conditions. **III=** There is marked limitation of ordinary physical activity. Angina may occur after walking one or two blocks on the level or climbing one flight of stairs under normal conditions at a normal pace. **IV=** There is inability to carry on any physical activity without discomfort; angina may be present at rest.
Congestive Heart Failure: Yes; No.	The patient has symptoms that occurred within 2 weeks prior to surgery. This does not include patients with chronic or stable non-symptomatic compensated congestive heart failure (CHF). The patient has one or more of the following: Paroxysmal nocturnal dyspnea (PND), Dyspnea on exertion (DOE) due to heart failure, Chest X-Ray (CXR) showing pulmonary congestion; and Pedal edema or dyspnea and receiving diuretics or digoxin.
NYHA Classification: Class I; Class II; Class III; Class IV.	New York Heart Association (NYHA) Classification represents the overall functional

Data Element	Definition
	status of the patient in relationship to both congestive heart failure and angina. The NYHA may not be the same as the CCS classification for the same evaluation period. Code the highest level leading to episode of hospitalization and/or procedure: **I=** Patients with cardiac disease but without resulting limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea, or anginal pain. **II=** Patients with cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitations, dyspnea, or anginal pain. **III=** Patients with cardiac disease resulting in marked limitation of physical activity. They are comfortable at rest. Less than ordinary physical activity results in fatigue, palpitations, dyspnea, or anginal pain. **IV=** Patients with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of cardiac insufficiency or of the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased.
Number of Prior Cardiac Operations Requiring Cardiopulmonary Bypass	Prior to this operation, the number of cardiac surgical operations performed on this patient utilizing cardiopulmonary bypass. Valid values are between 0 and 9.
Number of Prior Cardiac Operations Without Cardiopulmonary Bypass	Prior to this operation, the number of cardiac surgical operations performed on this patient without cardiopulmonary bypass. Valid values are between 0 and 9.
Prior PCI: Yes; No.	Percutaneous coronary intervention (PCI) was done at any time prior to this surgical procedure (which may include during the current admission). PCI includes percutaneous transluminal coronary angioplasty (PTCA), intracoronary fibrinolysis without PTCA, laser recanalization, stent implantation, rheolysis with angiojet, brachytherapy, and other catheter-based percutaneous recanalization techniques.
Interval from prior PCI to Surgery: <=6 Hrs; > 6 Hrs.	The time between prior percutaneous coronary intervention (PCI) and surgical repair of coronary occlusion:<=6 hours; > 6 hours.

Data Element	Definition
Ejection Fraction (%): Integer length 2	The percentage of blood emptied from the ventricle at the end of the contraction. Use the most recent determination prior to intervention. Enter a percentage in the range of 5-90.
Ejection Fraction Method: LV Gram; Radionucleotide; Estimate; ECHO.	Method of obtaining ejection fraction measurement information: **LV Gram:** Left Ventriculogram. **Radionucleotide:** MUGA Scan. **Estimate:** From other calculations, based upon available clinical data. **ECHO:** Echocardiogram.
Left Main Disease (% Stenosis): Integer length 3	Percentage of compromise of vessel diameter in any angiographic view. Valid values are between 0 and 100.
Number of Diseased Coronary Vessels: None; One; Two; Three.	The number of major coronary vessel systems (Left anterior descending (LAD) system, Circumflex system, and/or Right system) with >50% narrowing in any angiographic view. NOTE: Left main disease (>50%) is counted as TWO vessels (LAD and Circumflex). For example, left main and right coronary artery (RCA) would count as three total.
Mitral Insufficiency: None; Trivial; Mild; Moderate; Severe.	Indicate if there is evidence of mitral valve regurgitation and if so, the severity level.
Internal Mammary Artery(ies) Used as Grafts: Left IMA; Right IMA; Both IMAs; No IMA.	Internal Mammary Artery(ies) (IMA) used for grafts, if any.
Cardiopulmonary Bypass Used: Yes; No.	Use of Cardiopulmonary Bypass (CPB) at any time during the procedure.
Conversion to Cardiopulmonary Bypass: Yes; No.	The patient needed to be placed on cardiopulmonary bypass (CPB) after the off-pump procedure was attempted.
Primary Incision: Full Sternotomy; Partial Sternotomy; Transverse Sternotomy; Right Vertical Parasternal; Left Vertical Parasternal; Right Anterior Thoracotomy; Left Anterior Thoracotomy; Posterolateral Thoracotomy; Xiphoid; Epigastric; Subcostal.	The primary incision used as the initial intention for treatment.
Cardioplegia: Yes; No.	Cardioplegia was used.

APPENDIX C: HOSPITAL RESPONSES

Each of the hospitals included in the CCORP 2003-2004 report was provided with a preliminary report containing the risk-adjustment model and outcome results and allowed a 60-day review period for submitting statements to OSHPD. Letters were received from two hospitals and they are included in this appendix. The hospital comments have been summarized into the following categories:

1. Risk-adjustment methodology

Comment:

One hospital raised concerns regarding the methodology used for risk adjustment. The hospital listed cases where the death of the patient was attributed to the presence of end-stage lung disease, end-stage renal disease, and end-stage ischemic cardiomyopathy combined with congestive heart failure. According to the hospital, these patients did not die as a result of the CABG surgery.

Response:

The CCORP report uses a risk-adjustment methodology that takes into account the pre-operative risk factors reflecting severity of illness and risk of mortality for each patient. The presence of end-stage lung disease, renal disease, or congestive heart failure is captured by risk factors such as chronic lung disease, creatinine level, and congestive heart failure. Although not all possible risk factors can be included in the model, CCORP includes the risk factors that are included by STS and other similar programs. The CCORP risk model provides appropriate adjustments to hospitals that treat severely ill patients.

2. Operative mortality

Comment:

A hospital raised concerns about the CCORP definition of mortality. The author noted that this definition of mortality penalizes hospitals that do not transfer their CABG surgery patients to other facilities after 30 days. Patients who are transferred to another facility and expire after 30 days are not counted as deaths, whereas patients who are not transferred and expire after 30 days are counted as deaths.

Response:

CCORP uses operative mortality (patient death occurring in the hospital after CABG surgery, regardless of the length of stay or death occurring anywhere after hospital discharge, but within 30 days of the CABG surgery) as the outcome measure. Patient death is confirmed by linking CCORP data with the state death file provided by the California Department of Health Services. If a patient is transferred to another institution and dies there within 30 days after the surgery, the death is captured by this linkage. Using operative mortality helps avoid some potential "gaming" of outcomes through discharge practices though patients who are transferred 30 days after the operation and die in other facilities are not included in the mortality count. While

another measure could be used, CCORP decided to align its quality measure with the National Society for Thoracic Surgery (STS) which also uses operative mortality as their primary outcome measure for CABG quality reporting.

3. Consistency in coding

Comment:

Another concern was raised about the variation in coding of the risk factors, which can affect the validity of risk-adjusted results. Specifically, overstating the risk profiles of patients may provide an unfair advantage to some hospitals. In addition, the hospital mentioned that potentially difficult-to-measure risk factors not included in the current model may increase or decrease a patient's risk of an adverse outcome.

Response:

When this program first began, all hospital staff involved in abstracting surgical data were offered in-person instruction by the CCORP consulting cardiologist and training videos of these sessions were later distributed. Hospitals were also provided with a data abstractor's manual that clearly defines the data elements and the coding structure. For difficult to code elements, CCORP offers further information on the OSHPD Web site and refers unique cases to the consulting cardiologist. CCORP data for 2003 and 2004 were also subjected to medical chart review. The primary candidates for data audit were hospitals and surgeons identified as outliers on a preliminary basis, near outliers, or hospitals/surgeons with apparent over-reporting or under-reporting of risk factors. Audit data replaced the data submitted from the hospitals. The medical chart review, along with other analyses and data quality reports ensures the fairness of risk factor coding across hospitals. Information about the medical chart audit process is provided in Section III.

4. Combining years of data

Comment:

A hospital expressed concern about reporting separate results for individual years and combined years. The hospital believes caution should be used in interpretation of the mortality statistics.

Response:

CCORP reported hospital level data for 2003-2004 combined and 2004 separately in this report. The combined year data allows for direct comparison to the 2003-2004 surgeon level results. The two-year combined results are statistically more stable than the results from a single year of data, especially for lower volume hospitals. However, the 2004 data allows readers to see the most current performance and to observe any changes from the 2003 hospital level results previously reported.

5. Use of the Internal Mammary Artery (IMA)

Comment:

One hospital commented on the absence of consensus on what constitutes an unacceptably low level of IMA usage. However, the hospital does recognize the current endorsement, by groups like Leapfrog, National Quality Forum, Society for Thoracic Surgeons and programs like CCORP in regard to the importance of IMA usage for CABG surgeries. This hospital also stated that during the past 18 months IMA usage for CABG surgeries at their facility has significantly increased.

Response:

According to the STS, the internal mammary artery confers long-term graft patency and improves patient survival as compared to surgical revascularization with venous conduits alone. Despite these advantages there is great variability in its application. The main goal of public reporting of IMA usage rates is to encourage hospitals and surgeons to consider the IMA when appropriate. Absent clinical consensus on what constitutes an unacceptably low level of IMA usage, this report adopted a statistical one. CCORP encourages all hospitals and surgeons to make efforts to increase IMA usage rates.

The hospital letters received in response to this report follow.

St. Jude Medical Center
ST JOSEPH HEALTH SYSTEM

A Ministry of the Sisters of St. Joseph of Orange

August 29, 2006

Holly Hoegh, Ph.D.
Manager, Clinical Data Programs
Office of Statewide Health Planning and Development
818 K Street, Room 200
Sacramento, CA 95814

Dear Dr. Hoegh,

St. Jude Medical Center (SJMC) is one of Orange County's most respected hospitals, which ensures our patients receive superior care at every step, including expert physicians, advanced practice nurses, a state-of-the-art intensive care unit, and comprehensive rehabilitation programs.

St. Jude Medical Center appreciates the efforts of the California CABG Outcomes Reporting Program (CCORP) and the opportunity to respond with comment regarding the results of Internal Mammary Artery (IMA) usage in this most recent report.

As stated in the section of this year's CCORP report, Use of Internal Mammary Artery in CABG Surgery as a Process Measure of Quality, there is an "Absent consensus on what constitutes an unacceptably low level of IMA usage". However, St. Jude Medical Center recognizes the current endorsement of the California CABG Outcomes Reporting Program (CCORP), the Leapfrog Group, the National Quality Forum, and the Society of Thoracic Surgeons in regards to the importance of IMA usage for the CABG patient.

Appreciating that our facility's use of internal mammary artery use in CABG surgery could be higher and our commitment to continuous quality improvement, St. Jude Medical Center has implemented processes which detail the importance of considering IMA usage for patients undergoing CABG surgery. During the past 18 months, our facility's IMA usage for patients has significantly increased. Referring to the most recent Society of Thoracic Surgeons (STS) National Database Report - Spring 2006, our facility's IMA usage was 92.2% for 2005. In addition, review of more recent internal data shows that IMA usage for St. Jude Medical Center is 93.1% for January through June 2006.

St. Jude Medical Center is dedicated to continually improving the health and quality of life of people in the communities we serve through our core values of dignity, service, excellence and justice. We look forward to our continued participation in the California CABG Outcomes Reporting Program (CCORP).

Thank you for the opportunity to respond to the 2003-2004 California CABG Outcomes Reporting Program (CCORP) Report.

Best regards,

Doreen L. Dann
Executive Vice President and Chief Operating Officer

University of California
San Francisco
UCSF
Department of Surgery
Division of Cardiothoracic Surgery

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August 31, 2006

Holly Hoegh, Ph.D.
Manager, Clinical Data Programs
Office of Statewide Health Planning and Development
818 K Street, Room 200
Sacramento, CA 95814

Re: 2003-2004 California CABG Outcomes Reporting Program Report

Dear Ms. Hoegh,

The Division of Cardiothoracic Surgery at the University of California, San Francisco was one of the first groups to provide open-heart surgery in the state of California. The Division, along with the UCSF Medical Center are committed to providing excellence in all aspects of cardiovascular care. Surgery for coronary artery disease is no exception.

The UCSF Medical Center has participated in the state reporting of coronary artery surgery since 1999. As you know, only a minority of cardiac surgery practices reported on a voluntary basis at that time. In the 3 voluntary public reports issued by CCMRP from 1999 through 2002, UCSF consistently scored "as expected" for risk adjusted mortality in coronary artery surgery. In 2003, state law mandated public reporting of coronary artery surgery results for all centers providing this service. Again, in the 2003 public report, the UCSF Medical Center scored "as expected". The 2003-2004 California CABG Outcomes Reporting Program (CCORP) Preliminary Report will be made public shortly. In that report, the UCSF Medical Center along with one of its cardiac surgeons will be listed as "worst than expected" for risk adjusted coronary artery bypass graft mortality. We believe that this designation is not an accurate reflection of the excellence of care here at UCSF for the following reasons:

1. The CCORP risk stratification methodology cannot adequately capture the risk profile of some of our patients. This is exemplified by one patient at UCSF who underwent coronary bypass surgery who had end stage lung disease. This patient was on the waiting list for lung transplantation. The patient recovered uneventfully from his coronary bypass procedure and was discharged home. Unfortunately, the patient developed progression of his severe underlying lung disease and refused further care. He expired of complications related to his underlying end stage lung disease.

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A second patient underwent coronary artery bypass surgery with underlying end stage renal disease. This patient recovered uneventfully from the surgical operation and was discharged home. The patient subsequently died as a result of complications from hemodialysis, not from her cardiac disease.

A third patient who was admitted to the UCSF Medical Center with end stage ischemic cardiomyopathy and congestive heart failure. He was being considered for heart transplantation. After considerable discussion with our cardiovascular experts, coronary bypass surgery was recommended. The patient had a successful operation. However, he continued to have persistent severe heart failure postoperatively. He was placed on a ventricular assist device and was awaiting transplantation. The patient expired as a result of a stroke while on the ventricular assist device.

2. The CCORP reporting mechanism penalizes those hospitals that keep complicated coronary artery bypass patients within their institution for more than 30 days. Should these patients subsequently expire after 30 days, they are counted in the mortality statistics. However, if the patient is transferred to another facility at any point in time, the mortality is not noted under the CCORP Program. Again, UCSF has steadfastly maintained a dedication to uninterrupted care of heart surgery patients.

3. There are significant issues with the CCORP statistical methodology. Excerpts from a statement from the Society of Thoracic Surgeons national cardiac surgery data base report is appropriate here. "The validity of risk adjusted results relies on consistent and accurate coding of risk factors and surgical outcomes. In reality, there may be some variation in the way risk factors and outcomes are coded by two different participants. If one hospital tends to overstate the risk profiles of its patients while another hospital understates the risk profiles of its patients, the hospital that overstates the risk profiles will have an unfair advantage. To minimize bias, it is essential to pay close attention to it to data definitions when coding events and risk factors." Furthermore, the STS also states "not all risk factors are captured in the model. Risk adjustment attempts to level the playing field by adjusting for risk profiles of the participant's patient population. However, there are potentially difficult to measure factors that are not included in the risk assessment model which may increase or decrease a patients' risk of an adverse outcome. For this reason, two patients having exactly the same measured risk factors prior to surgery,

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might actually have substantially different real risk. If a participant tends to treat patients that are at greater or lower risks that they might appear based on the measured risk factors, this may bias their risk-adjusted results upward or downward." As you know, CCORP performed a data audit for the 2004 report. Forty hospitals were selected, including the University of California, San Francisco. The results of that audit revealed that 10.8 % of the categorical risk factors required correction. Moreover, 4.7 % of the categorical risk factors were over coded (risk factor coded more severely by hospital than by audited data) and 4.9% of categorical risk factors were under coded. Based on these statistical limitations, we believe that great caution should be used in the interpretation of mortality statistics.

4. We believe that the 2003-2004 California CABG Outcomes Reporting Program Report final report is also misleading in that it includes data from both 2003 and 2004. As mentioned previously, the 2003 CCORP published report for the UCSF Medical Center shows that we had an "as expected" designation for risk stratified CABG mortality. While our risk adjusted mortality for 2004 is "worse than expected", we feel that reporting our results for both years as "worse than expected" is not appropriate.

In summary, the Division of Cardiothoracic Surgery and Medical Center at the University of California, San Francisco, is dedicated to excellence in the care of patients with cardiovascular diseases, and we do not feel that the 2003-2004 CCORP report accurately reflects our practice here at UCSF. We would like to emphasize that the 2005 CCORP Hospital Data Summary Report for the UCSF Medical Center shows an unadjusted CABG mortality of 0.8%. In addition, for the first six months of 2006, the unadjusted operative mortality for CABG was 1.4%. We believe that these results along with our past-published CABG mortality reports are a more accurate reflection of the excellence in care at UCSF.

Sincerely,

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Additional copies of The California Report on Coronary Artery Bypass Graft Surgery can be obtained by contacting HIRC at (916) 322-2814 or HIRC@oshpd.ca.gov